Polygraph

JOURNAL OF THE AMERICAN POLYGRAPH ASSOCIATION

Volume 6 March 1977 Number 1

CONTENTS

PUBLISHED QUARTERLY

P.O. Box 74, Linthicum Heights, Maryland 21090

Polygraph 1977, 06(1)

VALIDITY AND RELIABILITY OF DETECTION OF DECEPTION

By

David C. Raskin, Ph.D., Gordon H. Barland, Ph.D., and John A. Podlesny, Ph.D.

This project was designed to provide information concerning the validity and reliability of polygraph techniques in the detection of truth and deception with criminal suspects. In addition to studies utilizing criminal suspects in the field situation, other studies involved laboratory experiments with a mock-crime paradigm (Podlesny & Raskin, in press). Those experiments investigated a number of aspects of the general problems of accuracy and reliability which could not be easily studied in the field situation. They also assessed the usefulness of a number of physiological measures which had previously received little attention in scientific research. Finally, several studies were undertaken to evaluate the commonly-held belief that psychopaths can "beat the polygraph," the adequacy of current practices by field polygraphists, the usefulness of different question structures in polygraph examinations, and the risks of different types of errors in field applications.

In order to accomplish the aims of this project, eight experiments and studies were conducted. The details of the methods and results have been provided in other reports from this project (Barland & Raskin, 1976; Podlesny, Raskin & Barland, 1976; Raskin, 1975, 1976; Raskin & Barland, 1976). In this report there is a general description of the methodology of each experiment and study. The findings are then presented by topic areas rather than separately for each study or experiment. Thus, results bearing on a particular problem are drawn from all sources within the project and presented together under that topic heading.

Methods

The eight separate phases of this project can be divided into two categories. One category consists of two laboratory experiments in which the subjects were offered monetary incentives for participating in a mock-crime and attempting to produce truthful outcomes on the polygraph examination. Such studies have certain advantages. First, the laboratory setting allows complete and certain determination of ground (factual) truth. Therefore, the accuracy of outcomes and other results can be assessed against the certain knowledge of truthfulness or deception on the part of the subject. Second, in a laboratory situation it is possible to compare and evaluate

---

Dr. Raskin is Professor of Psychology at the University of Utah, Salt Lake City, Utah, 84112; Dr. Podlesny, is Adjunct Assistant Professor at the University of Utah; and Dr. Barland is a polygraphist in private practice.

The research reported in this article was funded by a grant from the University of Utah Research Committee; Biomedical Sciences Support Grant FR-07092 from the Research Support Branch, National Institutes of Health; and Grant Number 75-NI-99-0001 from the National Institute of Law Enforcement and Criminal Justice, Law Enforcement Assistance Administration, U. S. Department of Justice. Points of view or opinions in this document are those of the authors and do not necessarily represent the official position or policies of the U. S. Department of Justice.

different question techniques (test structures) and various physiological measures which may or may not have been extensively employed in previous research and application. Finally, it is possible to investigate the influence of subject characteristics such as psychopathy (sociopathy) in a controlled situation.

The results of laboratory experiments are very useful in making generalizations to the field situation with criminal suspects. However, such inferences should be made cautiously and tested by research in the field setting. Furthermore, there are many questions concerning field practices which can be answered only by studies of field applications. Therefore, the remaining six studies involved investigations which utilized data obtained from polygraph examinations conducted on criminal suspects for real-life purposes. Some of those examinations were conducted at the University of Utah, and others were provided by a variety of law enforcement and private polygraph examiners.

Laboratory Experiments

The two laboratory experiments were similar in design and procedures employed. Both utilized a mock-crime situation in which the subjects were informed about the nature of the crime. Half of the subjects in each experiment were instructed to commit the crime (guilty subjects), and the other half were merely informed about the nature of the crime (innocent subjects). Each subject was subsequently administered a polygraph examination by an examiner who had no knowledge concerning the guilt or innocence of the subject.

All subjects had been instructed to deny having committed the theft, and they were offered a cash bonus if they could produce truthful results on the polygraph test. The polygraph examiner (who was trained and experienced in field polygraph techniques) conducted a standard pretest interview with each subject, administered the polygraph test, and made his decision on the basis of numerical evaluation of the polygraph charts (Raskin, 1975). The first three charts for each subject were later subjected to detailed quantitative analyses utilizing computer techniques.

Experiment I. This research (Raskin, 1975) was conducted at a provincial prison in British Columbia, Canada with 48 male volunteers from the prison population. All of the subjects were convicted felons, and half of them had been clinically diagnosed as psychopathic (sociopathic). The crime consisted of stealing $20 from a drawer in a room which was off-limits to inmates, and all subjects (guilty and innocent) were instructed to deny the theft and attempt to produce truthful results on the polygraph test. All subjects who produced truthful polygraph charts received a $20 bonus.

The polygraph test was zone-comparison control-question test (Barland and Raskin, 1975) consisting of a number test followed by a minimum of three charts. A typical question sequence was as follows:

1.	(neutral) Were you born in Canada?	Yes.
2.	(sacrifice relevant) Regarding that $20, do you intend to answer truthfully each question about that?	Yes.
3.	(outside issue) Are you completely convinced I will not ask a question that hasn't been reviewed?	Yes.
4.	(control) Other than what you told me, before you were 18 did you ever steal any money?	No.
5.	(relevant) Did you take that $20?	No.
6.	(control) Did you ever steal anything else from someone who trusted you?	No.
7.	(relevant) Did you take that $20 from the drawer?	No.
8.	(neutral) Is your last name _____?	Yes.
9.	(control) Have you ever taken anything of value from an employer?	No.
10.	(relevant) Do you have that $20 now?	No.

According to the theory of control-question tests (Backster, 1969; Podlesny and Raskin, in press, Reid & Inbau, 1966) the subject will respond most to the questions which are the greatest threat at that time. For a guilty person the relevant questions are the most threatening, and he will show larger reactions to the relevant as compared to the control questions. However, the innocent subject knows he is being truthful to the relevant questions, and he should be more concerned about the control questions. Therefore, the innocent subject should produce larger reactions to the control than to the relelvant questions.

