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POLYGRAPH AS A SCIENTIFIC AID TO LAW ENFORCEMENT

By

Susan Dreiband

"High quality personnel, high training standards, and quality control of the polygraph product." These are the essential elements contributing to the U.S. Army Criminal Investigation Command's (USACIDC) successful use of the polygraph in law enforcement.

In a speech before members of the Amerian Polygraph Association (APA) during the Association's annual meeting in St. Louis, Missouri, 10 August, Maj. Gen. Paul M. Timmerberg, USACIDC Commander, outlined the reasons polygraph use has become an important method for verifying truth and detecting deception in Army law enforcement.

He complimented APA on its advocacy of high standards in polygraph education and training procedures and on the Association's efforts in providing for a valid and reliable scientific technique.

Major General Timmerberg is in charge of all Army criminal investigators. The command, USACIDC, is located in Falls Church, Virginia, and is often referred to by its more familiar acronym, CID, which originated during World War I.

"It is absolutely crucial that polygraph users employ every possible new technological improvement in coping with the criminal element. Over the years, CID has closely examined the capabilities of the polygraph, carefully employing it to satisfy the needs of the agents in the field," said Major General Timmerberg.

The CID has made a number of advances in developing sophisticated, state-of-the-art polygraph equipment over the last 30 years. Presently, USACIDC, in conjunction with other Army, Department of Defense, and Federal activities, has provided new technical evaluations of the polygraph to identify additional new requirements, in an effort to increase the quality of polygraph examinations. In order to achieve scientific excellence in polygraph use, the CID has put a tremendous emphasis and stringent requirements on the people trained to use the polygraph.

"The finest piece of polygraph equipment is virtually useless without properly trained people," said Major General Timmerberg. "Therefore, the Army CID has placed primary emphasis on the quality of the individuals accepted as polygraph examiners and the quality of instruction presented to them during the initial and refresher training," he said.

In order for a CID agent to qualify for admittance into the Army Polygraph School, the agent must be at least 25 years old, a graduate of an

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The author is a Public Information Specialist, U.S. Army CID Command. For copies of reprints, write Susan Dreiband, U.S. Army Criminal Investigation Command, 5611 Columbia Pike, Falls Church, Virginia 22041.

accredited four-year college, and have experience as an investigator in law enforcement. A background investigation is conducted on the applicant at which time the agent must be recognized as possessing high moral character and sound emotional temperament. The agent must also undergo a polygraph examination before beginning the 14 weeks of instruction at the Army Polygraph School.

The curriculum, which has undergone continuous evaluation and refinement since its inception in 1951, is all inclusive. Each student is required to satisfactorily exhibit proficiency and knowledge in polygraph theory, regulations, laws, and semantics. The student must master procedures for calibration and maintenance of the polygraph as well as the precise use of at least six different testing techniques for the evaluation of mental and physical fitness of subjects. Additionally, the student must be proficient in chart interpretation and in the conduct of hypothetical examinations.

Following completion of the Army Polygraph School, the agent becomes an "intern" and must conduct examinations for a duration of six months to one year under the direct monitorship of a certified polygraph examiner. At this time, and only upon successful completion of the internship, the individual is certified as a polygraph examiner.

The most recent innovation in Army USACIDC polygraph programs is the creation of a specialty field for polygraph examiners where the examiners' only duties are in polygraph. This type of specialized program creates a team of polygraph examiners who are highly skilled, knowledgeable professionals.

Through examination of the measures the USACIDC has implemented to enhance polygraph use, it has found that, ultimately, by increasing the length of time students spend at the Army Polygraph School, and by requiring an internship, better qualified polygraph examiners are being certified.

Major General Timmerberg stressed that although recruiting high quality personnel and giving them the best polygraph training available is vitally important to the polygraph program, quality control of the polygraph product is equally significant.

Research during 1965 and 1966 revealed that a polygraph examiner who is only reading and reviewing charts can interpret the charts of others with greater reliability than the examiner who was actually collecting the charts. This is because the review examiner is not subject to contamination by the examinee and will, therefore, not unconsciously read something into the charts which is not present.

The CID started its quality control program in 1966, and found it to be of such benefit that it now requires four polygraph examiners to analyze the charts of all examinations conducted worldwide. At the time of the review, the quality control officer does not know the results of the field examination.

As Major General Timmerberg noted, "When we started the polygraph quality control program in USACIDC it was to provide higher assurance that

we were making correct decisions — that we did not make determinations that truthful people were lying, or that liars were telling the truth.

We found, during the initial stages of quality control that we had another problem. Some of our early examiners had inconclusive results, too frequently. These examiners were not adhering to the standards of testing taught at the Army Polygraph School, but were searching for new procedures. Some were using test designs that had never been confirmed as reliable. They were changing the phraseology of questions, wherein the meaning of the questions may have been perceived differently than intended. To cure this ill, we took a conservative approach. All examiners were required to adhere to standards that had been positively accepted as valid."

Although the Army teaches most of the techniques taught at other polygraph schools, examiners are no longer allowed to mix techniques, or to change standards within techniques.

Flexibility in polygraph application is still encouraged. However, now when a new procedure is presented it is thoroughly, scientifically, and systematically researched. If it is found to result in more accurate and reliable tests, it is incorporated as part of an already existing technique or developed as a separate and innovative testing procedure or standard.

Implementation of quality control has become vital and integral to the CID polygraph program. This is especially evidence when polygraph is used in the resolution of inconclusive results and in the adherence of examiners to prescribed standards.

Polygraph's use in exculpation has increased greatly in recent years. Because many individuals volunteer to be examined on polygraph, cases are easier to deal with — prove or disprove — to absolve innocent suspects and identify the not-so-innocent, where physical evidence points in another direction.

"A review of our examination statistics reassures me that we are asking ourselves the right questions and we are doing the right things," said Major General Timmerberg.

The Army's substantive statistics reveal that: (1) the number of examinations and the overall use of the polygraph have increased steadily each year and is now being used in 18 percent of the Army's criminal investigations: an increase of 4 percent in 1978 over 1977, 12 percent over 1974, and 15 percent over 1964; (2) confirmed examinations have increased 7 percent during 1977-78, 15 percent over 1974, and 20 percent over 1964; (3) inconclusive determinations have dropped from 8 percent in 1964 to less than 1 percent in 1978; (4) polygraph examiners have recovered a substantial amount of money and property for the Government as a result of confessions they have obtained; (5) examiners have regularly established the innocence of numerous persons who were falsely suspected or accused in crimes, and; (6) the Army CID polygraph examiner has assisted materially in raising the overall case-solve-rate in approximately 10 percent of felony investigations.

"Although we have made great strides, we in the Army feel that we must continue to improve our procedures," said Major General Timmerberg.

Commenting on current improvements, he said, "We are now examining the concept of having polygraph rooms that are, in essence, sterile. They are being designed to make it easier for the examiner and the examinee to establish rapport, and to preclude external influence or distractions. We are confident that these measures — our efforts to produce a more sophisticated instrument, and our quality control procedures — will further improve the favorable results that have been previously achieved."

In his speech, Major General Timmerberg also reflected on the time when he first entered law enforcement, 30 years ago (the year the Army sent its first group of students to polygraph school — Keeler's School in Chicago, Ill.). That was "when motorcycles were equipped with radios which would receive but would not transmit and only some patrol cars had radios; and when radar for traffic enforcement was unheard of and calibration of speedometers for traffic vehicles was only required when the vehicle was first put into service.

"At that time," said Major General Timmerberg, "criminal investigators were perceived as interrogation specialists who solved their crimes through use of informants and skillful interrogations. The only technical knowledge required of these investigators was that they know how to lift fingerprints, use plaster of paris, draw sketches, and photograph crime scenes."

Actually, the Army was slow in incorporating polygraph use as an aid in criminal investigations. The three-channel polygraph was developed by Mr. Keeler in 1926, but the Army's first major use of the device was not until World War II.

One of the first cases where polygraph was used in the Army CID involved the larceny of the well-known Hess Crown Jewels (The Kronenberg Castle Case) in Germany. Mr. Keeler conducted the examinations for the Army in that case and the charts collected by him are still kept. Their quality is excellent.

"I have found that the essential elements for valid polygraph examinations are that examiners be ethical, be properly educated and trained, and be knowledgeable about the cases in which they are to conduct the examination," said Major General Timmerberg.

"The examiner must also be a skilled interrogator and must use accepted and validated standards during the conduct of the test. Following this," he said, "quality control of the charts and procedures by a review examiner is imperative."

* * * * * *

POLYGRAPH SCREENING OF POLICE APPLICANTS

NECESSITY OR ABUSE?

By

Richard L. Putnam

Law enforcement administrators feel strongly that high standards of character and conduct must be required of applicants for employment by their agencies; as a result, many such administrators use polygraph screening examinations as a part of the applicant selection process. In contrast, a small but vocal group of public officials, both elected and appointed, feel that the use of polygraph in this role is abusive, if not a violation of the privacy and rights of the applicant.

Polygraph screening determines the willingness of the applicant to be truthful about his background; this tends to indicate the degree of honesty which can be expected of the applicant should he be hired. It is a valuable adjunct to background investigation procedures; information not available from records or interview of associates can be, and frequently is, obtained. In light of the high mobility which exists in our society today, polygraph screening is also cost effective, developing information which otherwise could only be obtained through more extensive, and therefore more costly investigation.

The reputation and conduct of any employee of a law enforcement agency reflects not only upon the individual but the agency as well, and is quick to come to public attention. A law enforcement agency depends upon the cooperation of the public and public support to execute its responsibilities. The acts of any individual employed by a law enforcement agency will reflect upon that agency, lessening public respect, and subsequently limiting that agency's ability to serve effectively.

The polygraph screening of police applicants must explore many aspects of the individual's past in great detail because of the nature of the employment. Although it could be argued that such broad criteria is an unwarranted invasion of privacy and would have a disparate impact upon some applicants, it can also be argued that the information developed through polygraph screening is job related, and therefore a valid consideration for employment. It is, in fact, a qualification for employment. Affirmative action programs have been interpreted as not requiring the hiring of the unqualified.

The author is a sworn deputy of the Washoe County Sheriff's Department, Reno, Nevada 89505, and has been a full time polygraph examiner since 1975. He is also a member of the APA and the California and Arizona associations.

The author wishes to express his gratitude to Robert J. Galli, Sheriff, Washoe County, without whose cooperation and support this article would not have been possible.

Requests for Reprints should be addressed to the author.

The burden in an equal employment opportunities complaint, under Title VII of the Civil Rights Act, lies in proving that no discrimination existed. This may successfully be done with regard to polygraph screening, if the request to submit to examination applies to all applicants, and if during each examination the background areas explored are standardized, and proper procedures are used.

The "business necessity argument" has also historically been used in successfully meeting this burden. It can be argued that the criteria (consideration of the polygraph examination and the information gleaned from it) is necessary for the "safety and proper conduct of the business" of law enforcement.

In addition, EEOC hearings on the polygraph, involving claims of racial discrimination by the examiner or the technique, have not met with support, and every case of record has found the examiner and technique to be non-discriminatory including one that was appealed to the United States Fifth Circuit Court. Claims of invasion of privacy by polygraph examiners conducting pre-employment examinations have also been met with disagreement by federal and state courts. There is not a single case of record indicating the polygraph examination was an invasion of privacy, or violates any constitutional rights.[1]

The most frequent voiced objection to the use of polygraph in personnel screening is that it is embarrassing, humiliating, degrading, and an unwarranted invasion of the applicant's right to privacy. Since critics of polygraph screening are not in a position to accurately assess the opinions of applicants actually exposed to this process, an ongoing survey is being conducted by the Washoe County Sheriff's Department to determine if these objections do, in fact, exist in the minds of the applicant.

This survey began on 22 March 1978. At the conclusion of personnel screening examinations, applicants were given a questionnaire[2] and instructed that participation in the survey was voluntary, that the answers provided would have no bearing on their consideration, and that honest and candid answers were desired.

It was noted with interest that after reviewing the questionnaire, no applicant refused the request to participate in the survey.

Although this survey is an ongoing project, it is felt that the results at this point are statistically significant, with 85 persons participating.

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[1] Quick Reference Guide to Polygraph Admissibility, by Norman Ansley, American Polygraph Association, 1978.

[2] See Figure I, a modification of a similar form prepared by Edward Gelb, APA Vice President-Private, 1977.

To the question "Were you in any manner embarrassed, humiliated, or degraded by any part of the polygraph examination process?", 79 (92.9%) answered "no", and 6 (7.1%) answered "yes", one of whom qualified his answer with "slightly." In discussing these "yes" answers with these applicants, five of the six indicated their answer was based solely upon embarrassment caused by information they provided to the examiner which had not been directly solicited by the questions asked. None of the six felt they had been degraded or humiliated.

To the question "In your opinion, was there any objectionable or unwarranted invasion of your privacy during the conduct of the polygraph examination?", all 85 persons surveyed (100%) indicated they felt there had been no invasion of their privacy.

It is obvious that many police administrators feel that polygraph screening of applicants is necessary. A question continues to exist, however, as to the feeling of individual applicants subjected to such examination. The survey also included the question "Should you be hired, do you believe you will be more secure and comfortable in your work environment knowing that polygraph is used to assist in personnel evaluation?" Of the 85 persons surveyed, 83 (97.6%) answered "yes", 1 (1.2%) answered "no", and 1 (1.2%) answered "no opinion."

Based upon the current results of this survey, it may be concluded that the vast majority of the applicants actually submitting to polygraph screening did not feel that it is embarrassing; none felt it was degrading, humiliating, or an invasion of privacy; and almost without exception they approved of its use with regard to their own applications as well as the applications of others.

The use of polygraph in screening applicants must also be viewed from the standpoint of its effectiveness; if the consideration of a vast majority of applicants is not affected by the use of polygraph as a personnel evaluation tool, then it could be concluded that it is not essential to the overall personnel screening process. If, however, there were frequent instances where individuals were identified as not being qualified for employment, or there was only one instance where the public was protected from a dishonest or unethical individual being sworn as a police officer, then the procedure is justified.

Both are true.

As an indication of the frequency with which the consideration of applications is affected, during calendar year 1977, 47 individuals submitted to polygraph examination with regard to their applications for employment with the Washoe County Sheriff's Department. Of those 47 applicants, 29 (61.7%) made statements during the polygraph screening process which disqualified them from further consideration.

As an indication of the types of admissions which were obtained from disqualified applicants, the following, taken from files covering the last 12 months, are representative:

1) Applicant admitted assault with a deadly weapon (knife) against a landlord in a rental dispute 45 days prior to the examination; admitted fraud of $200 to $300 two months prior to the examination; admitted committing thefts involving a total value in excess of $100 three months prior to the examination.

2) Applicant admitted that his wife was the victim of an ongoing blackmail which, at the time of the examination had involved in excess of $60,000. Applicant admitted that pressure applied through his wife could cause him to violate his sworn duty should he be employed.

3) Applicant admitted falsification of his application, i.e., he had listed a prior felony conviction as a misdemeanor. He admitted that a like falsification had caused his termination with a federal agency.

4) Applicant admitted receiving stolen property valued at approximately $200 one year prior to the examination; admitted stealing property valued at approximately $1,000 from a government agency 2 years prior to the examination.

5) Applicant admitted overdosing on prescription drugs two months prior to the examination as the result of "personal problems"; the individual's "boyfriend" had jilted the applicant at that time. The applicant believed the "boyfriend" was involved in organized crime as a transporter of illegal narcotics; this belief was based upon the applicant observing a "shipment" of 900 amphetamines in their jointly occupied apartment 90 days prior to the examination. The applicant admitted illegal use of drugs and narcotics from 1968 through 1978.

6) Applicant admitted suffering from alcoholism for a four year period ending four months prior to the examination; admitted suffering partial paralysis caused by combined alcohol and illegal drug abuse four months prior to the examination; admitted illegal, frequent, and continuing use of prescription drugs during an 18 month period while employed by an out-of-state law enforcement agency. Applicant's employment with that law enforcement agency had been terminated nine months prior to the examination.

7) Applicant admitted unfavorable termination from three of six places of employment during a two year period immediately prior to the examination; admitted a history of failure to meet financial obligations and being 60 days in arrears in all financial obligations at the time of examination. Applicant admitted frequent and continuing alcohol abuse and operating a motor vehicle while intoxicated to a point that

would support charges of driving under the influence approximately twice monthly during the two year period immediately prior to the examination.

8) Applicant admitted being in possession of illegal drugs at the time of examination; admitted cultivating marijuana two years prior to the examination; admitted continuing and repeated use of illegal drugs and marijuana during the seven year period prior to the examination. The applicant admitted income tax evasion of $700 in 1974 and failure to report "free lance" income in 1976; admitted submitting fraudulent expense accounts during 1974, 1975, 1976, and 1977.

9) Applicant, formerly a police officer with an out-of-state agency, admitted accepting bribes on two occasions, "rolling" a homosexual and beating him to a point that required hospitalization, stealing property while answering an alarm at a burglary scene, and ransacking the apartment at a death scene and stealing the property of the deceased. The same applicant admitted continuing and frequent use of marijuana for 11 years, possession of marijuana at the time of examination, and cultivation of marijuana four months prior to the examination.

10) Applicant admitted illegal possession of amphetamines at the time of the examination; last purchasing 100 amphetamines 30 days prior to the examination, and frequent and continuing use of amphetamines.

11) Applicant admitted aiding the escape of a fugitive suspect in an armed robbery 10 years prior to the examination; continuing and frequent use of marijuana and amphetamines for a period of approximately 10 years.

12) Applicant admitted possession of stolen property at the time of the examination, i.e., the siding used to build his home, his washer, his dryer, and his kitchen stove had all been stolen by his father-in-law; admitted stealing and still being in possession of tools and welding equipment stolen from an employer; admitted possession of illegal drugs and marijuana at the time of examination, and continuing but infrequent illegal use of amphetamines and marijuana.

13) Applicant, recently discharged from the U.S. Army, admitted while servicing as a military policeman, attempted to outrun a patrol vehicle to evade citation for a traffic violation; participating in the theft of a "truckload" of "booze, beer, and cigarettes", and while facing courts-martial with regard to that offense, declining to cooperate with the prosecution. Although the applicant was not convicted by courts-martial, he was barred from subsequent re-enlistment.