Skin conductance (SCR), thoracic and abdominal respiration, plethysmographic measures of finger blood volume (FBV) and finger pulse amplitude (FPA), heart rate (HR), and skin potential (SPR) were measured on a Beckman Dynograph. The time between the beginning of consecutive questions ranged between 25 and 35 seconds. Following each chart, the examiner asked the subject if any question bothered him and if he would like to change the wording of any questions. The subject's attention was directed toward the control questions, which were frequently modified following admissions or expressions of concern by the subject. If the results did not seem to be conclusive after three charts, the fourth chart was a silent answer test (Horvath & Reid, 1972). Additional charts were sometimes obtained up to a maximum of seven charts.

The charts were then scored numerically using the three components of respiration, SCR, and cardiovascular (plethysmograph). If the total score was +6 or higher, the decision was truthful; if it was -6 or lower, the decision was deceptive; and scores between +6 were called inconclusive. All of the physiological measures were then subjected to a detailed, quantitative analysis by a person who had no knowledge of the outcome or experimental group of any subject.

Experiment II. This experiment (Podlesny et al., 1976) was conducted at the University of Utah using 60 male subjects recruited from the community by newspaper advertisements. They were paid $5 for participation and were offered a $10 bonus if they produced truthful results. The crime consisted of stealing a gold wedding ring from a drawer in a secretary's desk on another floor of the building. All subjects were informed that they were also suspected of having stolen a watch. That was introduced to allow the evaluation of the effectiveness of a guilt-complex question as a type of control questions (Barland & Raskin, 1973; Lykken, 1974; Reid & Inbau, 1966).

The testing procedures were the same as in Experiment I with a few exceptions. During the pretest interview, the examiner asked a series of questions obtained from those which Horvath (1973) found to be useful in differentiating truthful and deceptive criminal suspects. The examiner wrote down the subject's answers to the questions and also noted the spontaneous verbal and nonverbal behavior of the subject. Prior to the polygraph test, the examiner marked on a scale to indicate whether he thought that the subject was in the guilty or innocent group. His assessment was based on a composite evaluation of the subject's responses to the questions and the verbal and nonverbal behaviors as described by Horvath (1973). For 20 subjects the control questions were of the type which clearly excludes the crime being investigated (Backster, 1969), and for 20 subjects the control questions did not exclude the relevant issue (Reid & Inbau, 1966). A typical question sequence with nonexclusive control questions was as follows:

1.	(neutral) Is your name _____?	Yes.
2.	(sacrifice relevant) Regarding the ring and the watch, do you intend to answer the questions about them truthfully?	Yes.
3.	(outside issue) Are you convinced I will only ask questions on this test that you've already okayed?	Yes.
4.	(nonexclusive control) Have you ever stolen any money?	No.
5.	(relevant) Did you take that ring?	No.
6.	(nonexclusive control) Besides what you told me about, have you ever taken anything of value?	No.
7.	(relevant) Did you take that ring from that desk?	No.
8.	(guilt complex) Did you take that watch from Room 702?	No.
9.	(nonexclusive control) Have you ever taken anything from someone who trusted you?	No.
10.	(relevant) Do you have that ring with you now?	No.

For subjects who received exclusive type control questions, the words "Have you ever" were replaced with wording which clearly excluded the crime being investigated. That was done by specifying a certain time period such as

"While you were in high school." A typical exclusive control question was "Between the ages of 15 and 20 did you take something of value?"

An additional 20 subjects were examined using the guilty-knowledge test (Lykken, 1959). The rationale for the guilty-knowledge test is that the absence or presence of differential responsibility to items of information known only to a guilty person provides the basis for conclusions about truth or deception concerning the crime. The subject was administered a series of five charts each having six alternatives to a different question concerning information related to the crime. The items consisted of a set of equally plausible alternatives, one of which was the correct (critical) alternative. The question sequence was as follows:

Chart 1

Regarding the type of ring that may have been taken,

(1) Do you know if it was a sapphire class ring?
(2) Do you know if it was a pearl engagement ring?
(3) Do you know if it was a silver and turquoise ring?
*(4) Do you know if it was a gold wedding ring?
(5) Do you know if it was a ruby class ring?
(6) Do you know if it was a diamond engagement ring?

Chart 2

Regarding the floor of this building that the ring was hidden on,

(1) Do you know if it was the 1st floor?
(2) Do you know if it was the 12th floor?
(3) Do you know if it was the 6th floor?
(4) Do you know if it was the 4th floor?
*(5) Do you know if it was the 8th floor?
(6) Do you know if it was the 10th floor?

Chart 3

Regarding the number of the room that the ring was hidden in,

(1) Do you know if it was Room 800?
*(2) Do you know if it was Room 820?
(3) Do you know if it was Room 810?
(4) Do you know if it was Room 816?
(5) Do you know if it was Room 814?
(6) Do you know if it was Room 803?

Chart 4

Regarding the type of envelope that the ring was hidden in,

(1) Do you know if it was an inter-campus mail envelope?
(2) Do you know if it was a medium-sized manila envelope?
*(3) Do you know if it was a business-sized white envelope?
(4) Do you know if it was a small-sized manila envelope?
(5) Do you know if it was a small-sized white envelope?
(6) Do you know if it was a large-sized manila envelope?

Chart 5

Regarding the name of the doctor that the guilty person was instructed to ask for,

(1) Do you know if it was Dr. Trumbull?
(2) Do you know if it was Dr. Tolman?
(3) Do you know if it was Dr. Heisse?
(4) Do you know if it was Dr. Jordan?
(5) Do you know if it was Dr. Calvin?
*(6) Do you know if it was Dr. Mitchell?

The first alternative was included as a buffer to absorb initial responding and was not scored. The remaining five alternatives consisted of a critical item and 4 noncritical items. The critical item was the correct alternative, and noncritical items were all incorrect. The critical items were positioned among the noncritical items in a pseudo-random order across charts. In the above list, critical items are identified with an asterisk. The rationale of the guilty-knowledge technique was explained to each subject in that group, and prior to each chart the question was reviewed, but no alternatives were stated until the test was administered except with Chart 4. Prior to that chart an example of each type of envelope was shown to the subject and specifically named. Subjects were instructed to answer "no" to each alternative on all of the charts.

The probability that an innocent subject without knowledge of the details of the crime would show his largest reaction to a critical item is 1/5 for each chart. Thus, only 6 of 100 innocent subjects would produce their largest reactions to the critical item on three or more charts. However, the probability of a series of such large reactions from a subject with guilty knowledge is very high. This guilty knowledge procedure is designed to protect against false positives (an innocent person producing deceptive results) which Lykken (1974) claims are frequent occurrences with control-question tests.

With both control-question and guilty-knowledge tests a minimum of 15 seconds elapsed between the verbal response to the question or alternative item and the beginning of the next question or item. Control-question tests consisted of a number test and a minimum of three charts. Responses were

recorded on a Beckman Dynograph and included thoracic respiration, skin conductance (SCR), plethysmographic measures of finger pulse amplitude (FPA) and finger blood volume (FBV), relative blood pressure measured by a low-pressure (50-60 mmHg) cardio cuff, skin potential (SPR), heart rate (HR) measured on a second-by-second basis, and a dry cardio activity monitor (CAM) placed on the palmar tip of the second finger.

Following the last chart the results were immediately evaluated to determine whether the subject was truthful or deceptive. Control-question tests were numerically evaluated in the same manner as Experiment I using the SCR, respiration, relative blood pressure (cardio), and plethysmograph measures. For guilty-knowledge tests the size of the SCR to each critical item was measured to determine if it was the largest of the responses to the five alternative items for that question. If the response to the critical item was largest on at least three of the five charts, the subject was called deceptive. If he showed less than three such responses, he was called truthful.

All of the charts were subsequently scored independently by an examiner who had no contact with the subjects and no knowledge of their guilt or innocence. All of the analyses of numerical scores reported here are based on the results of those independent evaluations. The control-question tests were evaluated in the same manner as was originally performed. For the guilty-knowledge tests, the ranking system used by Lykken (1959) was employed. If the critical item produced the largest SCR, it was assigned a value of 2; if it was the second largest, it received a 1; and ranks lower than second largest were assigned a 0. The ranks for the critical items were summed over the five charts. If the total was 6 or higher, the subject was called deceptive. If the total was less than 6, the subject was called truthful. All of the physiological measures were then subjected to a detailed, quantitative analysis by persons who had no knowledge of the outcome or experimental group for any subject.

Field Studies

A total of six different studies were completed using polygraph examinations on criminal subjects. Except for one source in the study described below under the heading of "current field practice," all of the examinations used a control-question technique. Some of them were Backster zone-comparison tests (Bailey & Rothblatt, 1970), some were federal zone-comparison tests (Barland & Raskin, 1975), and some were Reid control-question tests (Reid & Inbau, 1966).

Reliability and validity with criminal suspects. In spite of careful attempts to simulate field situations, there are a number of important differences between most laboratory experiments and application of detection of deception in the field situation with criminal suspects. Those include profound differences in the consequences of the outcome and the resulting differences in subject motivation, differences in subject populations, the availability of information about the case which may influence the examiner and the subject, and frequent differences in the type of techniques utilized and the training and experience of field examiners as compared to the typical laboratory researchers. In the two experiments described above, many of those differences were eliminated. However, it was not possible to eliminate some of them.

This study (Barland & Raskin, 1976) was designed to extend the results obtained by Bersh (1969) and to overcome some of the limitations of that study by using nonmilitary criminal suspects obtained by referral from both law enforcement and defense sources. It also studied the relationship between various personality, behavioral, socioeconomic, and crime categories and the results obtained on the polygraph tests.

A total of 102 criminal suspects were examined at the request of police, defense attorneys, or prosecuting attorneys; and 92 independent cases were selected from those. All but one subject was tested on field model polygraphs with a federal zone-comparison control-question technique, and the results were evaluated using the numerical scoring procedures described above. The charts were subsequently evaluated by an independent examiner who had no knowledge of the case or the original outcome, and the results reported here are based on those evaluations. All tests included a minimum of three charts, and numerical evaluations were based on the standard field measures of respiration, skin resistance, and cardiovascular activity.

Background information was obtained from each subject, and he or she responded to several scales from the Minnesota Multiphasic Personality Inventory (MMPI) including the Lie, K, Psychopathic Deviancy, Hypochondriasis, and Depression scales. The examiner also observed both spontaneous behavior cues and those elicited by specific questions reported to be helpful in differentiating truthful and deceptive persons (Horvath, 1973). On the basis of that behavioral information, the examiner made two covert predictions of the outcome of the polygraph test, the first immediately following the advisement of rights and the second just prior to the administration of the polygraph test.

Three criteria were developed for assessing ground truth in order to evaluate the accuracy of the polygraph results. The first consisted of the independent judgments of a 5-member panel of experts composed of two criminal defense attorneys, two criminal prosecuting attorneys, and a judge. In cases where at least 3 of the 5 panel members agreed on a decision of guilt or innocent, the judgment of the panel was used as the criterion for ground truth. The second criterion consisted of judicial outcomes in which the polygraph results played no role and the case was not dismissed for insufficient evidence. The third consisted of a full confession or plea of guilty to the original charge. The latter criterion was used only for analyses to assess the effectiveness of the three physiological components with guilty subjects.

Effectiveness of physiological measures with criminal suspects. In order to test the findings from laboratory Experiment II on a sample of subjects tested on real-life criminal issues, cases were obtained by referral from defense and prosecution sources. A total of 26 subjects was tested on th e criminal charge involved in the case using the federal zone-comparison control-question test.

All subjects were examined at the University of Utah laboratory using the same instrumentation employed in Experiment II (above). From that group of subjects, 13 were selected to analyze the effectiveness of the non-standard physiological measures evaluated in Experiment II. Since the

standard measures of respiration and skin conductance had repeatedly been demonstrated to identify guilty and innocent subjects in laboratory and field situations, the subjects were separated into guilty and innocent groups on the basis of the total numerical scores for respiration and skin resistance responses. Only subjects who produced decisive outcomes were utilized. Seven subjects were eliminated for analyses, reducing the innocent group to the same size (N=7) as the guilty group. The mean total score on those measures was -8.7 for the guilty group and +6.3 for the innocent group. On the assumption that there was a high degree of accuracy in assigning the subjects to the proper group, it was then possible to evaluate with a sample of criminal cases all of the non-standard measures found to produce significant results in Experiment II.

Evaluation of current practices by law enforcement and private polygraph examiners. Although there are several recent reports concerning the accuracy and reliability of decisions made by field polygraph examiners (Barland & Raskin, 1975; Horvath, 1974; Horvath & Reid, 1971; Hunter & Ash, 1973; Slowik and Buckley, 1975), the sampling of cases was highly selective in all but the Barland and Raskin study. In the other four studies only cases in which the original examiner had made a definite decision were utilized, and most of those were selected from cases which had been verified by confession of the guilty person. Those facts plus the laboratory nature of the Barland and Raskin experiment limit the representativeness and generalizability of the results to the typical field situation.