Is polygraph screening a necessary part of the screening of police applicants? In light of the admissions obtained which are covered in this article, the

obvious answer is "yes." Prior to submitting to polygraph screening, the individuals who made these admissions were subjected to written and oral testing and interviews, during which none of these admissions were brought to light. Without the proper polygraph screening, many, if not all of these individuals, would now be in "positions of trust."

Is the polygraph screening of police applicants abusive, degrading, humiliating, and an unwarranted invasion of the applicant's right to privacy? In light of the results of the survey covered by this article, applicants actually subjected to proper polygraph screening procedures overwhelmingly feel it is not. This is a direct contradiction to the opinions expressed by some political figures who, in all likelihood, have had very limited exposure to polygraph themselves.

Rather than violating the rights of the individual applicant, properly conducted polygraph screening is a valuable tool which aids the police administrator in protecting the rights of that group of individuals known as our society; the right of the individual citizen to be protected by, not only the most qualified, but the most honest, ethical, and trustworthy police officer possible.

Figure I SURVEY

I, _____, submitted myself to polygraph examination on _____ at the Washoe County Sheriff's Department, after being advised of my constitutional rights and the fact that the examination was voluntary.

No promise or reward was made to me for answering the following questions:

1. Were you in any manner embarrassed, humiliated, or degraded by any part of the polygraph examination process?
   Yes or No _____
2. In your opinion, was there any objectionable or unwarranted invasion of your privacy during the conduct of the polygraph examination?
   Yes or No _____
3. Should you be hired, do you believe you will be more secure and comfortable in your work environment knowing that polygraph is used to assist in personnel evaluation?
   Yes or No _____

I have answered these questions of my own free will and hereby authorize the release of my answers to these questions to any person or parties having an interest in them.

Signature of Person Examined: _____

Examiner's Signature: _____

* * * * * *

COMPARATIVE ANALYSIS OF RESPONSES IN UNKNOWN AND KNOWN SOLUTION STIMULATION TESTS

By

Mellberth Bowling

Purpose

The purpose of this study was to determine through comparative analysis which physiological components of the polygraph instrument are more consistently responsive and accurate in identifying the point of deception in known and unknown number stimulation tests. A secondary concern of this endeavor was to ascertain the value of anticipatory responses, specific responses, and relief patterns in evaluating the point of deception on stimulus test charts. All combinations of the preceding response criteria were also considered.

Methodology

The study was conducted using the Stimulation test charts from case files of 100 field-administered Military Intelligence polygraph examinations. The stimulus charts were evaluated in the blind by a Certified Polygraph Examiner. In each instance of evaluating a test chart from an unknown number stimulus test, it was necessary for the reviewing examiner's opinion to agree with that of the original examiner, or that particular test chart (and case file) was not used. Ninety-four of the stimulus tests were unknown number tests and six were known number tests. Of the 100 examinations evaluated, 89 were male subjects and the remaining eleven were females. The examinees average age was 29.3 years, the youngest was 21 years and the oldest was 59 years. Thirty-two of the examinees were college graduates including three who possessed advanced degrees. The nationalities of the examinees included Americans, Europeans, Orientals, and Latin Americans. A three-component Stoelting polygraph instrument was utilized to conduct 90 of these examinations. The remainder were administered with a Lafayette instrument containing two pneumographic components, a GSR component, and an electronically-enhanced cardiosphygmograph component. The Galvanic Skin Response (GSR) component of both instrument types was operated in automatic mode when the stimulus tests were conducted.

Results

Results of the study by component and the significance of responses at the point of deception, are indicated below. As reflected in the tabulation, when considering First-Best responses at the point of deception, the GSR was overwhelmingly superior to the other polygraph components. The relatively balanced result shown between the remaining two components tends to place each about equal to the other in terms of responsivity.

Mr. Bowling is an Army Intelligence and Security Warrant Officer, and a certified Army examiner with extensive overseas experience. For reprints write to Mellberth Bowling, P. O. Box 302, Fort Meade, Maryland 20755.

RESPONSE PRIORITY	RESULTS BY COMPONENT		
	PNEUMO	GSR	CARDIO
First best response:	6	75	19 = 100
Second best response:	27	18	20
Third best response:	34	5	27
No significant response:	33	2	34
	100	100	100

In assessing results in terms of the relative importance of anticipatory responses, relief patterns, specific responses, and combinations thereof in successfully analyzing the test charts, specific responses appear to be clearly superior. In 19% of the reviewed examinations, anticipatory responses were present. Discernible relief patterns were present in 30% of the cases. By far the most consistently accurate overall indicator of deception, however, was a specific response, which accounted for some 51% of accurate determinations at the point of deception. On stimulation test charts containing a combination of the preceding criteria, relief patterns combined with specific responses were present in 65% of cases evaluated. A combination of anticipatory responses, relief patterns, and specific responses or other variations thereof were present in the remaining 35% of those cases.

Discussion

In evaluating results of this study it should be borne in mind that although much similar research has been accomplished in laboratory environments, little has been done utilizing actual test cases. Moreover, stimulation tests (or peak of tension tests) have been given little specific attention in pilot studies as to accuracy or whether they consistently achieve their goal. Therefore, it is believe that examiners who prefer using the unknown number tests to known number stimulation tests will review these results with a critical eye since they have long considered the GSR the component to "hang your hat on" when all else fails in the attempt to determine the correct number (or letter) selected by the examinee. Results of this study tend to support the conventional wisdom of that theory. Another significant aspect of this study is the heterogeneous nature of the examinees' backgrounds and nationalities. They were from many walks of life and represented a true sampling of major ethnic groups of the World's people.

That point brings into play some recent viewpoints which have been aired concerning examinee race and cultural background and their effects on the responsivity of the GSR. This point was addressed in a study published in Polygraph 6(2)(June 1977) by Stanley H. Craddock, entitled: "The Validity

and Reliability of the Electrodermal Response, an Annotated Bibliography." Clearly in this instance, such considerations notwithstanding, the GSR prevailed as highly reliable in determining the point of deception on stimulus test charts in field polygraph examinations.

Summary

Results of this study clearly indicate that, with respect to unknown number stimulus tests, specific response criteria in all components combined with relief patterns are the best combined indicators of the point of deception. That is particularly significant since many examiners have a tendency to favor one component over the others when reading different charts. However, in the case of unknown number stimulus tests, if an examiner is inclined to favor a particular component it would appear from these results that component should be the GSR. As for responsivity of the pneumo and cardio components in unknown number stimulus test situations, results indicate that they are about equal. This was particularly evident in Second Best, Third Best, and No Significant Response categories.

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R E P R I N T S

A limited number of copies of the following reprints are available from APA Publications, P. O. Box 1061, Severna Park, Maryland 21146. Each reprint is $1.50 postpaid.

Gordon H. Barland, Ph.D. "Use of Voice Changes in the Detection of Deception," Polygraph, 7(2)(June 1978).

S. K. Lahri and A. K. Ganguly. "An Experimental Study of the Accuracy of Polygraph Technique in Diagnosis of Deception With Volunteer and Criminal Subjects,"Polygraph, 7(2)(June 1978).

National Association of Chain Drug Stores, Inc. "Report on Polygraph Usage in Chain Drug Stores," Polygraph 7(1)(March 1978).

Thomas T. Puckett. "Elimination of Variables in Polygraph Testing," Polygraph 7(2)(June 1978).

Tony Teuscher. "The Polygraph and Probation," Polygraph 7(1)(March 1978).

Owen M. Wilkerson. "The Peak of Tension Tests Utilized in the Ashmore Kidnapping," Polygraph 7(1)(March 1978).

James Wygant. "Proposal for a Revised Single Issue Test Structure," Polygraph 7(1)(March 1978).

POLYGRAPH QUADRI-ZONE COMPARISON TECHNIQUE

By

James Allan Matte

The Quadri-Zone Comparison Technique, a modification of the Tri-Zone Comparison Technique, provides a fourth zone of comparison designed to recoup response energy lost by the other zones as a result of "inside issue" factors. It further provides a qualitative modification of the conversion table currently used in the numerical scoring system of chart analysis as developed by Cleve Backster on the basis of scientific principles rather than empirical data.

Part I

"Inside Issue" Factor

Several years ago, Cleve Backster developed two symptomatic questions[1] which he inserted into his Zone of Comparison polygraph technique to identify any "outside issue" that might interfere with the polygraph examination. Backster hypothesized that an examinee might fear that an unreviewed question embracing an area more threatening to the examinee yet unconnected to the matter under investigation might be asked during the examination. This fear might cause a dampening of both the control and the relevant questions resulting in inconclusive findings. Backster's remedy was to reassure the examinee that no unreviewed questions would be asked during the examination, and introduced two symptomatic questions into the test to determine whether the examinee was, in fact, convinced that no surprise questions would be asked during the test. The validity of the symptomatic questions in identifying the "outside issue" factor[2] is well documented.

The purpose of this thesis is to identify "inside issue" factors that might interfere with the polygraph examination, and offer a remedy that will identify the presence of the "inside issue" factor and prevent its anti-climax dampening effect.[3]

Exclusive control questions[4] encompass a period of time necessarily divorced from the period of the crime for which the examinee is being polygraphed. The control questions (probable lie) are therefore structurally

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The author is a graduate of the Backster School of Lie Detection and a member of the American Polygraph Association. For copies of reprints, write to James A. Matte, Suite 321, Statler Hilton Hotel, Buffalo, New York 14202.

[1]Backster Standardized Polygraph Notepack and Technique Guide, 1963 ed.

[2]Backster, C., "Outside Issue" Factor, Backster School of Lie Detection, Notes, 1972.

[3]Backster, C., "Anticlimax Dampening Concept," Polygraph 3(1)(March 1974): 48-50.

[4]Raskin, D.C., Barland, G.H., Podlesny, J.A., "Validity and Reliability of Detection of Deception," Polygraph 6(1)(March 1977): 1-39.

less intense than the relevant (crime) questions. For example, if the examinee is 25 years of age and the crime occurred on his 25th birthday, the control questions would not embrace a period later than his 23rd birthday.

The intensity and magnitude of the threat conveyed by the crime question will depend upon the security of the examinee regarding the possible outcome of the polygraph examination. The guilty examinee's "fear of detection" will be proportionate with the seriousness of the crime and his perception of the expertise of the polygraphist and the accuracy of the polygraph examination.

The degree of response to the crime questions is directly related to the degree of fear the guilty examinee has about being detected.

The innocent examinee's "fear of error" will also be proportionate with the seriousness of the crime and his perception of the expertise of the polygraphist and the accuracy of the polygraph examination.

The greater the "fear of error" on the part of the innocent examinee, the more threatening the crime questions become to him. The degree of dampening effect the "fear of error" has upon the control questions depends upon the intensity of the threat offered by each type of question.

If the reader can envision a see-saw with the control questions on one end and the crime questions on the other end, ideally we should have one end up and the other end down. If the see-saw is parellel, the results are inconclusive.

The lack of competition by weak or ineffective control questions will increase the risk of erroneously deceptive results from an innocent examinee whose "fear of error" is pronounced.

It is not unusual to hear an examinee express his fear of error during the pre-test interview, and hopefully the polygraphist is able to dispel these fears by explaining the instrumentation and the physiology involved, and the fact that several charts will be conducted and they will be analyzed through a quantification system permitting a second polygraphist to review his charts. The use of the Stimulation test[5] is certainly an effective means of reassuring the innocent examinee of the effectiveness and accuracy of the polygraph technique.

However, we have so far no means of identifying the examinee who still has a "fear of error" in spite of the above recommended procedures. Furthermore, we have no means of measuring the degree of his "fear of error."

I, therefore, propose that the following "fear of error" question be inserted into control-question examination, to be positioned immediately after the last relevant question:

ARE YOU AFRAID AN ERROR WILL BE MADE ON THIS TEST?

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[5]Reid, J.E., Inbau, F. E., Truth and Deception, The Polygraph ("Lie Detector") Technique. Williams & Wilkins Co., Baltimore, 1966, p. 68.

The above question may be introduced by explaining that it is designed for the innocent examinee who for some reason is afraid that an error will be made and the test will find him guilty. After offering substantial reasons that should convince the examinee that an error will not be made, a negative answer is hopefully obtained.

A response to the aforementioned "fear of error" question should alert the polygraphist regarding responses to the relevant questions versus lack of response to the control questions. In such a situation, the polygraphist should accentuate the control questions by reviewing only the control questions with the subject, and if the same problem persists, a new set of control questions should be introduced. In this manner, the polygraphist is focussing the examinee's psychological set away from the crime questions onto the control questions while attempting to determine if the control questions are ineffective or too weak to compete with subject's apparent strong "fear of error."

The "fear of error" question should be considered a control question to which only the truthful examinee may respond. This question, therefore, not only acts as a problem identifier, but can also serve to buttress or augment the numerical score of the control questions when a response is shown. This "fear of error" control question would serve to add needed truthful points lost from the control questions as a result of the examinee's "fear of error." In other words, whatever response energy lost by the control questions as a result of the subject's psychological set being unduly focussed onto the relevant questions because of his "fear of error," that energy is recaptured by the "fear of error" question which is included in the control question group that is numerically quantified for a determination. This is made possible by not increasing the required score in the truthful area to reach a determination in spite of the fact that a control question has been added. The reasoning is that whenever a response is elicited from the "fear of error" question, a comparable loss of response will be felt on the other two control questions as a result of the subject's focus onto the relevant questions whose responses will be competing against those two control questions.

During the review of the "fear of error" control question with the examinee, which occurs after the review of the last of the two probably lie control questions, the examinee should normally answer that question in the negative. However, if he does answer in the affirmative, the polygraphist should then take the necessary time to convince him of the accuracy of the instrument by the fact that it is regularly calibrated and of its unbiasness by the fact that it is an inanimate object. Further, that the interpretation of the charts is totally objective due to its quantification system of analysis which possesses a built-in safeguard that requires an overwhelming numerical score from two or more charts in order for someone to be found deceptive and the standardization of the technique which permits double verification by a polygraph laboratory.

The polygraphist should then advise the examinee that in addition, he will administer to the examinee a sensitivity test at the very beginning of the examination to determine whether he is, in fact, a testable subject, and further determine his minimum capability of response. After the

sensitivity test (Stimulation Test), the examinee should then be thoroughly convinced of the accuracy of the test and the polygraphist should then be able to elicit a negative answer to the "fear of error" question.

If, however, the examinee still persists in giving an affirmative answer to the "fear of error" question after a successful sensitivity test has been administered, the polygraphist should then accept that answer from the examinee and instruct him to answer that question likewise on the test.

If the examinee's "fear of error" is, in fact, that severe, the "fear of error" question will provide the examinee with a psychological outlet upon which to relieve that fear.

The fact that he is answering the question truthfully does not prevent the examinee from responding to that question as evidenced by the Silent Answer Test.[6] The fact that this question specifically relates to that innocent examinee's greatest fear will draw his psychological set upon that question offering sympathetic relief.

Another possibility is that a guilty examinee may offer an affirmative answer to the "fear of error" question as a countermeasure. While this examinee's answer will be a lie, the nature of this lie will be trivial to the guilty examinee in comparison to the lie he will also be telling in the next question also dealing with an "inside issue" factor which will be used for intercomparison.

This next question which I shall call the "resignation" question is a relevant question which is used to counterbalance the above "fear of error" control question, yet provide a means of identifying the guilty but defeated and resigned examinee whose fear of detection has been rechanneled into hope of defeating the examination.

This type of examinee has a defeatist attitude, whether because of overwhelming evidence against him or some other factor, he has lost the will to fight and has resigned himself to whatever fate befalls him. He has not confessed to his crime, but simply became passive. The prospect of "passing" a polygraph examination which may be of assistance in his cause is of greater emotional importance than "fear of detection" to a crime he feels "detected" but not proved. In such an instance, crime questions may elicit only mild responses. Therefore, the following "resignation" question would serve to capture response energy rechanneled from "fear of detection" into "hope of passing" the polygraph test.

The below "resignation" question should be inserted immediately after the "fear of error" question. In this manner, the examination will be properly balanced, inasmuch as the test normally should include an equal number of control questions versus relevant questions.

ARE YOU HOPEFUL AN ERROR WILL BE MADE ON THIS TEST?

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[6] Horvath, F.S., and Reid, J.E. "The Polygraph Silent Answer Test." The Journal of Criminal Law, Criminology and Police Science 63(2)(1972).

The above question may be introduced by explaining that it is designed for the guilty examinee who is hopeful that somehow an error will be made and the test will find him innocent. Obviously only a guilty examinee will hope an error is made on the test. Yet a negative answer is expected from all examinees.

A response to the aforementioned "resignation" question should alert the polygraphist regarding the lack of adequate response to the relevant question. This "resignation" question is considered a relevant question, therefore, a response to this question can be numerically scored and added to the total points obtained from the relevant questions weakened as a result of the examinee's defeated resignation.

If the guilty examinee has not, in fact, adopted a defeated attitude, then the relevant question having the greatest threat to his well-being will elicit subject's psychological set followed by the second relevant question having the next greater threat to the subject's well-being. Whereas the "resignation" question which is broad in nature becomes the weakest of the relevant questions, it may therefore elicit little or no response. This phenomenon is well described by Cleve Backster in his "outside issue" factor wherein he explains that oftentimes an examinee will attempt deception to one or more relevant questions on a test and will show reaction to those questions yet will show no reaction to the "catch all" question located at the end of the test, such as "Have you deliberately lied to any of these questions?" even though it is known that the subject did, in fact, lie to that question also. This phenomenon is called the anti-climax dampening concept which holds that an examinee's focus or psychological set will be directed onto those questions having the greatest threat to his well-being, dampening out questions of a lesser threat on the same test. Therefore, it is possible for an examinee to be lying to four or five questions on one test yet show a reaction on only one or two questions, those having the greatest threat to his wellbeing which will dampen out neighboring questions of a lesser threat.

It must be noted that in the overall tally of the numerical scores, more total points are required to arrive at a finding of deception than truthfulness due to the fact that relevant questions are structurally more intense and threatening than control (probable lie) questions.

In the analysis and quantification of the aforementioned "fear of error" control question and "resignation" (relevant) question, these two questions should be compared against each other in the same manner that the other relevant questions are compared against their neighboring control questions. A determination must be made in each individual tracing regarding which of these two questions displays the most physiological evidence of sympathetic and para-sympathetic activity and one score either in the plus (truthful) area or in the minus (deception) area is assigned in each tracing.

The addition of two questions in a specific type polygraph examination will undoubtedly cause concern to those polygraphists who are still using a mechanical polygraph instrument without the availability of an electronically enhanced cardio cuff which permits lower cuff pressure. The additional 50 seconds required to implement the aforementioned "inside issue" questions may

be obtained by removing "catch all" questions, or experimental questions located outside the zone of comparison. Control-question techniques that employ a greater number of relevant questions than control questions can effectively omit the weakest relevant question(s) in order to achieve an equal balance between control and relevant questions.

The following Quadri-Zone Comparison Technique consists of an ameliorated Backster Zone of Comparison[7] test incorporating the two "inside issue" factor questions discussed above which are reflected as questions number 23 and 24.

POLYGRAPH QUADRI-ZONE COMPARISON TECHNIQUE

	14J	Were you born in the United States?
	39	Regarding whether or not you stole that $1000 discovered missing from the safe at ABC Markets on 12 Jan 77, do you intend to answer truthfully each question about that?
	25	Are you completely convinced that I will not ask you an unreviewed question during this chart?
#2	46	Between the ages of 18 and 23, do you remember ever stealing anything?
ZONE #1	33	Did you steal that missing $1000 from ABC Markets?
#3	47	During the first 18 years of your life, do you remember ever stealing anything?
	35	Regarding that $1000 missing from the safe at ABC Markets on 12 Jan 77, did you steal that money?
#4	23	Are you afraid an error will be made on this test?*
	24	Are you hopeful an error will be made on this test?*
	26	Is there something else you are afraid I will ask you a question about, even though I told you I would not?
	44J	Regarding drugs, are you holding back information about any drugs or medication you have taken during the last 12 hours?

*It is conceivable that an examinee who is truthful regarding the issue for which he is being polygraphed might nevertheless hope that an error be made on the test regarding the control questions to which he is attempting deception. Therefore, it is imperative that the polygraphist emphasize that questions 23 and 24 pertain to the issue for which the examinee is being polygraphed. As a precaution, the author has been adding the suffix "Regarding this arson, theft, burglary," etc., to both questions 23 and 24.

PART II

QUALITATIVE QUANTIFICATION SYSTEM IN POLYGRAPH CHART ANALYSIS

The advantage of the comparison technique where each relevant question is compared against its neighboring control (probable-lie) question for a presence or absence of sympathetic and para-sympathetic activation, is that it lends itself to a numerical scoring system in the analysis of each chart tracing, i.e., breathing, psychogalvanic reflex, and cardio. A score is assigned in each tracing to each set of relevant versus control question on the basis of rules and standards established from logic and experience. When all scores are tallied, a conclusion regarding truth or deception must be made from this tally by means of a conversion table which appears to be based upon empirical data obtained from previous verified polygraph examinations.[8]

While the source for the present conversion formula appears to be demonstrably reliable on the basis of past experience, this author believes that the formula should be ameliorated to conform with basic requirements of logic and consistency in order to meet scientific standards that are defendable in the courts.

In order to understand the basis of this qualitative standard, a brief description of the numerical scoring (quantification) system is herewith discussed.

In chart interpretation, the polygraphist must not allow a significant reaction in one tracing to influence his evaluation of that same relevant question in the other tracings. He also must not allow a strong reaction in any or all tracings to one relevant question to influence his evaluation of the other relevant questions on the same chart.

To attain an objective measure of the reactions or lack of reaction to each relevant question in each of the three tracings, a numerical scoring system was designed to provide the polygraphist with a means of objectively evaluating each relevant question versus its neighboring control question, hereafter referred to as a set of relevant/control questions, in each tracing according to chart interpretation rules with penalties for violation of those rules, by the assignment or scoring of each set with a number from a seven-position scale described below:

MT	T	t	?	d	D	MD
VALUE	VALUE	VALUE	VALUE	VALUE	VALUE	VALUE
+3	+2	+1	0	-1	-2	-3

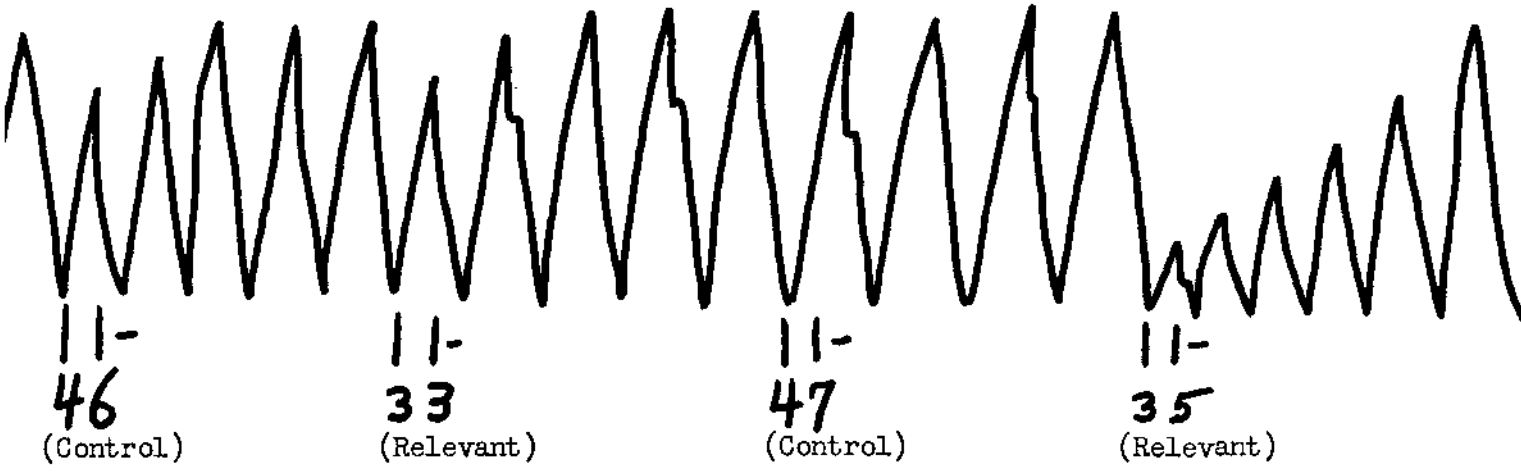
Numbers preceeded by a minus sign fall into the deceptive area; numbers preceeded by a plus sign fall into the truthful area. An explanation of the above-described seven-position scale is as follows:

+1 (t) Minimum Truthful Score
+2 (T) Truthful Score

+3 (MT) Maximum Truthful Score
-1 (d) Minimum Deception Score
-2 (D) Deception Score
-3 (MD) Maximum Deception Score

Now we will apply the above seven-position scale in actual charts beginning with the top tracing on the chart, the breathing tracing.

The polygraphist examines the first set of relevant-control questions within the zone of comparison on the chart. The control question No. 46 preceeds the first relevant question No. 33 which is followed by the second set of relevant-control questions as indicated below:



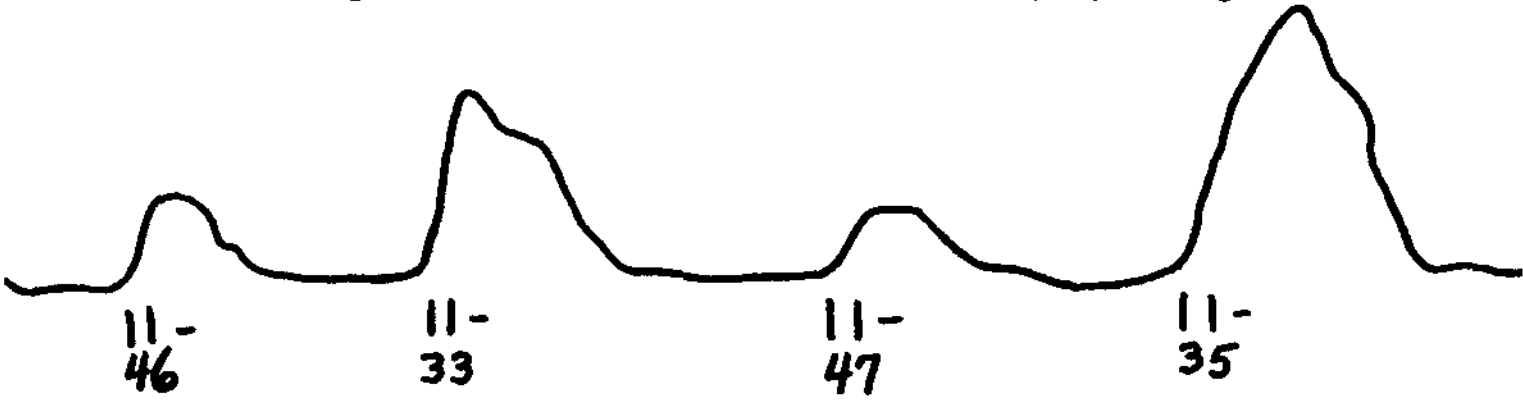
The above illustration reflects a slight suppression of equal magnitude in both the relevant question No. 33 and the neighboring control question No. 46 indicating mild sympathetic activation to both questions, but no evidence of para-sympathetic activation, inasmuch as there is no relief pattern in the form of hyperventilation because the suppression is mild. The polygraphist can always turn to the other neighboring control question No. 47 for comparison purposes but he cannot ignore a reaction to question No. 46.

When there is a presence of mild reaction in both the relevant question and its neighboring control question of equal magnitude, such as above where there is no presence of parasympathetic activation, a numerical value of zero (?) must be assigned to this question set in the breathing tracing. However, when there is a presence of strong reaction manifested by distinct activation of both sympathetic and parasympathetic systems in both the relevant question and its neighboring control question of equal magnitude, a minimum deception score must be given to this question set in the breathing tracing for a score of -1 (d). The rationale being that both questions appear to be equally threatening to the examinee, its degree being proportionate to the degree of the responses, which indicates that while the examinee may be attempting deception to the relevant question, its neighboring control question may be too intense due to faulty structure, embraces a more serious unknown crime, or a countermeasure attempt was made by deliberate intense

concentration on the control question. The polygraphist must keep in mind that an examinee may be able to cause a reaction on the control question but cannot control an oncoming reaction on the relevant question.

Due to the addition of the "inside issue" factor question set (questions 23 and 24), the polygraphist is now able to determine whether a reaction on the relevant question, especially in the situation described above, is due to "fear of error" or genuine fear of detection. If there is equally mild reaction in control question No. 46 and relevant question No. 33 as illustrated in the diagram above, and there is also a presence of strong reaction in the "fear of error" question No. 23, the polygraphist may safely assume that the mild reaction at relevant question No. 33 was caused by his "fear of error," therefore he should administer a stimulation test following this chart to reassure innocent as later verified examinee. However, if there is a presence of strong reaction at the "resignation" (relevant) question No. 24 with an absence of reaction at question No. 23, the polygraphist may assume that the presence of reaction at relevant question No. 33 is due to a genuine fear of detection, but that its neighboring control question is too intense for reasons that the polygraphist should not attempt to uncover for fear of raising an "outside issue" but should definitely eliminate from the test by changing the age category or the scope of the control question. Furthermore, a stimulation test should be administered immediately following this chart to stimulate the guilty as later verified examinee's psychological set, onto the question having the greatest threat to his well-being.

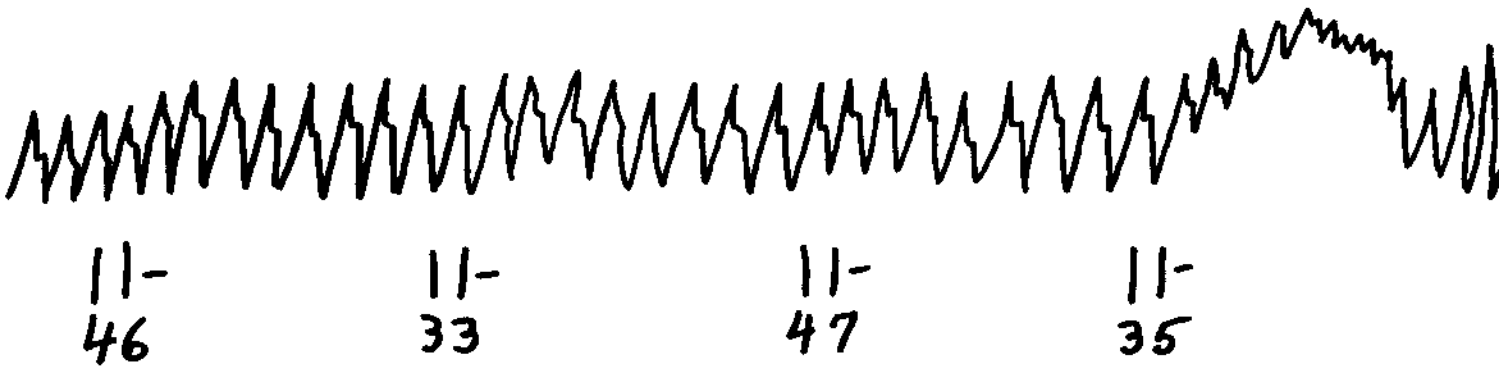
The polygraphist remains with this first question set and evaluates the next tracing below which is the Galvanic Skin Reflex (GSR) tracing:



In the analysis of the GSR tracing a minimum ratio of two to one must be attained for a minimum truthful or minimum deception score (+1 or -1). A ratio of three to one must be attained for a score of truthfulness or deception (+2) (T) or (-2) (D). A ratio of four to one or higher must be attained for a score of maximum truthfulness or maximum deception (+3) (MT) or (-3) (MD).

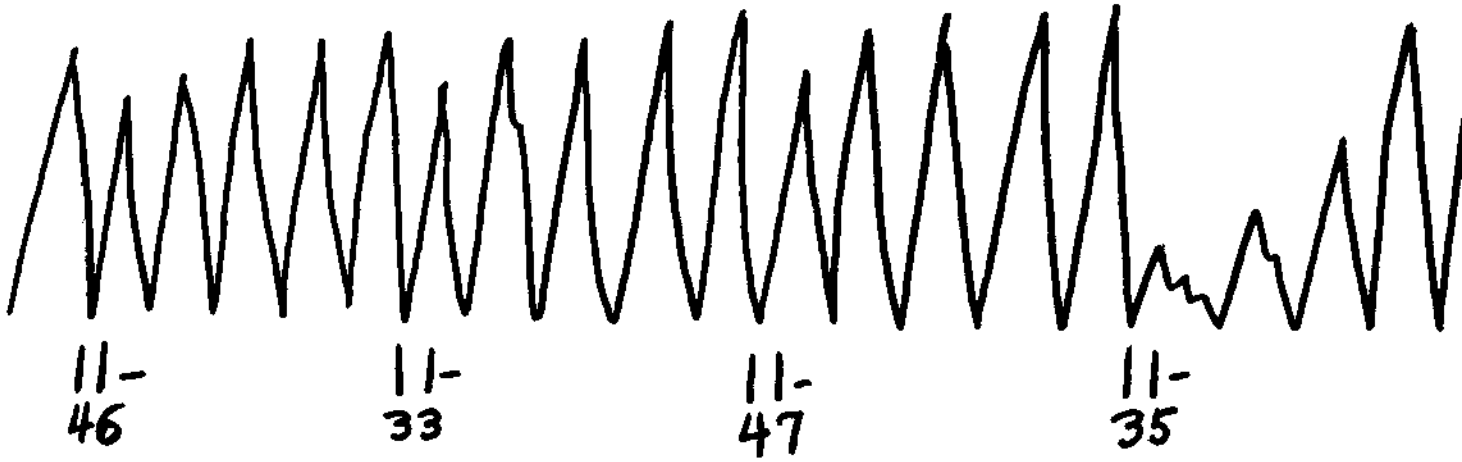
In the above tracing, the pen excursion in question No. 33 reached a height double that of question No. 46 affording a score of only -1 (d).

The polygraphist now drops his sight to the bottom tracing which is the cardio and evaluates the first question set.



Inasmuch as there is equal mild blood pressure arousal in both questions No. 33 and 46 being intercompared, the same rule as outlined above in the breathing tracing applies. A score of zero (?) is assigned to this question set.

We now turn to the second set of relevant-control questions, from the top tracing downward in the same fashion as the first question set:



Question No. 35 above reflects significant suppression followed by hyperventilation signifying that both the sympathetic and para-sympathetic systems activated on this relevant question. The neighboring control question No. 47 reflects mild suppression with no evidence of a relief pattern. Therefore a score of -2 (D) or deception is given to this question set in the breathing tracing.

The polygraphist now examines the same question set in the GSR tracing previously illustrated and finds that the pen excursion of the relevant question No. 35 is three times as high as its neighboring control question No. 47.

Inasmuch as the ratio is three to one in favor of the relevant question, a score of -2 (D) deception is given to that question set.

We now turn our attention to the bottom chart tracing, namely the cardio and find that there is a substantial blood pressure arousal at question No. 35 and only mild arousal at question No. 47. Therefore, we must arrive at a score of -2 (D) deception in the analysis of this tracing.

Relevant-Control question sets can only be upgraded to +3 (MT) or -3 (MD) if there is a strong reaction and relief pattern with absolute purity of tracing in one question and a complete or near complete lack of reaction to its neighboring question being used for intercomparison.

Purity means that the tracing contains typical characteristics that are distinct and clean with a lack of distortion or non-typical characteristics.

If either the relevant question zone or the control question zone being intercompared is less than twenty seconds of chart time from the examinee's answer to the beginning of the next question, or more than twenty-five seconds of chart time during that same zone, a score of Truth (T) or Deception (D) cannot be upgraded to Maximum Truth (MT) or Maximum Deception (MD). Furthermore, upgrading of Truth or Deception cannot be made if amplifier sensitivity has been increased or decreased during any portion of the two question zones being intercompared.