This study (Raskin & Barland, 1976) was designed to overcome the above objections and to extend the investigation to answer the questions of adequacy of techniques employed by law enforcement and private examiners, relative effectiveness with different crime categories, and relative effectiveness of the standard measures of respiration, skin resistance (galvanic skin response), and relative blood pressure (cardio).

The procedure involved sampling approximately 60 recent cases from each of seven different locations, three law enforcement agencies and four well-known polygraph firms. Cases were selected to include examples from the crime categories of crimes against people (homicide, assault), economic crimes (robbery, burglary, theft), and sex and drug offenses. Only tests performed on suspects were included in the sample, and only one examination from any specific case was included. Using those criteria a total of 419 examinations was obtained for analysis.

Each examination was independently evaluated by Dr. Barland and Dr. Raskin. All of the standard control-question charts were subjects to our standard numerical scoring procedure, and decisions were made using the ± 5 inclusive region for inconclusives. The relevant-irrelevant tests obtained from one location were evaluated subjectively since there is no system for numerical scoring of such charts. Characteristics such as chart quality, chart markings, case information, question structure, source of referral, length of pretest interview, and name of examiner were noted for each examination. A total of 43 polygraph examiners was represented in the sample.

Accuracy of chart interpretation. Although there has been a number of studies of reliability of chart interpretation, the only reported studies

which have utilized numerical scoring procedures have been conducted at the University of Utah (Barland & Raskin, 1975, 1976; Podlesny, Raskin and Barland, 1976). Those experiments have produced very high rates of agreement on decisions (96-100%) based on numerical scoring of charts. Those results together with the high accuracy rates obtained with that technique (Barland and Raskin, 1975; Podlesny, Raskin & Barland, 1976) seem to indicate that numerical evaluation of polygraph charts might increase the accuracy of decisions made on the basis of such numerical scores. One purpose of this study (Raskin, 1976) was to investigate that possibility. Since polygraph examiners differ widely in their training and experience with chart interpretation, a second purpose of this study was to study the accuracy of chart interpretation performed by polygraph examiners with a variety of training, experience, and familiarity with numerical scoring techniques.

Polygraph charts from 16 independent criminal cases were selected from those obtained in a previous study (Barland & Raskin, 1976). Each examination consisted of three charts recorded on a field model polygraph using the federal zone-comparison control-question technique. All of the examinations had been confirmed by confession of the guilty person; 12 were from guilty subjects and 4 from innocent subjects. The 16 sets of charts were independently evaluated by 25 field polygraph examiners from a variety of training backgrounds and experiences. They were not informed about any aspect of the case or the outcomes and were asked to render a conclusion of truthful, deceptive, or inconclusive for each case. They were told to employ numerical scoring if they had been trained in it and wished to do so. Of the 25 examiners, 18 had at least one year of experience, 13 had received formal training in numerical scoring, but only 7 of those explicitly scored the charts numerically.

The "friendly polygrapher." In a recent paper, Orne (1975) stated that under certain conditions the motivation of a guilty subject would be reduced to the point that false negative errors would be greatly increased. Since it is well known that motivation to deceive and the threat of serious consequences of detection are essential to successful detection of deception, Orne speculated that polygraph examinations conducted at the behest of defense attorneys fail to meet those motivational requirements for guilty subjects. He reasoned that a subject in such a situation "knows that the results of the test if he is found deceptive will not be used against him ... As a consequence, the client's fears about being detected are greatly reduced (p. 114)." He also speculated that the so-called "friendly polygrapher" employed by the defense attorney will treat the subject differently than an "arms length" examiner such as a law enforcement examiner or one working for the subject's employer. Orne concluded that such a situation will make the guilt subject less detectable.

This study (Raskin, 1976) was designed to test Orne's hypothesis using the results of polygraph examinations conducted on a confidential basis for defense attorneys and those conducted with explicit knowledge and/or agreement with law enforcement authorities or the subject's employer. The "friendly polygrapher" hypothesis predicts that examinations conducted confidentially for defense attorneys would produce more truthful-appearing polygraph charts and more truthful decisions than those performed with the knowledge on the part of the subject that the results would be reported to the

law enforcement authorities and/or his/her employer. However, the theory and experience with control-question tests predicts that such an effort would not occur and the most to be expected would be an increase of inconclusive results.

Three different samples of control-question examinations were obtained. The first sample consisted of all examinations of criminal suspects conducted during an 1-year period by an experienced examiner for law enforcement authorities or private attorneys. The cases consisted of 106 examinations for law enforcement authorities and 98 examinations for defense attorneys. The outcomes of those examinations were obtained in the form of the number of truthful, deceptive, and inconclusive determinations.

The second sample consisted of control-question examinations of criminal suspects obtained from two private polygraph firms included in a previous study (Raskin & Barland, 1976). A total of 19 different examiners conducted the testing which consisted of 54 confidential examinations referred by defense attorneys and 57 examinations performed with the subjects' knowledge that the results would be reported to law enforcement authorities and/or his/her employer. Each set of polygraph charts was numerically evaluated by Dr. Barland or Dr. Raskin prior to their obtaining any information concerning the issue tested, the source of referral, or the decision by the original examiner. Since at least two charts were obtained for each subject, the numerical score from the first two charts comprised the data utilized in the data analysis.

The third sample consisted of 27 control-question examinations of criminal suspects conducted at the University of Utah. Fourteen of the examinations were performed on a confidential basis for defense attorneys, and 13 were performed with the subject's knowledge that the results would be reported to law enforcement authorities. All examinations contained a minimum of three charts, and the total numerical scores for the first three charts were utilized in the data analysis.

Errors in examinations. In contrast to the concern about false negative results expressed by Orne (1975), another critic (Lykken, 1974) has focused a great deal of attention on the problem of false positive errors (a deceptive results obtained from a truthful person). Lykken asserted that the control-question technique cannot accurately identify innocent suspects since he believes that it is impossible to design control questions which will produce the same level of responsiveness in innocent subjects as is produced by the relevant questions with guilty subjects. A number of scientifically conducted studies has investigated the accuracy of control-question tests. Three of those are laboratory studies conducted by Raskin and his associates (Barland & Raskin, 1975; Podlesny, Raskin & Barland, 1976; Raskin, 1975). Of the errors obtained in those studies, 56% were false positives. Two recent field experiments (Bersh, 1969; Barland & Raskin, 1976) used the control-question technique with criminal suspects and defined ground truth by means of the judgments of a panel of experts. In the Bersh study, 44% of the errors were false positives, and all but one of the errors in the Barland and Raskin study were of the false positive type. Although the error rate is relatively low (approximately 10%), there is evidence that false positive errors may compromise a substantial proportion of the errors obtained with criminal suspects. Therefore, the major purpose of this study (Raskin, 1976) was to attempt to

determine some of the factors which are associated with the occurrence of such errors.