If a "yes" answer is given by the examinee to a control question (Probable lie) during the actual examination in spite of instruction to the contrary during the review of the test question, that question zone cannot be used as an indication of reaction to that control question. However, a lack of reaction under the same circumstances can be used in comparing the control question to its neighboring relevant question, however, a maximum score of -2 (D) only can be given.

A minimum of two charts must be run in each test in order to attain consistency of response, so that any stray emotion that may possibly cause a reaction will not have a serious effect on the overall trend. In order to arrive at a solid conclusion of either truthfulness or deception regarding the target issue, we must have consistent response to either the control questions or the relevant questions.

In tallying the scores obtained from each tracing and each relevant-control question set, we must eliminate from each question set the score which is the lowest in number or the score that does not follow the general trend of the overall tally. (See example below.)

	Question No. 33		Question No. 35	Question No. 24
Breathing	d = -1	(eliminates lowest score or that	D = -2	d = -1
GSR	d = -1	score which does not follow over-	D = -2	? = 0
Cardio	d = -1	all trend of 2 complete charts)	D = -2	? = 0
	TOTAL: -2		TOTAL: -4	TOTAL: -1

FIRST CHART GRAND TOTAL: -7

It must be noted that Relevant-Control question set No. 24 is not expected to yield strong responses unless an "inside issue" factor is present. Should this occur, milder responses may be expected in the other two Relevant-Control question sets.

Elimination of the weakest score necessitates a tally of strong scores in order to attain a tally high enough to arrive at a definite conclusion of either truthfulness or deception. Otherwise inconclusive results are obtained in which case the examinee is rescheduled for another examination.

The score table illustrated below reflects a change from the Backster score table in that Relevant-Control question set No. 24 has been added to the tally.

TRI-ZONE QUANTIFICATION SYSTEM

SCORE TABLE

PEC-1	TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP	
NE 33	+3 +2	+1 0 -1	-2 -3	=( )	35	+3 +2	+1 0 -1	-2 -3	=( )	24	+3 +2	+1 0 -1	-2 -3	=( )
SR 33	+3 +2	+1 0 -1	-2 -3	=( )	35	+3 +2	+1 0 -1	-2 -3	=( )	24	+3 +2	+1 0 -1	-2 -3	=( )
AR 33	+3 +2	+1 0 -1	-2 -3	=( )	35	+3 +2	+1 0 -1	-2 -3	=( )	24	+3 +2	+1 0 -1	-2 -3	=( )
PEC-2	TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP	
NE 33	+3 +2	+1 0 -1	-2 -3	=( )	35	+3 +2	+1 0 -1	-2 -3	=( )	24	+3 +2	+1 0 -1	-2 -3	=( )
SR 33	+3 +2	+1 0 -1	-2 -3	=( )	35	+3 +2	+1 0 -1	-2 -3	=( )	24	+3 +2	+1 0 -1	-2 -3	=( )
AR 33	+3 +2	+1 0 -1	-2 -3	=( )	35	+3 +2	+1 0 -1	-2 -3	=( )	24	+3 +2	+1 0 -1	-2 -3	=( )
PEC-3	TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP	
NE 33	+3 +2	+1 0 -1	-2 -3	=( )	35	+3 +2	+1 0 -1	-2 -3	=( )	24	+3 +2	+1 0 -1	-2 -3	=( )
SR 33	+3 +2	+1 0 -1	-2 -3	=( )	35	+3 +2	+1 0 -1	-2 -3	=( )	24	+3 +2	+1 0 -1	-2 -3	=( )
AR 33	+3 +2	+1 0 -1	-2 -3	=( )	35	+3 +2	+1 0 -1	-2 -3	=( )	24	+3 +2	+1 0 -1	-2 -3	=( )
PEC-4	TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP	
NE 33	+3 +2	+1 0 -1	-2 -3	=( )	35	+3 +2	+1 0 -1	-2 -3	=( )	24	+3 +2	+1 0 -1	-2 -3	=( )
SR 33	+3 +2	+1 0 -1	-2 -3	=( )	35	+3 +2	+1 0 -1	-2 -3	=( )	24	+3 +2	+1 0 -1	-2 -3	=( )
AR 33	+3 +2	+1 0 -1	-2 -3	=( )	35	+3 +2	+1 0 -1	-2 -3	=( )	24	+3 +2	+1 0 -1	-2 -3	=( )

Total: _____ BEST 2 OR MORE CHARTS Total: _____ Total: _____

TARGET ( ) GRAND TOTAL FOR ( ) CHARTS: _____

The grand total score for two or more charts obtained from the Score Table illustrated above is applied to the Conclusion Table depicted below which reflects the numerical range that must be attained to reach a definite conclusion by the number of charts conducted. Although a range is given for a single chart, this by no means indicates a conclusion should be rendered in less than two charts. The single chart tally is furnished to show progression in the tally and further afford the polygraphist a means of spot analyzing his charts after each test to identify and remedy any problem areas before continuing the examination.

The Conclusion Table depicted below reflects a change from the Backster table in that a slightly lower score is required to obtain a finding of truthful inasmuch as reaction to control questions which are of lesser intensity than relevant questions are not expected to be as pronounced, yet the score is still within the acceptable limits of the Utah Study. The score requirements for Deception in the second, third and subsequent charts were also changed to coincide with the requirements of the first chart, in that the first chart requires -5 or more to reach a conclusion of Deception, therefore, the second chart should also possess those minimum requirements which would then necessitate a -10 or more to reach a conclusion of Deception, and so forth. This same principle applies in the tally for truthful conclusions. By applying this principle of equal treatment for each chart, the score requirement for two charts for Deception has been increased by one point.

CONCLUSION TABLE

For

TRI-ZONE QUANTIFICATION SYSTEM

	CIRCLE APPROPRIATE NUMBER BELOW		
RESULTS FOR 1 CHART - SPECIFIC TEST	+12 to +4 TRUTH	+3 to -4 INDEFINITE	-5 to -12 DECEPTION
RESULTS FOR 2 CHARTS-	+24 to +8 TRUTH	+7 to -9 INDEFINITE	-10 to -24 DECEPTION
RESULTS FOR 3 CHARTS-	+36 to +12 TRUTH	+11 to -14 INDEFINITE	-15 to -36 DECEPTION
RESULTS FOR 4 CHARTS-	+48 to +16 TRUTH	+15 to -19 INDEFINITE	-20 to -48 DECEPTION

The Backster "conversion" table depicted below reflects progressively lower score requirements per chart as the number of charts in the tally increase until only minimum scores on all charts are needed to reach a conclusion.

CONVERSION TABLE	← ADD → TOTAL →	TARGET "B"
FOR 1 "YOU" PHASE "B" RUN -- CIRCLE BELOW		
+12 to +5 TRUTH	+4 to -4 INDEFINITE	-5 to -12 DECEPTION
FOR 2 "YOU" PHASE "B" RUNS - CIRCLE BELOW		
+24 to +9 TRUTH	+8 to -8 INDEFINITE	-9 to -24 DECEPTION
FOR 3 "YOU" PHASE "B" RUNS - CIRCLE BELOW		
+36 to +13 TRUTH	+12 to -12 INDEFINITE	-13 to -36 DECEPTION

The basis for the change in the minimum score tally requirement for Deception is not only to maintain consistency and uniformity in the analysis, scoring, tallying and conversion of scores in each chart, but also the mandate that the four highest scores left for evaluation and tally after elimination of the two weakest scores in each chart, must contain at least one -2 (D) score reflecting a strong response. I don't believe that a finding of deception should be based on charts that produce only four -1 (d) scores which I classify as minimum deception scores and which Backster initially labelled as "lean toward deception" placing it in the indefinite category. Therefore, each chart used for evaluation should contain a minimum of one -2 (D) score plus a minimum total score of -3 from the other tracings in the same chart to reach a definite conclusion of Deception.

The requirement for only one -2 (D) score on each chart is based upon the principle that the subject's psychological set may be focussed upon only one of the relevant questions, that which was the greatest threat to his well-being. That question may produce a -2 or even a -3 score; however, the other relevant questions may produce only minimal response as a result of the examinee's strong focus on the question which he feels most threatening.

The serious consequences deceptive polygraph results may have on an examinee, especially if the results are admitted into evidence, dictates that a convincing scientific argument be presented validating the results. An offer of four -1 (d) scores which are all minimum deception scores, although consistent throughout two or more charts, will not present a convincing argument to prove the guilt of an examinee.

If a person is guilty of a crime for which he is being polygraphed, at least one of the relevant questions should be of a sufficient threat to produce a -2 response in at least one of the three tracings on one of the relevant questions. In order to establish reliability, two or more charts producing an absolute minimum in each chart of a -2 score plus a minimum total score of -3 from the other tracings in the same chart for a minimum grand total of -5 in each chart should be obtained before a definite conclusion of Deception should be rendered. The only exception to this rule occurs when an inside issue factor dampens the responses to relevant questions No. 33 and 35 but the lost response energy is recouped by relevant question No. 23; however, the total score for each chart must still meet the minimum score requirement set forth in the conclusion table. Obviously, evidence of a consistently greater score tally will correspondingly decrease the probability of error already reduced to infinitesimal proportion.

The aforementioned required consistency and uniformity in the analysis and scoring of each chart is also applied in the truthful tally at the conclusion table. The lower score is justified on the basis that weaker responses are expected from control questions, and if each of the four remaining highest scores average a +1 (t) each reflecting mild response to those control questions as opposed to no response to the neighboring relevant question, it can be safely assumed that the results reflect truthfulness regarding the issue for which the examinee was tested. The +8 minimum score for two charts for a truthful conclusion is within the limits set forth in the Utah Study.

The required minimum scores depicted in the aforementioned conclusion table are unaffected by the insertion or omission of relevant/control question set No. 24 into the control-question technique because its primary role is to recoup response energy otherwise lost by the other preceding relevant/control question sets.

In conclusion, the above conclusion table formula is in compliance with the suggested minimum criteria furnished in the Utah Study based upon empirical data obtained from verified polygraph charts, and is further in compliance with the laws of logic and reliability.

Footnotes:

[1] Backster Standardized Polygraph Notepack and Technique Guide, 1963 Ed.

[2] Backster, C., "Outside Issue" Factor, Backster School of Lie Detection, Notes, 1972.

[3] Backster, C., "Anticlimax Dampening Concept." Polygraph 3(1)(March 1974): 48-50.

[4] Raskin, D.C., Barland, G.H., Podlesny, J.A., "Validity and Reliability of Detection of Deception." Polygraph 6(1)(March 1977): 1-39.

[5] Reid, J.E., Inbau, F.E. Truth and Deception, The Polygraph ("Lie Detector") Technique. Baltimore: Williams & Wilkins, 1966, p. 68.

[6] Horvath, F.S., and Reid, J.E., "The Polygraph and Silent Answer Test." The Journal of Criminal Law, Criminology and Police Science, 63 (2) (1972).

[7] Zones 1, 2 and 3 were developed by Cleve Backster, Zone No. 4 was developed by the author.

[8] The numerical scoring system in chart analysis was initially developed by Cleve Backster, Backster School of Lie Detection, New York City, New York. See Backster Standardized Polygraph Notepack and Technique Guide, 1963 Edition.

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Answers to Polygraph Review:

1.	d.	6.	False.
2.	b.	7.	False.
3.	d.	8.	True.
4.	b.	9.	True.
5.	b.	10.	False.

* * * * * *

REALI'S POSITIVE CONTROL TECHNIQUE

A New Concept of Polygraph Procedure

By

Sylvestro F. Reali

Reali's Positive Control Technique is a relatively new concept in polygraph useage. Heretofore, all techniques utilized, and still use systems which permit the Polygraph practitioner a great deal of psychological input to the examinee. Various methods are used by the examiner to stimulate the Subject to truthfulness or deception. Different types of control procedures are used to promote a physiological reaction in the control question to be compared with those, if any, in the relevant question.

The Control Question Technique was designed to force a person to lie to a possible past occurrance of wrongdoing. Having lied; it is expected that a physiological reaction will occur which will supersede that reaction which may or may not occur following the relevant question. This indicates truthfulness. The deceptive person exhibits a physiological reaction to the relevant question which is greater than that produced, if any, to the control question. This method of comparing physiological reactions in control and relevant questions is universal in comparative methods. The problem the polygraphist faces is one of balance. Is the control question balanced well enough against the relevant question to get a true psychophysiological reaction indicative of truth or deception? Did general nervous tension, or the fear of the polygraphic procedure, produce such strong physiological reactions to the relevant question to preclude the control question from functioning in accordance with the theory? Did the subject grasp the concept of the control question well enough for it to function as designed? Did the examiner strengthen his control question so much that he prevented the deceptive person from exhibiting a greater physiological reaction to the relevant question than that observed in the control question? Or, did he not strengthen the control questions enough to overcome the physiological reaction in the relevant question, thereby causing a truthful person to be read as deceptive?

The examiner's input factor is a tremendous problem in polygraph technique. This can occur when the examiner misreads a person; or through his personal feelings, miscalculates in formulating the control questions. The polygraphist, after all, is capable of human error.

The primary function of the polygraphist is to find out what the subject knows to be the truth. I would prefer to state it this way, "The primary function of the polygraphist is to allow the subject to physiologically show the polygraphist the truth from within the subject himself. Allowing for no input to that end from the examiner." How then to overcome these problems of balance and examiner input? Does the answer lie in the so-called "Yes-No" technique? I tried a version of that technique while serving as

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Mr. Reali is an APA Member and the Director of the Polygraph Personnel Research School for Lie Detection, 400 Lafayette Building, 5th and Chestnut Streets, Philadelphia, Pa. 19106. Requests for reprints should be addressed to Mr. Reali.

Commander of the Philadelphia Police Polygraph Unit, with no success at all. I used a system in which two complete examinations were given. In the first test I accepted the subject's relevant answer of no, tested, and then conducted a second test reversing the answer from no to yes. Then an attempt was made to compare the tests. This experiment did not last long, since it was quite evident from the outset that it did not work.[1] My next attempt was an innovation of the yes-no technique. Unknown to me, variations of this technique were tried and used by others.

Where then to go for a solution to these problems? I knew it had to be connected somehow to this dichotomous system of yes-no answer; or, at least, I thought so. I then realized that these answers were merely affirmatives and negatives, not necessarily generating stimuli through cognition of truth and deception. The element lacking was conceptual in nature. Answering yes and no in a litany-like cadence actually disrupted, if not totally destroyed, the psychological set developed in the preparation of the Subject for the test. This precluded the necessary psychophysiological reactions from occuring, necessary for the comparisons in chart reading. The solution was in the mind's concept of the answer, not merely the utterance of the reply. Having the subject recognize the fact that he is answering with lies and truths, whether it be yes-no or no-yes, made the difference so great that it could be discerned in the tracings on the polygraph test charts. In retrospect, what was accomplished, was I actually had the subject concentrating on his lie answer, thereby reinforcing it psychologically, while using the original yes-no test concept. I also corrected the inbalance characteristic of some other techniques by equal employment of the relevant and control questions. Fear of the polygraph situation or general nervous tension, if any, was equally responsive to both kinds of questions. The difference in reactions are caused through cognition of one or the other.

Examiner input was minimal; just that amount needed to explain that each question would be asked twice; and the question pairs were to be answered with a lie first, and then with the truth. This resulted in the self stimulation of the subject, allowing him the ability to show himself psychophsiologically with no interference or input from the examiner. Tactics such as strengthening or weakening a control question, convincing the subject that polygraph really works, were not used. The subject discerns for himself that polygraph works. His cognitive ability forces him to recognize that at one point he is given the opportunity to tell a lie; and shortly thereafter the truth. The subject is aware that the examiner can see the result from both. Herein lies the stimulative aspect of the technique, and the deceptive subject knows he will be detected. On the other hand, the truthful subject is totally cognizant of having to admit to something he has not done, and has repeatedly denied having done. This subject's psychological energies, including the better part of his general nervous tension, if any, will respond to the control question because he is acting against his self interest.

The subject is introduced into the technique; not forced into it by

[1]This is but one of several versions of the group called yes-no technique. For another version see the works of R. Golden. [Ed.]

by the examiner. The examinee is always at liberty to control his thoughts, based on lies and truth, in regard to the matter under polygraphic examinations.

Positive Control eliminates physiological reactions occurring through doubts or non-recognition factors from past life experiences. The system of questions also eliminates the problems arising from thought or experiential transference because of the lack of disparity in the interrelationship of the relevant and control questions.

There are two problems which can be encountered in Reali's Positive Control Technique, disassociation or complacency. The correction of these problems is, as usual, dependent upon the competency of the examiner to observe them in the subject or on the charts. Elimination of this problem is accomplished by securing the subject's attention through further instructions.

Reali's Positive Control Technique

The technique is structured to use a system of identical questions in pairs. These are called Controlled Sets. These questions are answered first with the examinee's subjective lie and then by the examinee's subjective truth. At this point the examiner is unaware of the real truth; and hence the terminology "Subjective Truth - Subjective Lie;" for the examiner accepts the examinee's word. All questions are asked and answered in the same manner regardless of the nature of the question; whether irrelevant or relevant.

The subject is informed thoroughly of the manner with which he is to answer the questions. It is also thoroughly explained that having given both a deceptive and truthful answer the examiner can see both reactions on the charts side by side and cannot make an error in his determination. The examinee realizes at this point there is no margin for error. Herein lies the self-stimulating factor. There is no attempt to hide the theory of the technique from the Subject; nor any attempts to convince him of the efficacy of polygraph per se. His own cognitive ability will convince him of the effectiveness of the system and the low margin of error possible for the examiner. This in itself eliminates much of the general nervous tension in the truthful subject; allowing him to give his strongest reaction in the subjective lie question (control question). Conversely the deceptive subject will increase his response to the subjective truth question (relevant), thereby exhibiting his deceptiveness. It is obvious, at this juncture, no mention was made of the words, "yes or no." The subject is never instructed to answer yes or no. The objective of the examiner is to enforce the concept of lie and truth.

The types of questions used in the Reali Positive Control Technique are:

I - Irrelevant question

S - Semi-Relevant (all encompassing in re Pre-Test Interview)

C - Control questions (Subjective Lie)

R - Relevant question (Subjective Truth)

M - Medical questions

PPQ - Previous Polygraph Question

VDQ - Verified Disclosure Question

Any questions whose first symbol is a letter is not used to determine truth or deception. They are used to acclimate the Subject with the test situation. All questions relevant to the matter to be resolved are identified by a number followed by C or R.

1c - 1r 1c - 1r Oc - Or 1c - 1r to 11c - 11r Mc - Mr Pc - Pr

1c.	Did you enter the transit unit at the bank that Saturday night you worked the back door?	YES NO
1r.	(Repeat 1c)	YES NO
2c.	Did you turn on the lights in the transit unit that Saturday night you worked the back door?	YES NO
2r.	(Repeat 2c)	YES NO
3c.	Were the lights on in the transit unit when you came to work that Saturday night you worked the back door at the bank?	YES NO
3r.	(Repeat 3c)	YES NO
4c.	Did you take a bank bag out of the transit unit that Saturday night you worked the back door at the bank?	YES NO
4r.	(Repeat 4c)	YES NO
5c.	Did you steal those foodstamps from the bank that weekend they were reported missing?	YES NO
5r.	(Repeat 5c)	YES NO
6c.	Did you give those foodstamps which were stolen from the bank to anyone?	YES NO
6r.	(Repeat 6c)	YES NO

7c.	Did you try to sell those stolen foodstamps?	YES NO
7r.	(Repeat 7c)	YES NO
8c.	Did you destroy those stolen foodstamps?	YES NO
8r.	(Repeat 8c)	YES NO
9c.	Did you leave the building that Saturday night you worked the back door at the bank?	YES NO
9r.	(Repeat 9c)	YES NO
10c.	Did you go into the back this past Saturday after you finished work?	YES NO
10r.	(Repeat 10c)	YES NO
11c.	Did you enter the bank this past Sunday?	YES NO
11r.	(Repeat 11c)	YES NO

All questions are reviewed exactly as asked in the test itself. Positive Control is an expandable test structure. The test is structured to encompass an entire incident rather than a finite single issue. Each Control set is read independently of any other Control set and stands on its own merits. There is no inter-comparisons of control sets.

After the control sets are read individually, the examiner interprets the examination based on the deceptive and truthful determinations observed.

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AN APPLICATION OF THE POSITIVE CONTROL CONCEPT OF POLYGRAPH EXAMINATION

By

Dorrance P. Howland

The purpose of this paper is to offer information on the Positive Control Concept of polygraph examinations from a Police application viewpoint. This will be done by outlining what I believe to be some problems associated with the traditional control question theory as we know it and to offer some remedial solutions. This should not be taken as an attempt to restructure polygraph technique or eliminate any of the established successful methods of examination. Instead, it is an attempt to broaden the knowledge and capabilities of the polygraph community.

Mass media and modern communication technology have upgraded the educational level and general awareness of the individual in our society. Some of the results are seen in civil rights advancements, freedom of information acts, and similar individual protection devices. Furthermore, in the wake of numerous political scandals and related incidents, people no longer take many things for granted. They want to know "why" they should follow a particular policy or answer to a certain authority figure. I believe this attitude has spread throughout our culture and has day-to-day applications.

Initially, I would like to outline some basic problems which I see associated with the traditional control question concept. These observations are from personal experience and from the experiences of other examiners as told to me. For example, the Policeman's Bill of Rights relates to an officer being ordered to take a polygraph examination during an internal investigation. The Maryland Attorney General has given an opinion which states in part; "The question asked in the (polygraph) test should be specifically, directly and narrowly related to the past performances of the employee's official duties." If we define a control question as something which is removed in time and place from the current investigation and to which the subject may show concern for and in fact lie to; then it would seem that strict interpretation of the Attorney General's opinion precludes the use of the traditional control question as we know it in this situation.

Continuing in other areas, as a police examiner, I often administered examinations to prison inmates and those I would describe as career criminals. When probing for control question subject matter with this type of person, it is not unusual for him to readily admit to a variety of crimes and misdeeds. When a person makes comments like: "I'm sure I hurt my Mom 'cause I got arrested" or "Yeah, I've stolen from a lot of people ..." it can be difficult to select what you as the examiner feel is an adequate control question. This is not to say that a good examiner would not pursue

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The author is a former examiner for the Maryland State Police who is now with the U.S. Government.

concept as presented here is not in the same form as taught by Mr. Silvestro Reali at his school in Philadelphia; however, the basic concept remains the same.

Positive Control Technique

Employment of the concept I refer to is simply a comparison of the examinee's reactions to a question which is asked two consecutive times. The only difference is that the person is instructed to deliberately lie to the question the first time he hears it and to answer truthfully approximately twenty seconds later, when he hears the same question repeated. For the innocent person, this means first denying all of the information he has painstakenly given during the pre-test interview and which he hopes will establish his innocence. Or perhaps he will be answering "yes" in response to a request to "lie" to the question: "Did you demand all the money from that cab driver last night?" Here the impact of saying that "yes" he committed robbery should create more anxiety than when subsequently given the opportunity to simply answer with the truth. Additionally, the innocent person's response tracings should show evidence of relief, following the stress of deliberately lying.

However, the guilty person, who was practicing deception in the pre-test, knows that when he answers "yes" in regard to the robbery, he is admitting it, and he therefore registers anxiety. But, twenty seconds later is where the real threat to his well being exists. That is at the question: "Did you demand all the money from that cab driver last night?" At this point his sympathetic system must activate, creating the responses. The objective question the polygraph examiner has to answer is: "Does the subject become more defensive when I ask him to deliberately lie to me, or is it that request for the real truth that creates the larger response?" Experience discloses that the deceptive subject may show some arrousal to the first question even though his answer is truthful, but there will be twice the reaction when the person answers the same question a second time with a deliberate lie. Even when the subject's emotional base line is at a high degree of nervousness, he remains in generally the same state of mind through the approximately 40 seconds it takes to ask any two-question set. Of course, not all responses in this technique are of textbook clarity, or exemplify the ideal, but they occur with significant regularity.

Irrelevant Questions in Positive Control

In addition to relevant question pairs, include irrelevant controls, questions to which the correct answers are already known. These are the irrelevant questions used in relevant-irrelevant testing. The difference however, is that these are also asked in two question sets. That is, the person is instructed to answer with a lie the first time they hear the question and then answer truthfully the second time. The purpose is of course to determine if the person does react when known to be lying and does not react, or at least not as much, when telling the truth. As in R/I testing, the general baseline tracings are obtained through known truth answers. For example, an irrelevant question set may be: "Tell a lie, have you ever smoked a cigarette?", followed by "Tell the truth, have you ever smoked a cigarette?" There is more reaction, or more distortion,

associated with the first question than with the second. A suggested list of such items for irrelevant sets could include questions about having a driving license, ever driving a car, or where a person lives. It has been suggested by Dr. Althea Wagman of the Maryland Psychiatric Research Center in Baltimore, that it may be desirable to use irrelevant issues than contain more emotional impact. Therefore, the examiner might construct irrelevant question sets as they generally relate to marital status or parenthood. For female subjects, question sets associated with going to the hairdresser or wearing make-up might be appropriate. For male subjects, questions about combing one's hair or wearing a moustache would probably have an adequate amount of emotional impact yet remain within the realm of propriety. Speaking generally about irrelevant question sets, they offer a helpful reference point from which to note idiosyncrasies in the examinee's tracings, and this helps in chart interpretation.

For chart markings, use Arabic numerals for the relevant question sets. For example, the first question in a relevant set could be numbered "1C" to indicate the control portion of the set when the deliberate lie is requested. The second time the question is asked in the relevant set should be marked "1R" to indicate that the subject was instructed to answer truthfully. It is my preliminary observation that this questioning technique forces the examinee to concentrate on the test subject matter. I believe that this makes it more difficult if not impossible for the subject to practice dissociation, that is, mentally wander away from the test environment. This also has meaningful application for the innocent person who wants to answer correctly and conduct himself in the proper manner. However, it forces the guilty individual to be aware of his answers and their relationship to his guilt.

The irrelevant sets are numbered with lower case letters of the alphabet followed by the "C" or "R" to indicate Control or Relevant, i.e., requested lie or requested truth. The markings "IC" and "IR", with capital I, stand for Individual Control and then Individual Relevant, that is, asking the person to answer with a lie and then answer with the truth to a question about his true name.

Reali's Technique

The test structure as taught by Mr. Reali, is to start the examination with an Individual Control question set, followed by a Pseudo-relevant set, marked "SC" and "SR". The third set regards any outside issue and is marked "OC" and then "OR." Following the outside issue then, is the first relevant question set, "1C" and "1R".[2] Then, either a second relevant set or an irrelevant question set completes the first chart. In the event you are using an instrument which allows longer charts to be obtained without release of the blood pressure cuff, then continue asking questions for a reasonable length of time. Use an irrelevant set after every two relevant sets. However, the technique is flexible and the examiner may determine the length and sequence.

[2]The relationship to the beginning of a Backster "You Phase" is obvious. However, the wording varies from that used by Backster. [Ed.]

For starting the second and subsequent charts, begin with an Individual or Irrelevant question set. For reasons of clarity and consistency of reaction, the examiner will want to obtain at least two samples of each relevant question set.

Speaking in terms of flexibility, the system also performs well in pre-employment screening. Here, the relevant question sets become job related issues.

I find the concept is also helpful in obtaining verification after a statement is made. It seems as though qualification of the questions can be made, subsequent to an admission, to determine if a person has told everything or has given a partial admission. For example, the person who works in a restaurant may not have stolen the $1000.00 out of the safe, but at the same time does use company money to buy cigarettes and coffee, not to mention the free meals provided by the chef. When the person is told they have responsed to the question relating to stealing the money from their employer, they may then tell you about the above mentioned incidentals which they did not reveal during the pre-test interview. At this point you can qualify the question with "other than what you told me ..." or "besides the cigarette money and meals ..." If the person is not involved in the $1000.00 cash theft, he will shift his psychological set to the control and away from the relevant portion of the question technique. Under these circumstances, the admission changes the emotional state, which in turn alters the tracings. With the Positive Control technique the new base line can be immediately absorbed into the system and evaluated through an objective comparison method.

The below listed question series and the accompanying chart segments are from an actual criminal case. The opinion of deception was verified by the defendant through a guilty plea in court.

FIRST CHART:

IC: Tell a lie, is your name (Subject's name)?

IR: Tell the truth, is your name (Subject's name)?

SC: Tell a lie, did you tell me the real truth about whether or not you stole that bank deposit money?

SR: Tell the truth, did you tell me the real truth about whether or not you stole that bank deposit money?

OC: Tell a lie, do you believe I will ask you any surprise questions in this test?

OR: Tell the truth, do you believe I will ask you any surprise questions in this test?

1C: Tell a lie, did you write the figure $889.48 on the side of that deposit slip?

1R: Tell the truth, did you write the figure $889.48 on the side of that deposit slip?

} Fig. 1

2C: Tell a lie, did you steal that bank deposit money?

2R: Tell the truth, did you steal that bank deposit money?

SECOND CHART:

DC: Tell a lie, do you have a child named Karl?

DR: Tell the truth, do you have a child named Karl?

3C: Tell a lie, are you the person who took that bank deposit money?

3R: Tell the truth, are you the person who took that bank deposit money?

DC: Tell a lie, have you ever driven a car?

DR: Tell the truth, have you ever driven a car?

4C: Tell a lie, have you told the real truth to Trooper Bohrer?

4R: Tell the truth, have you told the real truth to Trooper Bohrer?

BC: Tell a lie, have you ever driven a car?

BR: Tell the truth, have you ever driven a car?

1C: Tell a lie, did you write the figure $889.48 on the side of that deposit slip?

1R: Tell the truth, did you write the figure $889.48 on the side of that deposit slip?

} Fig. 2

THIRD CHART:

eC: Tell a lie, are you employed by the _____ corporation?

eR: Tell the truth, are you employed by the _____ corporation?

3C: Tell a lie, are you the person who took that bank deposit money?

3R: Tell the truth, are you the person who took that bank deposit money?

dC: Tell a lie, do you have a child named Karl?

dR: Tell the truth, do you have a child named Karl?

2C: Tell a lie, did you steal that bank deposit money?

2R: Tell the truth, did you steal that bank deposit money?

cC: Tell a lie, have you ever driven a car?

cR: Tell the truth, have you ever driven a car?

4C: Tell a lie, have you told the real truth to Trooper Bohrer?

4R: Tell the truth, have you told the real truth to Trooper Bohrer?

FOURTH CHART:

IC: Tell a lie, is your name (Subject's name)?

IR: Tell the truth, is your name (Subject's name)?

eC: Tell a lie, are you employed by the _____ corporation?

eR: Tell the truth, are you employed by the _____ corporation?

2C: Tell a lie, did you steal that bank deposit money?

2R: Tell the truth, did you steal that bank deposit money?

1C: Tell a lie, did you write the figure $889.48 on the side of that deposit slip?

1R: Tell the truth, did you write the figure $889.48 on the side of that deposit slip?

} Fig. 1

bC: Tell a lie, have you ever driven a car?

bR: Tell the truth, have you ever driven a car?

Summary

In summary, the ultimate concern of the examiner is the accurate evaluation of the chart tracings. Furthermore, this technique appears to work to the advantage of the truly innocent person because of the clarity of their responses, and gives a more objective means of accurate chart interpretation.

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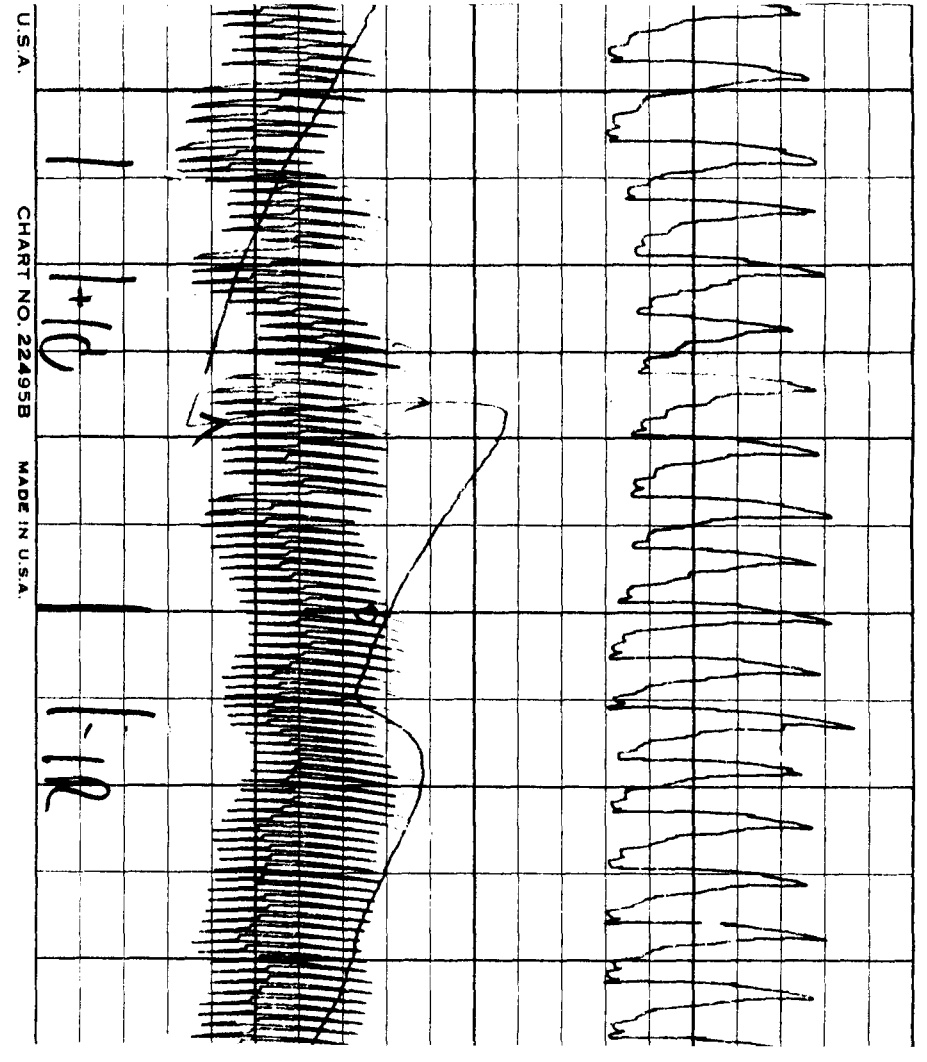

Figure 1
First set of relevant question pairs, first chart.

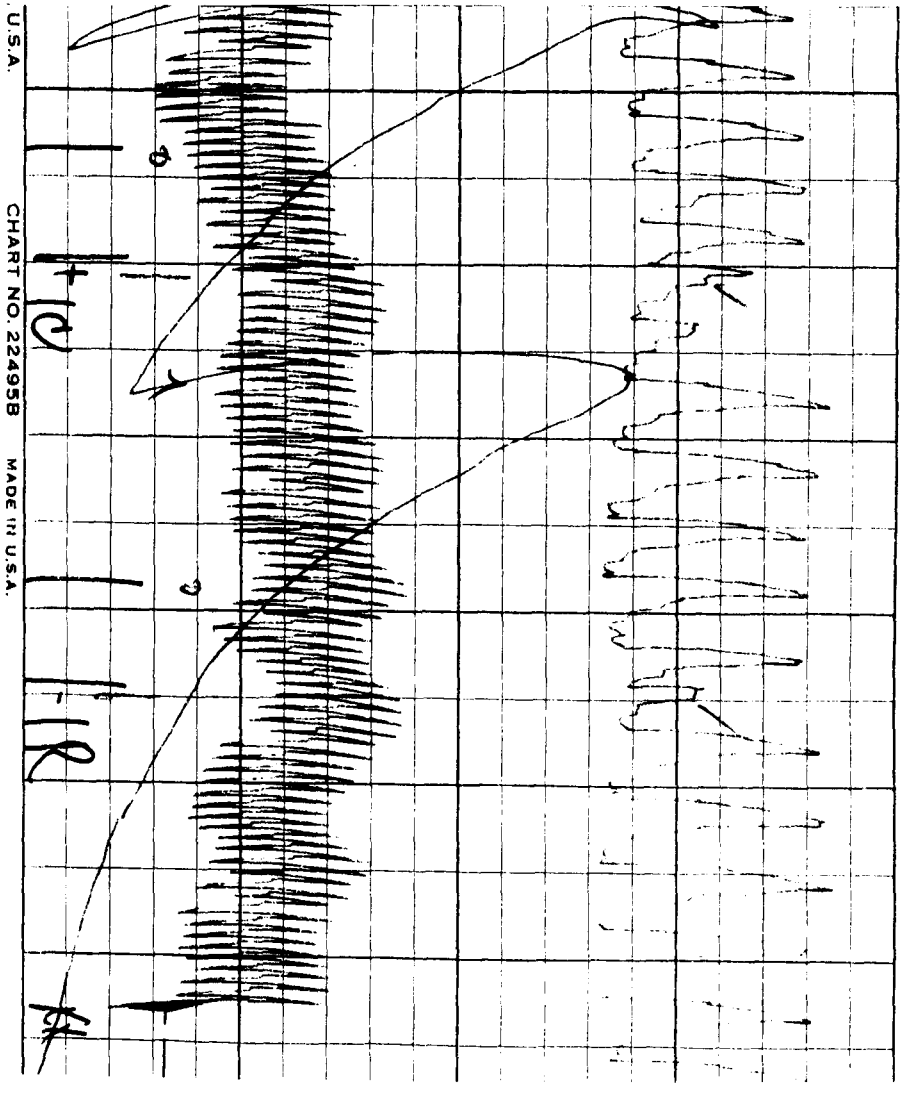

Figure 2
Last relevant question pair, second chart.