The type of error investigated was restricted to the occurrence of inappropriate physiological responses which occurred in the polygraph examination. Specifically, instances were sought in which other evidence indicated innocence but the subject produced a deceptive pattern on the polygraph charts. In all cases more than one polygraph test had been conducted on the suspect, and in some cases one or more additional persons had received polygraph examinations. In all but one case at least one of the examinations of the suspect had been conducted at the University of Utah.

In the 12 cases obtained for the study, three criteria were used to justify the determination that an error had been made. In two cases evidence obtained subsequent to the polygraph test clearly proved that an error had occurred, in nine cases opposing results were obtained from two or more examinations on the same subject, and in four cases conflicting results were obtained from another person examined on the same issue. In all cases the original deceptive results with the suspects was confirmed by a numerical evaluation by Dr. Barland or Dr. Raskin.

Results

Accuracy of Decisions

Laboratory experiments. The decisions made by the polygraph examiner in Experiment I and Experiment II are shown in Table 1. They are based on the total numerical scores using the criterion of +6 or higher for truthful outcomes and -6 or lower for deceptive outcomes. It can be seen that the accuracy rates were quite high with a combined accuracy of decisions which exceeded 90%. Approximately 10% of the subjects yielded inconclusive results, and the errors were almost equally distributed between false positives and false negatives.

Table 1

Accuracy of Control-Question Decisions and Types of Error in Two Laboratory Experiments

	% Correct	% False Positive	%False Negative	% Inconclusive	%Correct Decisions
Experiment I	88	4	0	8	95
Experiment II	80	2	8	10	89

In order to compare the effectiveness of control-question tests in identifying guilty and innocent subjects, the total numerical scores for the first three charts were obtained for both types of subjects. Those mean scores for innocent and guilty subjects in both experiments are shown in Table 2. Statistical analyses indicated that the technique was equally effective in identifying innocent and guilty subjects.

Table 2

Total Numerical Scores for 3 Charts Obtained in Two Laboratory Experiments

	Experiment I	Experiment II
Guilty	-11.1	-9.0
Innocent	+9.4	+14.2

Since the criterion of requiring a score of at least ±6 in order to render a decision was developed from the experiences of field examiners, the data from these two experiments were combined to evaluate the effectiveness of those cutoff points. Figure 1 presents the rates of correct decisions for guilty and innocent subjects and the rates of inconclusives using cutoffs for decisions which ranged from nonzero scores up to scores exceeding ±12 for all charts. It can be seen that the accuracy of decisions reaches an optimal level in the region of ±4, and inconclusives are relatively low (9%) up to cutoffs of ±5. Thus, it appears that the field practice of using scores which fall outside an inconclusive region of ±5 provides a good balance between accuracy and rate of inconclusives. Furthermore, there seems to be no compelling reason to alter that inconclusive region.

Field study. The accuracy of polygraph examinations with criminal suspects was evaluated using the decisions based on the numerical scores obtained from the independent chart interpretations. The standard ±5 boundaries were used for the inconclusive region. Those decisions were compared to the combined judgments of the panel and also to the judicial outcomes.

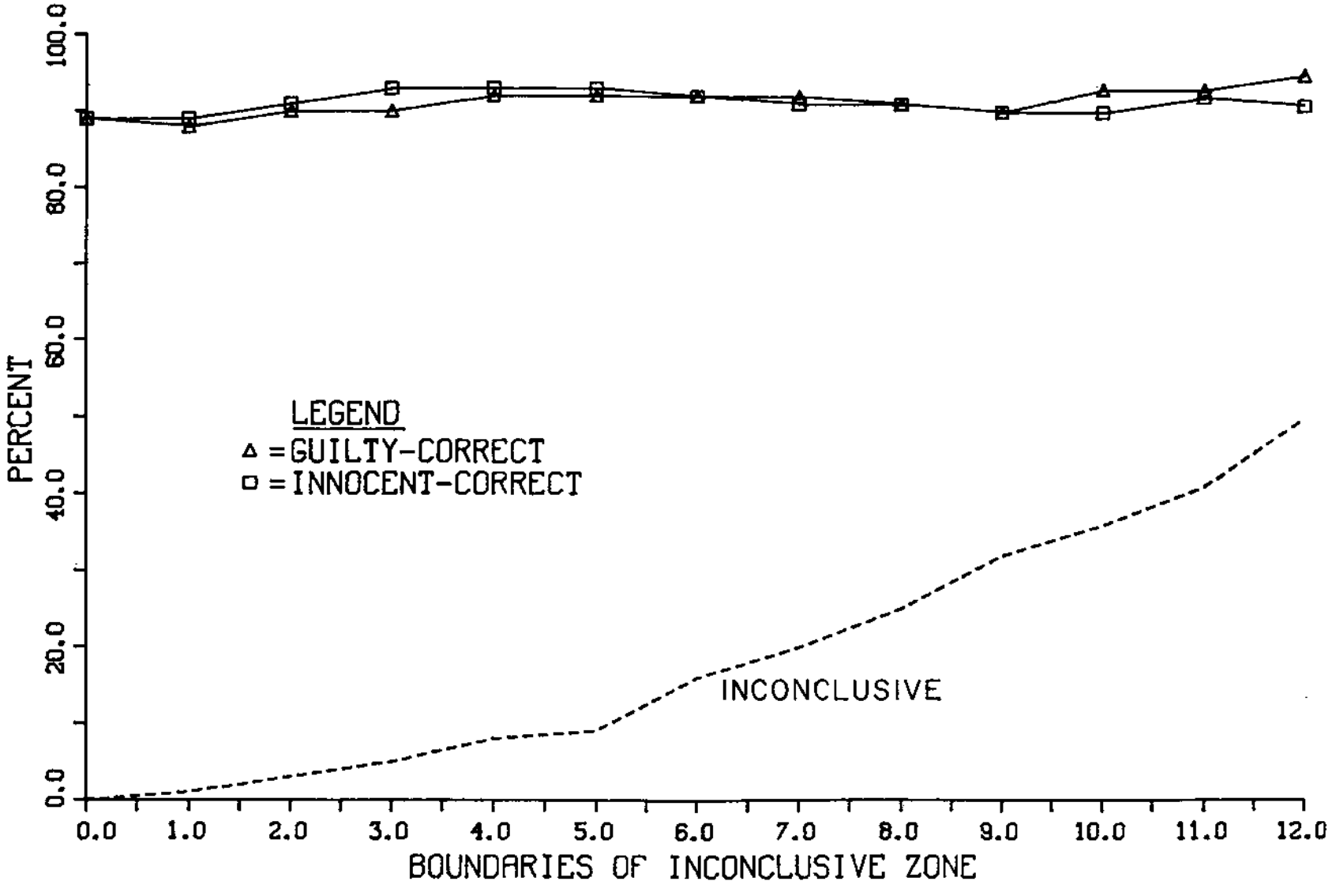
The results of the comparisons between the outcome of the polygraph examinations and the decisions based on agreement among at least a majority of the panel are shown in Table 3. When both the panel and the polygraph scores yielded a decision, the polygraph outcome agreed with the majority panel in 86% of the cases. More than half of the suspects found truthful with the polygraph produced inconclusive outcomes from the panel, and 6 of the 7 disagreements were false positives (deceptive polygraph results on subjects considered innocent by the panel).

Table 3

Comparison of Outcomes Based on Independent Examiner's Numerical Score and Panel Majority Decisions

Independent Numerical Evaluation	Panel Majority Decision: Guilty	Innocent	Inconclusive
Deceptive	39	6	13
Truthful	1	5	7
Inconclusive	7	6	8

Figure 1.



Rates of accuracy and inconclusives with different boundaries of the inconclusive zone.

The polygraph results were also compared to the judicial outcomes which were considered conclusive and were not influenced by the polygraph results. Those results are presented in Table 4, and they indicated that there was 88% agreement between the polygraph decisions and the judicial outcomes. All of the disagreements (4) occurred on subjects who produced deceptive polygraph charts and who were acquitted in court.

Table 4

Comparison of Decisions Based on Independent Examiner's Numerical Scores and Independent Judicial Outcomes

Independent Numerical Evaluation	Judicial Outcome: Guilty	Judicial Outcome: Innocent
Deceptive	27	4
Truthful	0	3
Inconclusive	6	1

It is of interest to note that there was less than complete agreement between the panel majority decisions and the judicial outcomes. In the 35 cases where a definite decision was made using both criteria, there was 89% agreement between the two criteria. Three of the four disagreements occurred with persons judged guilty by the panel and acquitted in court, and only three of the eight acquitted by the judicial process were judged innocent by the panel. Therefore, the extent of disagreement between polygraph outcomes and the two criteria for guilt and innocence should be interpreted in light of the fact that the two criteria were in less than perfect agreement.

Psychopaths. Two types of data were obtained to assess the effectiveness of examinations performed on persons diagnosed psychopathic (sociopathic). The first consisted of the accuracy of decisions obtained in Experiment I. The outcomes based on numerical evaluation of those charts are presented in Table 5. Among the 24 subjects who had been diagnosed as psychopaths, decisions were 96% correct. The single error was a false positive, and not a single guilty psychopath was able to produce a truthful polygraph outcome. Although the polygraph tests appeared to be slightly more effective with the psychopaths than with the nonpsychopaths, there was not a statistically significant difference between the accuracy rates for the two groups.

Table 5

Examiner Decisions Based on Total Numerical Scores in Experiment I

	Correct	Wrong	Inconclusive
Psychopaths	23	1	0
Nonpsychopaths	19	1	4

The second set of data with regard to psychopaths and polygraph outcomes was obtained from the field study with criminal suspects. On the basis of their MMPI scores, two groups were obtained from the 36 suspects judged to be guilty by the panel majority. The 14 guilty suspects with the highest psychopath scores were compared to the 12 guilty suspects with the lowest psychopath scores. Using the total polygraph scores for the first three charts, the guilty psychopaths had a mean scores of -7.8, and the guilty nonpsychopaths had a mean score of -7.1. There was no significant difference between those groups which indicated that the guilty psychopaths were detected by the polygraph as readily as were the guilty nonpsychopaths.

Other subject characteristics. The subjects from the study of criminal suspects were also compared on a number of biographical and personality variables. Those comparisons were made for sex, education, number of previous arrests, religiousness, previous polygraph tests, age, and the MMPI scores for the Lie scale, K-scale, Hypochondriasis scale, and Depression scale. There were no indications that any of those variables were related to the polygraph results.

Type of crime. The strength of polygraph reactions exhibited by deceptive suspects was compared for different crime categories. When the total scores for the first three charts were compared for suspects accused of sex crimes, drug crimes, crimes of violence, and crimes of financial gain, there were no discernible differences among the groups. A similar analysis was performed to compare the categories of sex crimes, drug crimes, crimes involving confrontation between criminal and victim, and crimes without confrontation between the criminal and victim. Again, there were no discernible differences among polygraph scores for deceptive suspects separated into those categories. Thus, there was no evidence that type of crime affected the strength of polygraph reactions among suspects found deceptive on the polygraph test.

Behavior symptoms. The predictions based upon the observation of behavior during the pretest phase of the polygraph examinations of criminal suspects were compared to the judgments of guilt or innocence made by a majority of the panel. The initial predictions agreed with the panel in 56% of the cases, and the later predictions agreed with the panel in 69% of the cases. Neither of those results was significantly above chance, indicating that systematic observation of behavior during the pretest phase of the polygraph examination was of no value in determining truth or deception. Similar findings were obtained in Laboratory Experiment II. Of the 40 decisions made by the examiner following the pretest interview, 86% of the guilty subjects were correctly identified, but only 48% of the innocent subjects were correctly identified. Overall, the judgments based on behavior symptoms were correct for only 69% of the decisions.

Reliability of Chart Interpretation

This project included four different assessments of the reliability of chart interpretation. Two of those involved comparisons between the decisions based on numerical scoring by the Project Director and Co-Director, the third compared decisions based on numerical scoring by the Project Director and

Co-Director with the original decisions made by 43 examiners employed by law enforcement and private firms, and the fourth involved a study of accuracy of chart interpretation by 25 field examiners who evaluated the same set of 16 confirmed polygraph examinations of criminal suspects. The results of each is described below.