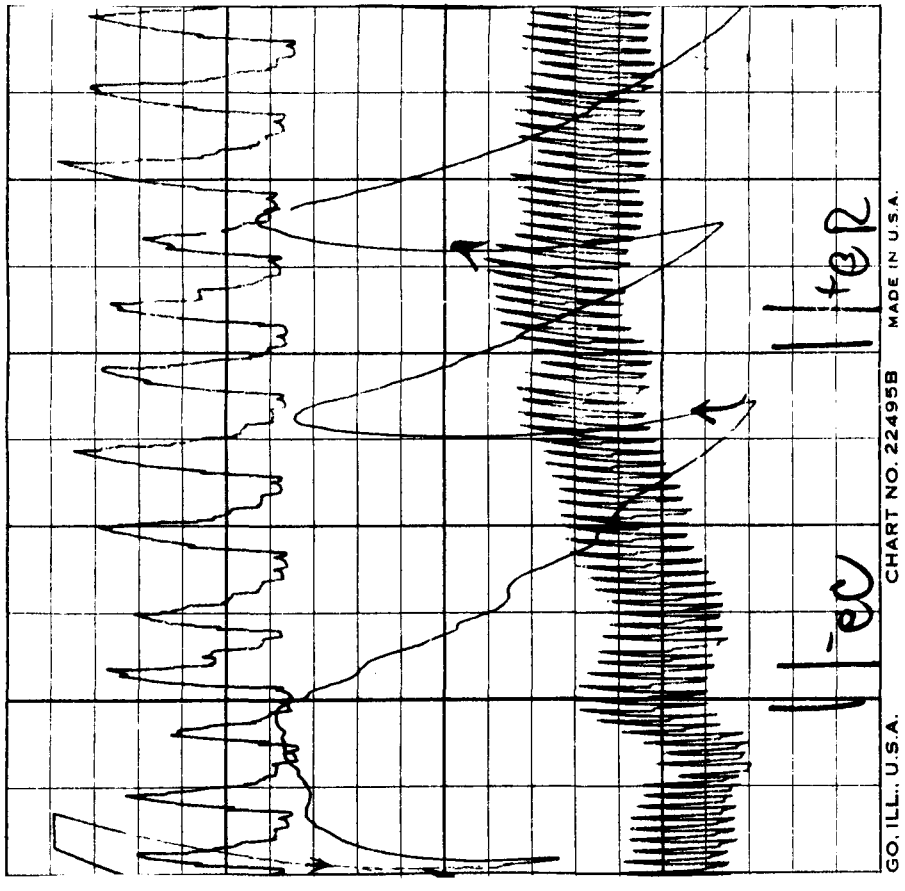

Figure 3
Second irrelevant pair, fourth chart

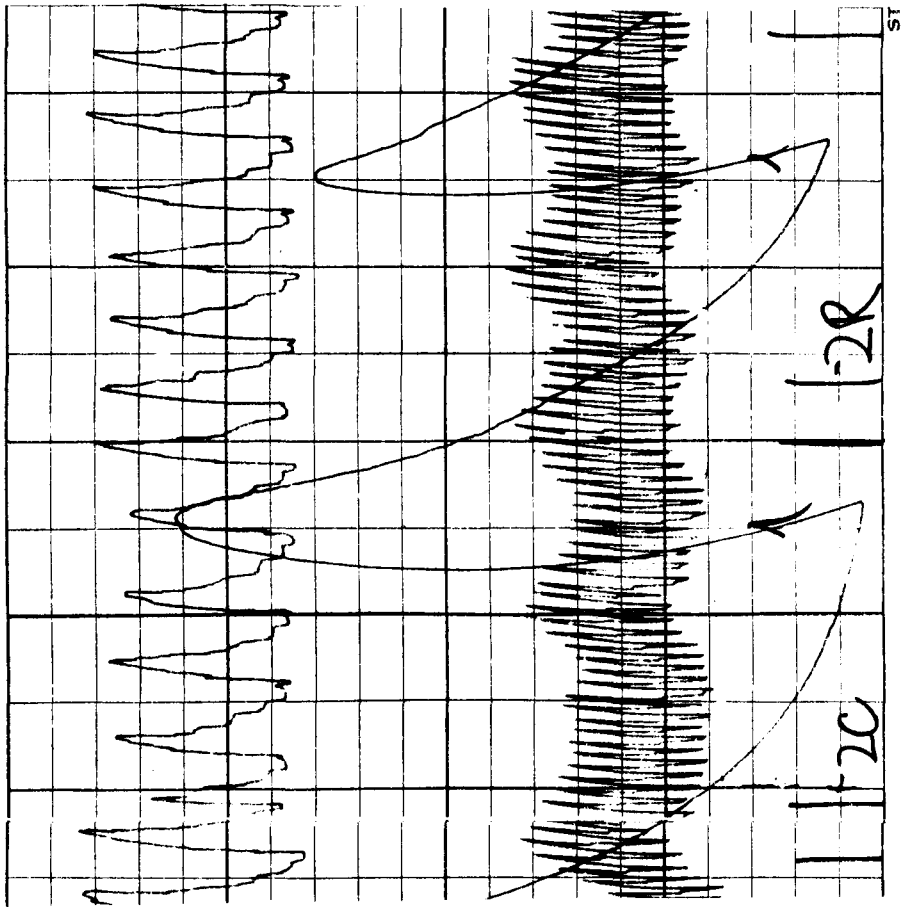

Figure 4
First relevant pair, fourth chart.

A SURVEY OF POLYGRAPH EXAMINATIONS IN JAPAN:
An Analysis of Actual Conditions

By

Akihiro Suzuki

Preface

This research was conducted to investigate actual polygraph examination conditions and to find those factors contributing toward more effective investigations. The significant of this polygraph survey study of the administration of the examination has been reported previously, (Suzuki, 1977); therefore, it will be omitted here. In this report, interviews, questioning methods, environments of examination, results and its utilization are arranged and analyzed.

Procedures

The subjects used, procedures and the periods of the survey were identical to the previous report.

Results and Remarks

Interviews

Roles of an interview in polygraph tests, such as confirming subject's willingness, explaining examination procedure, eliminating anxiety from outside issues, determining the rationality of questions, are considered crucial for a lawful and effective examination. An analysis from the standpoint of interview time, age difference between the subjects and examiners, contents of interviews (regarding suspected cases, background of subjects, other crimes, etc.) was carried out.

Time of Pre-Test Interview

Table I shows the accounts of subjects by Interview time and overall judgment and their relationship in the diagnostic difficulty.

Of all cases, 75% of the subjects were given less than 30 minutes of pre-test interviews. In looking at the relationships between the interview and overall judgment, the ++ judgment rate increased with longer allotted time. The relationship between other judgment and diagnostic difficulty in terms of allotted time did not show a definite trend. However, with the exception of "over 46 minutes" category, a tendency of increasing in number in reaction weakness, (++) and (+) and decreasing response (in confusion) and (-) with longer allotted interview time was noted. In the cross total

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The author is a Senior Researcher on the research staff of the Psychology Section at the National Institute of Police Science, Tokyo. The author is deeply grateful to Dr. Frank Horvath for his kind advice in preparing this English manuscript. This article originally appeared as "Field Polygraph Examination Condition and Analysis of Its Effective Procedures," Reports of National Institute of Police Science (Tokyo, Japan), 28(1975): 15-22. Reprinted in English with permission of the author and the Institute. For copies of reprints write to Akihiro Suzuki, National Research Institute of Police Science, 6 Sanban-cho, Chiyoda-ku, Tokyo, Japan.

of interview time and types of crime, interview time and age of subjects, etc., a characteristic of "over 46 minutes", was not noticed. This suggests that the interviews of "over 46 minutes", as compared to others, show a difference in the amount as well as the quality of the interview. In the interviews of "over 46 minutes", 92.9% of the cases were examined by examiners of only 4 prefectures which reflects the examiner's preferences or habits rather than the subjects' condition.

The diagnostic difficulty decreased with shorter allotted time, except in the "over 46 minutes" category. But in the "less than 15 minutes" category, the ratio of hired help theft, shop theft, and resident theft (hereafter all known as shop theft) in the non-intrusion theft was high (20.9%), and overall judgment rate of (-) was the highest in each allotted interview time. In a shop theft case, an examination of several subjects including the person who is not supposed to be so doubtful is often conducted as a decoy. This type of investigation is easy to administer and should show a higher (-) diagnosis rate. Taking all these into consideration, it is considered that the shorter interview time did not simplify the judgment essentially, but the interview was cut short because the subjects were readily judged. Therefore, it is unrealistic to surmise that the judgment becomes easier with shorter interview time.

Table I: Pre-Test Interview Time in Relationship To Overall Judgment

Interview Time:		within 15 min.	within 30 min.	within 45 min.	over 46 min.	Total
Cases		313	764	267	85	1,429
	%	21.9	53.5	18.7	5.9	100.0
Overall Judgment	++	5.8	8.2	12.4	15.3	8.9
	+	25.1	29.7	30.1	27.1	28.6
	± *	7.7	6.7	3.7	5.8	6.3
	± **	7.7	11.4	16.5	2.4	11.0
	-	53.7	44.0	37.5	49.4	45.2
Total:		100.0	100.0	100.0	100.0	100.0
Easy diagnosis	%	76.4	71.9	68.5	77.6	72.6
Difficult Diagnosis	%	23.6	28.1	31.5	22.4	27.4
Total:		100.0	100.0	100.0	100.0	100.0

* response confusion ** response weakness

Note: In this article the figures ++ and + indicate deceptive responses, ± inconclusive, and - as not deceptive. (This is the opposite of the U.S. practice of using a negative for deception, positive for no deception). [Ed.]

Interview Matters

Contents of the pre-test interviews were divided into the following three points and investigated: (1) on the case suspected, (2) family situation and background of subjects and (3) crimes other than the one being investigated. The cross total results of diagnostic facility and difficulty are shown in Tables 2, 3, and 4.

In Tables 2, 3, and 4, the rating of "thorough" interviewed showed the highest amount. In each case, the easy judgment rate was highest in the "thorough interviewed" column. The easy judgment rate was comparatively lower in the "interviewed some" column. In the order of "crimes other than the one being investigated," "family situation and background of subjects," and "on the case suspected", number of cases in columns "Thorough interviewed" were higher but the rates of easy judgment were the reverse.

Although small in number, 18 subjects were given "little interviewed" regarding the three points of interview given above and it seems they performed the examinations without hardly any interview. Judging from the inspection on each questionnaire sheet of survey, it seems, to the considerable extent, that the degree and contents of interview was depended on the traits or preferences of the examiner rather on the type of crime or subject's background.

Table 2: Thoroughness of the Interview and Its Relationship Diagnostic Difficulty

Degree of Interview	Thorough	Some	Little	Totals
Cases	1,065	319	45	1,429
%	74.5	22.3	3.1	100.0
Easy Judgment %	73.8	68.7	71.1	72.6
Difficult Judgment %	26.2	31.3	28.9	27.4
Total:	100.0	100.0	100.0	100.0

Table 3: Interviews on Family Condition, Background and Their Relationship to Diagnostic Difficulty

Degree of Interview	Thorough	Some	Little	Totals
Cases	661	672	96	1,429
%	46.3	47.0	6.7	100.0
Easy Diagnosis %	77.9	67.1	74.0	72.6
Difficult Diagnosis %	22.1	32.9	26.0	27.4
Total:	100.0	100.0	100.0	100.0

Table 4: Interviews on Crimes Other than Those Being Investigated and Their Relationship to Diagnostic Difficulty

Degree of Interview:	Thorough	Some	Little	Totals
Cases	487	523	419	1,429
%	34.1	36.6	29.3	100.0
Easy Diagnosis				
%	79.9	68.8	68.7	72.6
Difficult Diagnosis				
%	20.1	31.2	31.3	27.4
Total:	100.0	100.0	100.0	100.0

Age Difference Between Examiner and Subject

It is presumed that mutual relationship of the examiner and the subject during the interview also affects the diagnostic difficulty. Based on this assumption, the age difference between examiner and subject was examined. Table 5 shows the relationship of age difference as seen from the examiner's side, and the degree of difficulty.

Table 5: Age Difference Between Examiners and Subjects and Effect on Diagnostic Difficulty

Age Difference:	20 yrs. less than examiner	10-19 yrs. younger	5-9 yrs. younger	5 + or minus	5-9 yrs. older	10-19 years older	Over 20 yrs. older	T O T A L
Cases:	360	365	172	247	85	112	85	1,42
%	25.2	25.5	12.0	17.3	5.9	8.2	5.9	100.
Easy Diagnosis %	78.9	71.8	77.9	67.6	60.0	66.1	74.1	72.
Difficult Diagnosis %	21.1	28.2	22.1	32.4	40.0	33.9	25.9	27.
Total:	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.

About 62.7% of the subjects were younger than the examiners and 37.3% were of same age or older. From the degree of diagnostic difficulty, excluding those over 20 years difference, the rate of judgment was generally higher in the "younger than examiner" category than in the "older" category. The following reasons can be given for this: (1) The subject's physiological function does not lower and (2) the older examiner feels a psychological advantage over younger subjects. It is believed that these factors do affect the diagnostic difficulty but the degree of influence is not known.

Subject's Impression

Tables 6 and 7 show the relationship of cheerfulness-gloominess and irritable-docile traits of subjects in the diagnostic difficulty.

Recently, there is a tendency among the examiners to be concerned with the relationship of subject's personality to his response; but there is little research in this respect. In order to prove this problem, two items were arbitrarily selected from the examiners' impression of the subjects. The majority of the subjects were categorized as normal on these two items. The gloomy subjects rather than cheerful and irritable rather than docile were much more difficult to diagnose. The gloomy and irritable subjects showed more positive judgment than those of opposite personality. This may make diagnosis more difficult in criminals of one-sided or eccentric personality.

Table 6: Impression of Subject's Cheerful-Gloomy Attitude and Its Relationship in Diagnostic Difficulty

Impression	Cheerful	Normal	Gloomy	Totals
Cases	171	1,033	255	1,429
%	12.0	72.3	15.7	100.0
Easy Diagnosis %	78.9	73.1	65.3	72.6
Difficult Diagnosis %	21.1	26.9	34.7	27.4
Total:	100.0	100.0	100.0	100.0

Table 7: Impression of Subject's Irritable-Docile Attitude and Its Relationship to Diagnostic Difficulty

Impression	Irritable	Normal	Docile	Totals
Cases	150	950	329	1,429
%	10.5	66.5	23.0	100.0
Easy Diagnosis %	69.3	72.7	73.6	72.6
Difficult Diagnosis %	30.7	27.3	26.4	27.4
Total:	100.0	100.0	100.0	100.0

Examination and Environment

Card Test Response

The objectives of a pre-examination card test are to check the equipment, explain the procedure, and obtain the sample lie pattern of a subject.

The response intensity distribution in a card test and diagnostic difficulty are shown in Table 8.

Table 8: Card Test Response Distribution and Its Relationship to Diagnostic Difficulty

Card Test Response:	++	+	±	-	Not Used	Totals
Cases	255	685	267	52	170	1,429
%	17.8	47.9	18.7	3.6	11.9	100.0
Easy Diagnosis %	87.5	76.6	50.9	50.0	74.9	72.6
Difficult Diagnosis %	12.5	23.4	49.1	50.0	25.1	27.4
Total:	100.0	100.0	100.0	100.0	100.0	100.0

Subjects who have not been exposed to a card test consisted of 11.9% of the entire subjects. A further study showed that those who were not exposed to the card test were concentrated in specific prefectures and not scattered throughout various prefectures.

By using the number of subjects who were given the card test as a modulus, the occurrence of (++) and (+) reactions was 75.3%. This figure can be regarded as a possible diagnostic rate of the actual card tests. In comparing the overall judgment results in the card test and the actual test, many of those who showed (++) reactions in the card test were relatively high in the (++) judgment of their actual test; and many of those who showed (+) reactions in the card test were comparatively high in the (+) judgment. A similar tendency was seen in (±) and (-) reactions. Among whose responses in the card test which could not be diagnosed, 9.6% (5 subjects) were given (++) or (+) judgment in the actual test and the remaining subjects were given (±) or (-) judgment. About 40 to 50% of cases in each diagnostic category in the card test were judged as (-) (an indication of innocence) in the actual test. The card test response, as shown in Table 8, have relation in the rate of diagnostic difficulty in actual testing. Therefore, the card test is significant in providing vital information to the examiners.

Questioning Method

The relationship between the type of questioning methods and diagnostic difficulty is shown in Table 9. This table has been broken down into KS-POT, CQT, and PR-POT to determine the rate of diagnostic difficulty. The KS-POT method was used in 1,082 cases (39.4%) resulting in 73.5% for easier diagnosis. CQT method in 961 cases (35.0%) showing 69.6% and PR-POT method in 706 cases (25.6%) showing 70.5% for easier diagnosis.