Experiment II. The 40 sets of polygraph charts obtained with the control question technique were scored numerically by the original examiner (Dr. Barland) and were independently scored by Dr. Raskin. Both examiners made a definite decision on 36 of the 40 subjects, and they were in agreement on 100% of them.

Criminal suspects study. The outcomes based on the numerical scores by the original examiner (Dr. Barland) and those based on the blind evaluation of the charts by Dr. Raskin are shown in Table 6. Both examiners obtained the same categorization in 85 of the 102 cases (84.3%) when inconclusives were included. On cases in which both examiners made a decision, they were in agreement 100% of the time. The correlation between the numerical scores assigned by the two examiners was very high, r = .91.

Table 6

Comparison of the Original Examiner's Chart Evaluation and the Blind Evaluation of the Charts By an Independent Examiner

	Original Examiner's Scores		
Independent Evaluation	Truthful	Deceptive	Inconclusive
Truthful	10	0	5
Deceptive	0	61	1
Inconclusive	1	9	15

Current practices by law enforcement and private examiners. The extent of agreement between polygraph decisions by law enforcement and private examiners and those based on independent numerical evaluation by the Project Director and Co-Director is presented in Table 7. Location G utilized the relevant-irrelevant technique, and our evaluation of those charts was subjective since numerical scoring could not be utilized. The overall rate of agreement was 57% when inconclusives were included and 85% when inconclusives were excluded. There was a significant difference in agreement across the different locations sampled, and our evaluations showed a significantly higher rate of agreement with decisions made by law enforcement (92%) as compared to private polygraph firms (79%). The results were separated by type of crime, and there was no significant differences in rate of agreement for crimes against people, economic crimes, or sex and drug crimes.

Table 7

Agreement Between Independent Evaluations and Original Decisions at Each Location

	% Agreement	
	Including Inconclusives	Excluding Inconclusives
Police		
A	88.3%	98.0%
B	42.6%	95.8%
C	58.6%	82.1%
Combined	64.0%	92.1%
Private		
D	60.0%	89.7%
E	43.3%	76.5%
F	55.0%	80.6%
G	50.8%	75.6%
Combined	52.2%	79.9%

Accuracy of chart interpretation. Of the 400 judgments made by the 25 polygraph examiners on the set of 16 polygraph examinations, 79% were correct decisions, 8% were errors, and 13% were inconclusive. Excluding inconclusives, 90% of the decisions were correct. Accuracy ranged from 53% correct decisions for one examiner to 100% correct decisions for nine examiners. The proportion of the errors that were false positives (60.6%) was more than twice as high as would be expected by chance. There was no significant difference in accuracy of decisions for examiners with at least one year of experience (92%) as compared to those with less than one year of experience (89%). However, the 7 examiners who employed numerical scoring of the charts were significantly more accurate in their decisions (99%) than the 18 examiners who did not use numerical scoring (88%). Furthermore, even among examiners who had received formal training in numerical scoring, the 7 examiners who explicitly employed numerical evaluation achieved significantly higher accuracy of decisions (99%) than the 6 examiners who knew how to numerically score charts but did not explicitly employ the technique (88%).

Relative Effectiveness of Standard Measures

In four studies the standard field measures were compared in terms of

their relative effectiveness of identifying truthful and deceptive subjects using numerical scoring of responses. That was accomplished in both laboratory experiments and two of the field studies.

Laboratory experiments. In Experiment I the finger plethysmograph was used instead of a pressurized cardio cuff, and the numerical scores for the first three charts are shown in Table 8 for Experiments I and II. In both experiments the skin conductance measure provided the best discrimination between guilty and innocent subjects. In Experiment I all three measures showed significant capacity to identify both guilty and innocent subjects, and the respiration component identified innocent subjects better than it identified guilty subjects. In Experiment II the plethysmograph measures produced better discrimination between guilty and innocent subjects than did the cardio and respiration measures. The cardio and respiration measures showed significant identification of innocent but not guilty subjects. It should be noted that respiration in Experiment II was measured with a device different from that typically employed in the laboratory or field. Also, the cardio was measured using a low-pressure cuff at an inflation pressure between 50 and 60 mmHg.

Table 8

Mean Numerical Scores for Each Standard Component for the First 3 Charts in Two Experiments

	Experiment I		Experiment II	
	Guilty	Innocent	Guilty	Innocent
Respiration	-2.3	+4.3	+0.3	+1.8
Skin Conductance	-5.8	+3.8	-5.0	+5.6
Cardio	—	—	0.0	+3.6
Plethysmograph	-3.5	+1.3	-4.2	+3.1

Field studies. The three standard components used in the study of accuracy with criminal suspects were evaluated using the numerical scores on the first three charts of 32 suspects who subsequently made full confessions or pleaded guilty to the original charge. Those numerical scores were assigned by the independent evaluator who had no knowledge of the confessions or pleas. All three of the components yielded significant deceptive scores for those confirmed guilty subjects, and the skin resistance (galvanic skin response) measures produced significantly better results than respiration or cardio measures.

Finally the three standard components were evaluated using the numerical evaluations of the charts obtained from the six law enforcement and private locations which used control-question tests. Two types of data were utilized. First, our numerical scores were tabulated for the 179 cases in which our decisions agreed with the decisions made by the original examiner. The mean scores for each component for the 147 deceptive and 32 truthful decisions are shown in Table 9. All measures contributed significantly to both deceptive

and truthful outcomes, and the skin resistance measure was significantly larger than respiration and cardio for deceptive outcomes. The other analysis was performed on 56 deceptive results which were confirmed by confessions or admissions. All three measures showed significant identification of guilty subjects, and the mean skin resistance score (-5.8) was significantly larger than that obtained for respiration (-2.9) or cardio (-2.8).

Table 9

Mean Numerical Scores for Each Measure in Cases Where the Original Decision and the Independent Numerical Evaluation Agreed

	Respiration	Skin Resistance	Cardiovascular	Total
Deceptive (N = 147)	-3.8	-7.4	-4.7	-15.9
Truthful (N = 32)	+4.5	+4.8	+2.7	+12.0

Quantitative Analyses of Physiological Responses

In order to identify the characteristics of the various physiological measures which appear to be useful in detecting truth and deception, detailed quantitative analyses were performed on the polygraph recordings obtained in Experiments I and II and on the 14 sets of charts using those measures obtained from criminal suspects. Using control-question tests, significant effects were demonstrated when guilty subjects showed larger reactions to relevant as compared to control questions and innocent subjects showed larger reactions to control as compared to relevant questions. Only those measures which showed some effectiveness in the laboratory were tested with the sample of criminal suspects. Since measures of respiration and skin conductance amplitude were used to categorize the criminal suspects as truthful or deceptive, they were not analyzed quantitatively.