In a study on the questioning method and the time lag from the day of crime to examination, the number of KS-POT method alone cases and the combined

KS-POT and CQT cases were increased with the prolongation of time lag, but the test by CQT showed a reverse trend.

Table 9: Questioning Methods and Their Relationship to Diagnostic Difficulty

Methods	KS	KS-PR CQT	KS-CQT	PR	PR-CQT	CQT	KS-PR	Total
Cases	205	320	412	118	123	106	145	1,429
%	14.3	22.0	28.8	8.3	8.6	7.4	10.1	100.0
Easy Diagnosis								
%	82.0	71.3	70.9	78.8	56.9	74.5	73.8	72.6
Difficult Diagnosis								
%	18.0	28.7	29.1	21.2	43.1	25.5	26.2	27.4
Total:	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Number of Charts Used

Most of the questioning was by 4 to 6 charts (41.0%) followed by 1 to 3 charts (28.8%), 7 to 10 charts (26.0%), and over 11 charts (4.3%). In the 7 to 10 charts, the rate of easier judgment was high, 75.5%, followed by 1 to 3 charts with 74.7%, 4 to 6 charts with 69.8%, and over 11 charts with 67.2%. This did not show that the increase in the number of charts increases the rate of easier judgment.

A set trend could not be seen from the cross total of the time lag from the occurrence of crime, and the number of charts. Generally, a greater time lag would increase the substance of questioning, but in the examinations of "within 3 months," "within 6 months" and "over 6 months" conducted by 4 charts and over were 87%, 74%, and 72%, respectively.

The results of cross total between the number of charts and method of questioning are shown in Table 10. A tendency toward using only the CQT or a combined CQT and PR-POT can be seen when there was a lack of questioning materials. A smaller number of charts was used more frequently with subjects under no restraint, than those detained.

Table 10: Cross Total of the Number of Questioning Charts and Methods (%)

Methods	KS	KS-PR CQT	KS-CQT	PR	PR-CQT	CQT	KS-PR	Total
Number of Charts:								
1 - 3	29.3	9.4	25.2	28.0	48.0	98.2	14.5	28.8
4 - 6	44.8	40.6	42.2	53.4	37.7	-	55.6	41.0
7 - 10	21.5	40.9	27.9	18.6	16.3	0.9	26.2	26.0
Over 11	4.4	9.1	4.4	-	-	0.9	2.7	4.3
Total:	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Examination Room Environment

The exclusive-inclusive use, location, noise and temperature of the examination rooms have been checked. These conditions are shown in Tables 11 through 14.

Over 10% of the entire cases were examined in exclusive rooms equipped for polygraph tests, with soundproofing. Most of these rooms (81.1%) are located at the police headquarters and some (18.3%) are located at the local police stations. Those examinations conducted at the police headquarters, 87.7% took place in exclusive rooms. In the examinations conducted in non-exclusive rooms, 13.3% of subjects did the beat machine action, but this trend was higher (17.5%) in the exclusive room examination.

In checking the noise condition at the headquarters sites, 1.9% showed either "noisy" or "quite noisy" but the local stations showed 13.1% and 18.5% at other locations.

In regard to temperature, 9.9% of the examinations at headquarters were conducted in rooms registering over 27°C (27°C = 80.6F.), 13.1% at local stations and 16.6% at other locations. Since the survey period was between April and July only 1.3% of the examinations were carried out in a temperature less than 15°C.

In the result showing relationship between the noise and diagnostic difficulty, the rate of diagnosis was identical (72%) under "noisy," "Normal" and "quiet" conditions; however, the rate decreased to 61% in the "quite noisy" environment. Since the rate of diagnosis difficulty for "noisy," "normal" and "quiet" was same as in overall rate of difficult diagnosis, these situations cannot be a factor in diagnosis, except in the case of "quite noisy."

In regard to temperature's effect on diagnosis, examinations conducted in rooms of 15°C. or less showed a high easy diagnostic rate of 84.2% followed by 77.2% in rooms of 16 to 20°C., 70.3% in 21 to 26°C. and 67.4% in rooms over 27°C. This indicates the rate of easy diagnosis decreases with higher temperature. Every caution must be taken to generalize the result of easy diagnosis rate which was obtained from under 15°C. condition, since number of cases in this category were only 19 and the subjects must have felt a chill in this temperature.

Table 11: Use of Exclusive or Non-Exclusive Rooms

	Exclusive	Non-Exclusive	Total
Cases	175	1,254	1,429
%	12.2	87.8	100.0

15°C. = 59°F. 16 to 20°C. = 60.8 to 68° F. 21 to 26°C. = 69.8 to 78.8° F. 27° C. = 80.6° F.

Table 12: Examinations By Locations

	Police Headquarters	Police Stations	Others	Total
Cases	162	1,110	157	1,429
%	11.3	77.7	11.0	100.0

Table 13: Degree of Noise

	Quite Noisy	Noisy	Ordinary	Quiet	Total
Cases	13	164	905	347	1,429
%	0.9	11.5	63.3	24.3	100.0

Table 14: Temperature of Examination Room

Temperature	Less Than 15°C.	16 - 20°C.	21 - 26°C.	Over 27°C.	Total
Cases	19	517	706	187	1,429
%	1.3	36.2	49.4	13.1	100.0

Examination Starting Time and Time Consumed

The breakdown of investigations by time was 41.1% for 0800-1100 hours, 35.3% for 1100-1200 hours, 21.6% for 1400-1700 hours, 1.2% for 1700-1900 hours and 0.9% for other hours. Of these, 97.9% were conducted between 0800 and 1700 hours which can be considered a satisfactory condition for both examiners and examinees. The hours between 0800 and 1100 showed a highest rate of easy diagnosis (74.7%, an indication that the examinees have maintained a higher physiological function.)

The number of examinations according to time consumed is as follows: 53.2% between 1 to 2 hours, 37.0% within one hour, and 9.8% over 2 hours. The cross total of time consumed and easy diagnosis showed a highest rate of 75.2% for investigations of less than one hour, 72.1% for over 2 hours and 70.1% for 1 to 2 hours, indicating very little difference. Thus, a study on the relationship of "reaction weakness" and "reaction confusion" and time consumed was conducted; but a characteristic that tests under one hour show higher response confusion and tests over 2 hours show higher response weakness was not noted.

In examinations (over 100 cases) conducted for various crimes, the time consumed was higher in felonious crime, violence, and intrusion theft than in others (13.6%, 14.6%, and 14.9% respectively required over 2 hours). Most of the shop theft cases required less than one hour (64.8%). This indicates that the time consumed in the examination is governed to a certain degree by the seriousness of the crime.

Obstruction Action

In a total of 126 cases, or 8.8%, it was discovered by the examiners that the subjects made attempts to obstruct the examinations. Generally, this obstruction can be easily detected by observing the subjects and by looking at the charts. A disruptive action which cannot be detected by these means should be anticipated in actual examinations. Its countermeasures should be given further study.

Introspection

After the examinations, 1,007 (75.5%) cases of subjects were required to report the introspection during the examinations and the remaining 422 (29.5%) cases were not.

Reaction and Judgment

As mentioned before, various questioning methods and charts are used in Japan. Although it is relatively simple to obtain each individual judgment on each chart - To make an overall judgment from each response is not easy because there are no formulae nor concrete procedures, and the relevance of questions to the crime, especially POT, must be taken into consideration. Responses by three indices and an overall judgment based on the three indices were separately obtained for our research. The diagnostic difficulty and response distribution by the index are shown in Table 15.

Table 15: Response Distribution By Index and Its Relationship To Diagnostic Difficulty

Response	++	+	$\pm^{*}$	$\pm^{**}$	-	Total
Respiration:						
Cases	147	345	157	229	551	1,429
%	10.3	24.1	11.0	16.0	38.6	100.0
Easy Diagnostic Rate:	92.5	76.8	22.9	49.8	88.2	72.2
GSR						
Cases	132	343	166	268	520	1,429
%	9.2	24.0	11.6	18.8	36.4	100.0
Easy Diagnostic Rate:	93.7	77.0	32.5	52.2	87.5	72.2
Pulse Wave						
Cases	33	205	171	353	667	1,429
%	2.3	14.3	12.0	24.7	46.7	100.0
Easy Diagnostic Rate:	93.9	84.9	49.1	56.9	81.7	72.2

* Response Confusion
** Response Weakness

By the (++) and (+) positive responses, the respiratory rate of 34.4% and GSR rate of 33.2% were obtained in relation to 16.6% for the pulse wave response. It can be said from these results that the reactivity of pulse wave is not so high. A further comparison of occurrence of inconclusive responses for (±) indices showed that the response confusion rate for each index was 11 to 12%, and the response weakness rate was 24.7% for pulse wave, 16.0% for respiratory rate and 18.8% for GSR.

The easy diagnosis rate of (++) and (+) in each index was naturally high, and among (+) category, pulse wave showed higher easy diagnostic rate than the (+) of others. It can be said that once the change takes place in pulse wave, diagnosis can be made more readily.

In checking the diagnostic difficulty when a response confusion or a response weakness occurs, the response weakness showed a higher rate of easy diagnosis than in response confusion in all indices (see Table 15). However, this cannot be considered conclusive because, in connection with the contributing factor toward an overall judgment by indices, an index of higher contributing factor often becomes harder to diagnose when the reaction confusion or weakness occurs. In contrast, the index of lower contributing factor can be offset by other indices when the response confusion or weakness occurs. The views on diagnostic difficulty by examiners are from an individual preferance, but on the individual polygrams from each case.

The relationship between the response of each index and overall judgment are shown in Table 16. The number 13 on the left column for example indicates that there were 13 cases of (++) judgment in which all channels, the respiratory, GSR and pulse wave showed (++) reactions.

According to Table 16, the contributing factors toward the overall judgment shows a respiratory rate of 72.2%, GSR of 69.8%, and pulse rate of 61.2%. However, from the reactivity of an index alone, the degree of its contribution toward the overall judgment can be determined only from the (++) and (+) reactions. In the case of an (-) overall judgment from a (-) reaction and the overall judgment of (I) case, it is not considered that a response from each index contributes to the overall judgment. Therefore, only the (++) and (+) columns were used to calculate the degree of contribution toward the overall judgment by each index. The procedure of calculation was by totaling the (++) and (+) overall judgment in 498 cases as a modulus, then to divide the number of those showing conformity between the response and overall judgment to obtain the ratio. The results obtained were 76.7% for respiration, 69.5% for GSR and 36.5% for pulse wave. From these results, it can be said that the pulse wave response is weaker than the other two, has less conformity in reaction with other indices and shows no sign of a role of offsetting when the other indices fail to generate reactions. It is not known whether this result concerning the pulse wave comes from (1) examiners' preference or prejudice to certain indices, (2) problems arising in measurement, (3) problems in sensitivity and linearality of equipment or (4) characteristics of index itself of a physiological nature.

The "unconformity" column of Table 16 shows unconformity in all 3 indices regarding the overall judgment showing for example a (+) response occurring in each index and a (++) overall judgment.

In the overall judgment, 90, or 6.3%, showed response confusion and 175 or 11%, showed response weakness, and 82.7% of the total cases showed responses of diagnostic possibility.

Table 16: Response By Index and Its Relationship to Overall Judgment Response

Overall Judgment	++	+	±*	±**	-	Total (%)
Conformity of Indices	13	87	20	54	396	570 (39.9)
Conformity of Two Indices						
Respiration-GSR	39	105	24	21	26	215 (15.0)
Respiration-Pulse Wave	2	33	9	18	72	134 (9.4)
GSR-Pulse Wave	7	26	11	22	48	114 (8.0)
Conformity of One Index						
Respiration	43	60	10	11	32	156 (10.9)
GSR	18	51	6	8	15	98 (6.9)
Pulse Wave	3	11	3	10	29	56 (3.9)
Non-Conformity	2	36	7	13	28	86 (6.0)
Total:	127	409	90	157	646	1,429 (100.0)

* Response Confusion
** Response Weakness

Utilization of Test Results

Reporting Form of Test Results

The test results of 922 cases (64.5%) were orally reported to the authorities concerned, 321 cases (22.5%) were reported on forms for expert reports and 186 cases (13.0%) were in forms of the expert opinion, in writings. The documents in which detailed examination procedure and process were stated were defined here as the expert opinion in writings.

Confirmation of Results

Cases, which have been dismissed by confession or prosecution or verified as guilty by any other strong scientific evidence, were defined as confirmed positive and cases where actual criminals have been arrested or when the subjects have been cleared by other than polygraph test, were defined as confirmed negative.

There were 464 cases (32.5%) recognized as positive through this rough definition and 315 cases (22.0%) as negative, plus 650 cases (45.5%) as unconfirmed. The time taken for confirmation was between 2 to 6 months.

In respect to the type of crime in which more than 100 cases were examined, the unconfirmed rate for that crime was calculated and compared with the overall unconfirmed rate of 45.5%. The shop theft crime rated the highest with 58.5% unconfirmed, intrusion theft was 36.4%, non-intrusion theft excluding the shop theft was 37.3% and felonious crime was 45.2%, the latter being about the same as the overall rate.

Confirmation by confession, prosecution and other evidence are shown in Tables 17, 18, and 19. In the figures of column of "denied" in Table 17, "not prosecuted" in Table 18 and "no other supporting evidence" in Table 19, subjects whose results have not been confirmed have been included. Also number of the confirmed negative were included in the column of "denied" of Table 17, "not prosecuted" of Table 18 and "other evidence available" of Table 19. In the column "with other supporting evidences" in Table 19, is the sum of the confirmed positive and the confirmed negative both by other evidences.

Table 17: Confession

Confession Time:	Confession During Examination	Within One Day After Examination	Over Two Days After	Denied	Total
Cases	111	206	109	1,003	1,429
%	7.8	14.4	7.6	70.2	100.0

Table 18: Prosecuted Cases

	Prosecuted	Not Prosecuted	Total
Cases	443	986	1,429
%	31.0	69.0	100.0

Table 19: Existence of Other Evidences

	Other Evidences Available	Not Available	Total
Cases	488	941	1,429
%	34.1	65.9	100.0

Others

The positive test results of 68 cases were utilized as written pleas for warrants. This is 12.7% of the 536 cases designated as positive. Result of investigation by interrogators after examination revealed that the subjects who had committed other crimes admitted at the time of examination totaled 262 or 23.8% of the total. In the cross total of existence of other

crime and diagnostic difficulty, the rate of diagnosis was 77.1% in the "other crime committed group" and 71.25 in the "no other crime committed group."

Cases involving accomplices totaled 128 persons or 11.2% of the total. The cross total of existence of accomplices and diagnostic difficulty showed the rate of easy diagnosis to be 80.0% in the "accomplice group" and 71.6% in the "no accomplice group."

Summary:

Investigations were carried out to grasp the actual conditions in polygraph examinations in Japan and to find factors contributing toward effective examination interviews, methods of questioning, environments of the test room, and utilization of test results were analyzed and the results are summarized as follows.

1. Depth of interviews on subjects backgrounds, concerned crime and other crime have an effect on diagnostic difficulty.

2. Examinations on subjects who are of same age or older than the examiners show less diagnostic ease than those who are younger in age.

3. Subjects considered "gloomy" and "irritable" show less diagnostic ease than those reported as "cheerful" and "docile."

4. KS-POT, PR-POT and CQT showed progressively greater diagnostic difficulty, but the difference between PR-POT and CQT is very small.

5. The degree of card test response has a strong effect on the diagnostic difficulty.

6. The period of time between occurrence of crime and examination, and the number of charts showed no relationship.

7. About 39.9% of the entire cases showed uniform reactions in all three indices.

8. Pulse wave reaction showed a higher response weakness rate than the other indices and also showed a less contributing rate toward overall judgment.

9. Of those cases confirmed within 2 to 4 months, 32.5% were positive and 22.0% negative.

10. About 12.7% of the testing results of positive subjects were used for a written plea for warrants.

11. The length of interviews, omission of card tests, polygraph questioning method and selection depend more on the examiner's habit than on the types of crime or subject's condition.

* Reference: Suzuki, A. "A Survey of Factors Affecting the Polygraph Examination in Japan," Polygraph 6(3)(September 1977): 218-232.

THE UNCERTAINTY FACTOR IN CONTROL QUESTIONS

By

James Wygant

Although control questions are variously identified as probably lie or known lie or comparative response questions, their purpose in a polygraph examination is always the same, to stimulate a greater response than the relevant questions do for a test subject who is answering the relevant questions truthfully. If a truthful subject is producing greater responses to the relevant questions than to the controls, then the controls are not functioning as intended.

To avoid the use of defective controls it is helpful to examine the cause and effect relationship between the control question and its response, remembering that the kinds of sympathetic responses recorded in a polygraph test are not caused directly by lying. They are caused by the subject apprehending a threat to his or her well-being in the form of a specific question which demands his commitment to an answer. The delayed answer test study by Dawson[1] showed that subjects reacted with equal or stronger intensity to the question itself when their answers were delayed. And Raskin's study with psychopaths[2] showed that even prisoners who customarily attached virtually no stigma to the act of lying produced tests as accurate as non-psychopathic subjects, presumably because they still felt threatened by the questions.

Lying in a test is essentially the verbal reinforcement of the subject's commitment to a defensive posture with respect to a specific threatening stimulus. Any stimulus which contains elements which are capable of thrusting a test subject into that defensive posture will produce some degree of response. In a polygraph test we customarily deal with the lie that creates the threat of getting caught telling a lie, but we should recognize that a subject can be put in a defensive posture, in which he feels threatened and consequently produces a response, not just by lying, but also by uncertainty, embarrassment, anger, fear or intimidation. We are still dealing with the threat of getting caught telling a lie, but not one which originates from an actual lie but rather from the subject's concern that his answer will be perceived as a lie. These kinds of ambiguous responses are screened from the relevant questions by tight, specific construction, by avoidance of emotionally laden words, by using controls similar in nature, and by adequate pre-test preparation of the subject.

However, it is in the construction and presentation of control questions that we do place some reliance on the responses stimulated by uncertainty. The classic theory of control questions has been that they induce the test subject to tell a lie. Their function then has been to stimulate a response to the threat of getting caught telling an actual lie. The examiner has seldom known positively whether the subject was lying to a

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*The author is a licensed examiner in private practice. For reprints write to him at 11238 S.E. 21st Avenue, Milwaukee, Oregon 97222 or call (503) 654-6244.

control but has assumed a lie because theoretically the control question is so broadly constructed that it should cause a lie from any normal human being. Little regard has been given to the importance of the uncertainty factor in these questions, although most controls actually rely heavily upon uncertainty to create the necessary threat-provoking stimulus. In covering a broad range of both past time and possible circumstances, control questions produce responses not just because the subject knows he is lying—and many subjects may not be deliberately concealing something when asked, "did you ever steal anything?"—but because the subject can not be sure he is telling the truth.

As opposed to relevant questions which are constructed so tightly that the subject knows definitely that he either is or is not answering truthfully, proper control questions do not permit that kind of certainty. For the subject who knows he is lying to the relevants, the uncertainty in the controls will not pose a threat greater than that posed by the relevants; but for the truthful subject, the uncertainty inherent in the controls can be the most threatening aspect of the test.

To a substantial degree, the closer the controls are aligned with the relevant issue, the greater their impact. For instance, in an assault case in which the suspect denies using a weapon, a good control has been "do you remember ever taking up anything as a weapon in a dispute?" The truthful subject who is able to draw clear parallels between what he is suspected of and what he is being asked in the control questions can usually be expected to produce a higher score than the subject who does not see similarities between the control questions and the relevant issue. The most effective control would be one which the test subject either lied to or could not answer with certainty and which he recognized as almost an extension of the relevant issue. If he is a truthful subject but does not recognize that the control questions are important to his "guilt" or "innocence", he will be at a distinct disadvantage in the test.

In this regard, it is important to remember that it is the subject's perception of the nature of the issue that is critical, not the examiner's. Although in most cases both the examiner and subject will identify the issue as theft or assault or whatever, there will occasionally occur cases in which the examiner is trying to employ his usual controls, which the subject perceives as inappropriate or unrelated to the relevant issue. This is best illustrated by two actual cases in which pre-test interview indicated that the test subjects did not have the usual view of the relevant issue.

In one of the tests, the subject was a male accused of possession of amphetamines which had allegedly been found next to his seat in the van in which he was a passenger. This subject admitted extensive past and present involvement with drugs, creating a common difficulty in finding good drug controls. However, it was abundantly clear from talking with him that he viewed the issue as one in which his credibility was in dispute, not his alleged possession of drugs. He thought that the police had planted the drugs and felt certain that his friend driving the van was equally innocent. He was tested using the following controls (his present age being 31) and produced high scoring truthful results, with his strongest responses being to the second control:

Between the ages of 25 and 29, do you remember ever lying about someone else to protect yourself? NO

Between the ages of 25 and 29, do you remember ever putting personal loyalty above truthfulness? NO

Between the ages of 25 and 29, did you have anything to do with drugs besides what you told me? NO

In the other test, a prostitute who was working at a massage parlor was the subject. Her employer wanted to know if she had committed any prohibited sexual acts with customers. From pre-test interview it was obvious that she viewed the issue not as sex but as cheating on her employer. The following controls were used:

Before you were hired by [employer], do you remember ever cheating someone you were working for? NO

Before you were hired by [employer], do you remember ever cheating on someone who trusted you? NO

Before you were hired by [employer], do you remember ever totally disregarding important rules? NO

This subject produced deceptive results on this test, with relevants asking whether she had engaged in intercourse or oral sex with customers. She made admissions and was re-examined five days later to see if she was withholding any information. The relevants were similar to the first test, but excluded the admissions. The controls were as follows:

Before you were hired by [employer], do you remember ever actually lying to someone who trusted you? NO

Before you were hired by [employer], besides what you told me, do you remember ever cheating someone you were working for? NO

Before you were hired by [employer], do you remember ever totally disregarding important rules? NO

This time she produced truthful results. Note also that she made an admission to one of the controls during the second interview, that she had not made the first time.

Based upon these general concepts, the following control questions have been constructed for use with specific kinds of issues. Some of these questions or similar constructs are already in general use. In several of the questions, one or two words will make the difference between a question that works and one that doesn't work as well. All of these questions have been used with success in actual tests. The primary consideration in constructing most of these questions was to be able to present the test subject with a question that he would be inclined to answer "no" while not being able to be sure that it was a truthful answer. An outright lie would be better, but the examiner generally can not be sure that that's what he is getting. The

uncertainty generated by the question can be regarded as a minimum requirement.

A "yes" answer to any question would be cause for a specific explanation from the subject and exclusion of the admission from the question with a phrase like, "besides what you told me ..." The questions are, of course, not designed to be used indiscriminately with any subject. Obviously, case information and pre-test interview will suggest that some questions might be more appropriate than others for a specific subject. Phrases in parentheses may be added to the body of a question, as needed. The abbreviation "dyr" means "do you remember." Age brackets, when used, would customarily be placed at the beginning of a question.

Suspects in Sex Cases

dyr ever even considering forcing a woman to (submit to sex/ do something sexual)?

dyr ever forcing any sexual attention upon a girl/woman?

dyr ever continuing beyond genuine objections to your advances?

dyr ever feeling any improper sexual attraction for someone who was too young? (NOTE: For child-victim cases only.)

Before the incident reported by ——, did you ever want to have sex with her? (CAUTION: Use this question only when victim and suspect were acquainted and where there is a believable denial by both of prior sex.)

Suspects or Victims in Sex Cases

Dyr ever having sexual interests that were anything other than normal? (NOTE: Do not use "abnormal." For a question that reaches into teen years, add "for that age" at the end.)

dyr ever committing any sex act that most other men/women (that age) would not do?

dyr ever doing something sexual that (was/others would consider) improper for that age? (NOTE: For teens only.)

dyr ever doing something sexual (alone or with another) that you didn't want your wife/husband to know about?

dyr ever doing something sexual that others would consider excessive?

dyr ever handling your own body or another's in an improper sexual way? (NOTE: Especially suitable for indecent exposure cases.)

Victims in Sex Cases

dyr ever wanting to have sex with a man whose name you didn't know?

dyr ever attempting to encourage the interests of a man other than your husband?

dyr ever (dressing/appearing in public) in a way intended to arouse sexual interest?

Theft Cases

dyr ever taking or receiving something you weren't entitled to?

dyr ever justifying to yourself an actual theft you had committed?

dyr ever stealing anything (from an employer/from someone who trusted you?

dyr ever considering doing something illegal to get goods or money?

Assaults and Homicides

dyr ever creating a risk of injury to someone else by your own actions?

dyr ever endangering someone else by your own recklessness?

dyr ever hurting someone (except for genuine self-protection/ who trusted you/when you could have avoided it/without serious provocation)?

dyr ever doing anything excessive or unreasonable in a dispute? (NOTE: "Dispute" includes arguments, etc.)

dyr ever taking up anything as a weapon in a dispute? (NOTE: Use only when the relevant issue also involves a weapon.)

dyr ever having so little regard for someone that you could knowingly hurt them?

dyr ever being so mad at someone that you wanted them hurt/dead? (NOTE: Use "dead" for murders only.)

Drugs

dyr ever considering selling any addicting narcotics?

dyr ever dealing drugs for a profit? (NOTE: Useful if the subject admits prior sales but claims they were only to support his own purchases.)

dyr ever considering doing anything illegal to make money?

dyr ever considering that anything that made money was OK?

dyr ever actually encouraging someone to buy drugs?

dyr ever selling any drugs when it was more than just a favor to a friend?

did you ever consider yourself a drug dealer?

Conspiracy and General

dyr ever encouraging someone else to do anything illegal?

dyr ever engaging in any (serious) prohibited conduct with someone else?

dyr ever being (willingly) involved in someone else's illegal act?

dyr ever putting personal loyalty above truthfulness?

dyr ever considering that any lie that helped you was excusable?

dyr ever lying about something when you thought it couldn't be proved?

The form of these questions is intended to suggest a wide range of possibilities in formulating controls for specific test subjects. Many of the questions contain key uncertainty words that can be used successfully in other questions; that is, words which do not have precise meanings, such as: improper, actually, excessive, entitled, justifying, genuine, risk, considering, etc. A critical consideration for the examiner faced with formulation of control questions should be: given what I know about this subject, if I were him and was answering the relevant questions truthfully, what kind of control question would stimulate me. This mental role reversal, coupled with proper "selling" of the controls during the pre-test phase of the examination, can contribute substantially to conclusive test results.

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[1]Dawson, Michael E., The Delayed Answer Test and the Effects of Countermeasures, Andrew Norman Research Center, Gateways Hospital, Los Angeles, summary report presented at 1977 APA Annual Meeting.

[2]Raskin, D.C. Psychopathy and Detection of Deception in a Prison Population, University of Utah, Department of Psychology, June 1975.

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TECHNICAL NOTES

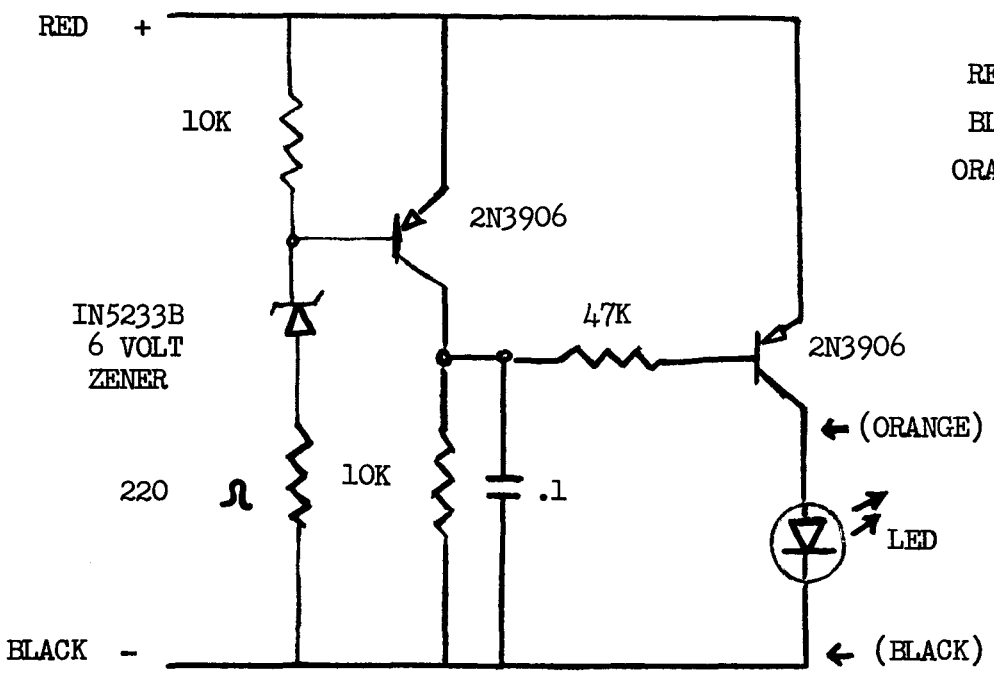
By

Ronald E. Decker and James Hudson

Low Voltage Indicator

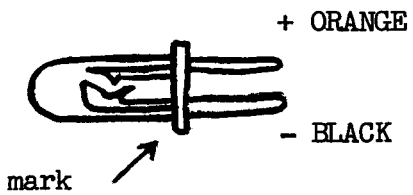
The diagram below outlines the design of a low voltage indicator which may be installed in either Stoelting or Lafayette DC operated polygraph instruments. The device will cause a LED (lite) to be activated when battery voltage reaches a level of 6.61, thus indicating to the examiner that a battery charge is required to permit the polygraph instrument to function properly.

LOW VOLTAGE INDICATOR



LED turns on +6.6v which would leave 1.1v per cell

LED - DRAKE CM4-23



POLYGRAPH REVIEW

By

Bobby J. Daily

How would you score on a licensing examination? Are you sufficiently up-to-date about such subjects as psychology, physiology, instrumentation, test question construction, chart interpretation, interview techniques, etc? Are you prepared to undergo direct and cross-examination on polygraph subjects in court? A score of 9 or 10 is excellent, 7 or 8 is good, and below 7 may indicate some review is warranted. (Answers on page 280.)

1. In Zone Comparison tests, an irrelevant question is designed to elicit a normal, truthful reaction from:

   a. a truthful subject.
   b. an untruthful subject.
   c. an emotional subject.
   d. a subject.

2. In a Peak of Tension test, the proper preface of all questions should normally be: "Do you know if -- - etc." This is done:

   a. so the subject will easily understand the question.
   b. so the questions can be answered with a "yes" or "no".
   c. in order to give the subject time to react.
   d. to give the subject a sense of security.

3. Which of the following would normally be the best relevant question in a rape case?

   a. Did you rape that woman?
   b. Did you ravish that woman?
   c. Did you have carnal knowledge with that woman?
   d. Did you force that woman to have sex relations?

4. In a control or guilt complex test, the questions should normally be based on:

   a. the matter under investigation.
   b. a hypothetical situation.
   c. a widely publicized case.
   d. a minor matter to which the subject has confessed.

5. In the preparation of each relevant question, it is advisable to do which of the following?

   a. Make the question slightly complicated so the subject stays alert.
   b. Confine the question to one issue.
   c. Cover as many aspects of the crime as possible, yet remain brief.
   d. Use legal and technical terminology whenever possible to minimize confusion.

6. The level of intelligence of a subject has no bearing on the actual wording of test questions. (T) (F)

7. The primary purpose of the irrelevant question traditionally has been to give the subject the psychological impression he is being treated fairly. (T) (F)

8. The General Question Test can be, and is used in any type of case. (T) (F)

9. A control question normally serves as a basis for evaluating reactions to relevant questions. (T) (F)

10. In formulating relevant and control questions, they must be designed to produce emotional reactions in all subjects. (T) (F)

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A B S T R A C T S

Polygraph History

Utroska, D. "History of Forensic Laboratories." Industrial Research (November 15, 1977): 35-42.

The first forensic laboratory was the Scientific Crime Detection Laboratory in Chicago at Northwestern University. It was sponsored by Bert A. Massee who was Vice President of Colgate-Palmolive-Peet Company and John H. Wigmore, Dean Emeritus of the Law School at Northwestern University. Colonel Calvin Goddard was the first Director. The polygraph section, one of the laboratory's most notable contributions, was set up as a result of the St. Valentine's Day Massacre which occurred on February 14th, 1929.

Electrodermal

Kizaki, Hisakazu and Yamaoka, Kazunobu, "Effect of the Different-Natured Stimulus on Skin Potential Responses in the Polygraph Test." Reports of the National Research Institute of Police Science 31 (2)(,ay 1978): 11-17.

In the field setting, some of the suspects in the polygraph test enhanced their differential responses to one or more non-critical items. On the basis of the previous observations, it is presumed that subjects who are presented some different-natured stimuli in the interrogation sequences will less frequently produce psychophysiological activity to critical items as opposed to non-critical items than will subjects who are not presented such particular stimuli.

The stimulus materials consisted of five two-digit numbers (10 "29" 38 47 56), all of which were colored green. For the experimental group, one ("29") of these stimuli which was colored red, was embedded in the mixture of other non-critical stimuli in a series. Each slide of stimuli was projected on a screen to a random schedule, previously determined. Presenting the different-natured stimuli (red 29) in its respective sets enhanced background activity. In other words, subjects in the experimental group showed increased responsiveness in general. Therefore, the frequency of detection

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among subjects who are presented non-critical stimuli, one of which aroused presumably their attention, was likely to be lesser. (English author abstract, text in Japanese.)

Mr. Kizaki is with the Scientific Investigation Research Laboratory, Kyoto Prefectural Police Headquarters. Mr. Yamaoka is in the Psychology Section, National Research Institute of Police Science, Tokyo. [Ed.]

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Grilly, David M. "Prediction of the Informational and Motivational Properties of "Right-Wrong" Knowledge of Results With the Skin Resistance Response." Psychophysiology 15(6)(November 1978): 509-516.

The magnitude and rate of habituation of the skin resistance response (SRR) to extrinsic "right-wrong" knowledge of results (KR) were used to assess the KR's motivational and informational properties in delayed matching of visual patterns. Two experimental groups of 20 college students each received KR which was either contingent or non-contingent upon their actual choices, and two control groups of 10 subjects each received no KR. The magnitude of the SRR elicited was found to be higher to "right" than "wrong" KR stimuli but was not affected by correctness of the subjects' choices. The relative rate of SRR habituation was rapid when a low frequency of "right" KR stimuli was provided and the KR stimuli were not contingent upon the subjects' choices, but it was slow if either a high frequency of "right" KR stimuli were provided or the KR stimuli were contingent upon the subjects' choices. The results indicated that the KR stimuli had motivational properties but very little informational value. It was concluded that the SRR may be useful in assessing the reinforcing value of a feedback stimulus in terms of its motivational and informational qualities independently from its effects on task performance. (Author abstract.)

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Schneider, Robert E. and Don C. Fowles. "A Convenient, Non-hydrating Electrolyte Medium for the Measurement of Electrodermal Activity." Psychophysiology 15(5)(September 1978): 483-486.

Two experiments with 12 subjects each compared electrodermal recordings taken simultaneously with four different electrolyte media. These were polyethylene glycol, Unibase/glycol, Unibase, and hydrated agar (i.e., a site recorded with agar electrolyte after presoaking it with water.) The primary purpose was to compare the electrolyte containing a mixture of Unibase/glycol with the other electrolytes. The glycol and the hydrated agar were assumed to reflect low and high levels of epidermal hydration, respectively, while Unibase provided a comparison with Unibase alone. These comparisons were made for positive SPRs and rapid recovery SCRs (and their associated prestimulus levels), which are believed to reflect the endosomatic and exosomatic manifestations of the epidermal membrane response.

Unibase/glycol was quite similar to glycol alone; thus it offers a more convenient electrolyte for use when minimal hydration is required. The results were interpreted as indicating that Unibase/glycol is preferable for skin potential recordings, while Unibase is to be preferred for skin conductance recordings.

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ANNUAL INDEX

Volume 7

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