Respiration amplitude. Experiment I measured both thoracic and abdominal respiration. Both measures of respiration produced clear indications of greater suppression in respiration amplitude following relevant questions for guilty subjects and control questions for innocent subjects. Furthermore, thoracic respiration showed an increase in amplitude following relevant questions for innocent subjects. A similar effect did not occur in abdominal respiration. No significant results were obtained with respiration amplitude in Experiment II. However, the transducer used in Experiment II appears to have been inadequate. Based on the results of Experiment I, it appears that suppression of respiration is a clearly effective indicator, and increase in respiration amplitude should not be used as an index of deceptive reaction but as a lack of reaction.

Respiration cycle time. There were significant effects in respiration cycle time demonstrated in Experiment I. The effects were accounted for by the reactions of the innocent subjects who showed a slowing in respiration following control questions and a speeding of respiration following relevant questions. Respiration rate showed no significant effects in Experiment II, but the poor transducer may have prevented any significant findings. Based on the results obtained, it appears that slowing of respiration may be considered as a reaction, but speeding of respiration should be viewed as a lack of reaction.

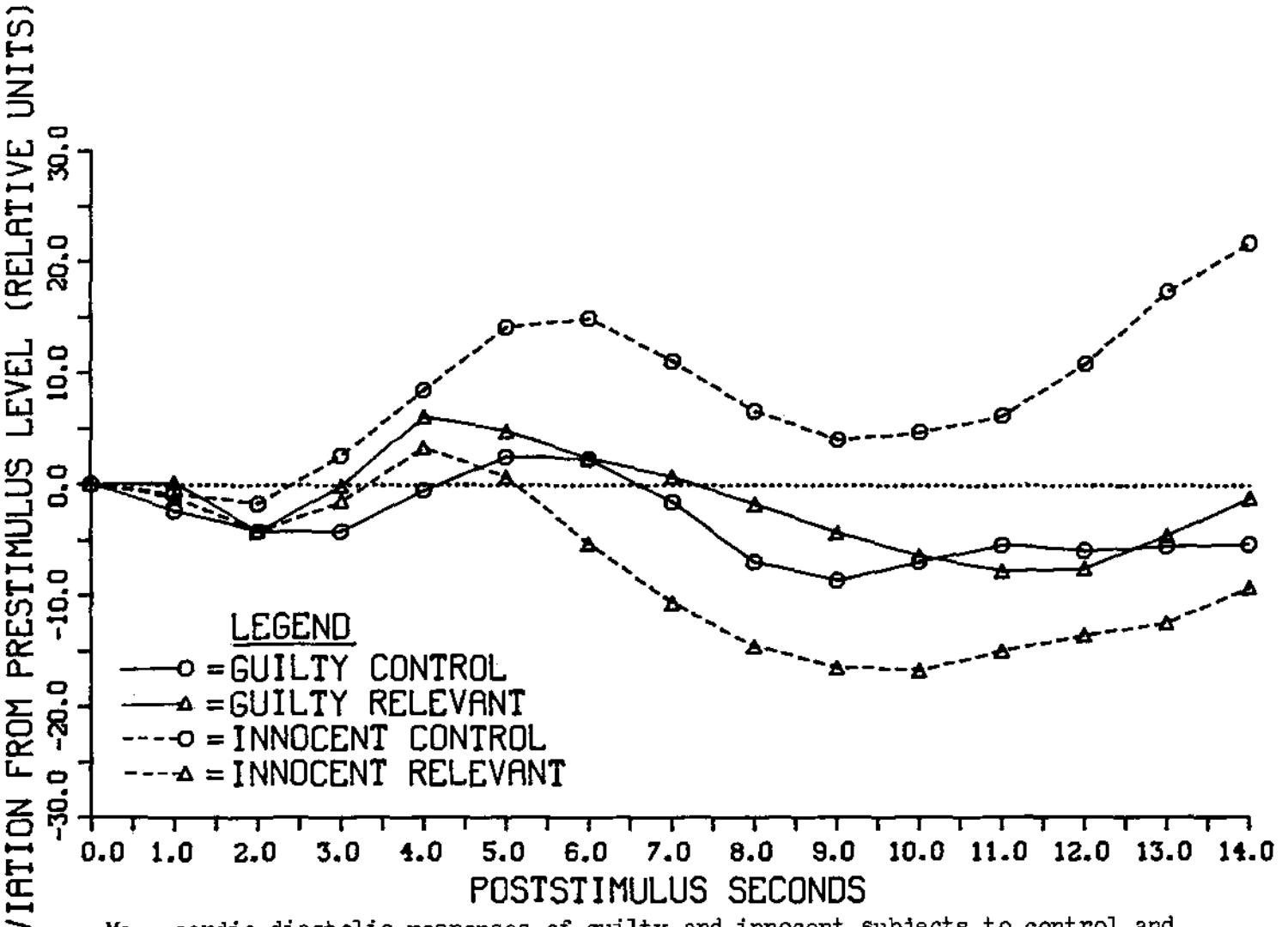
Skin conductance response amplitude. In both Experiment I and Experiment II skin conductance response amplitude was larger following relevant questions for guilty subjects and following control questions for innocent subjects. With guilty-knowledge tests, guilty subjects produced larger responses to critical items. Thus, skin conductance response amplitude was found to be very effective.

Skin conductance response rise time. In Experiment II the time required for skin conductance to reach its maximum level from the beginning of a response was found to be shorter to relevant questions for both guilty and innocent subjects. Therefore, it was not useful in identifying deceptive and truthful subjects.

Skin conductance response recovery. In Experiment II the amount of time required for skin conductance responses to return half of the distance back toward their base level before the response began was shown to be effective for two different measurement methods. Basically, the results showed that skin conductance responses which began after the onset of a question and following control questions for innocent subjects. However, those effects occurred only when exclusive control questions were used and not with tests employing nonexclusive control questions. With guilty-knowledge tests there was some indication of slower recovery of responses following critical items for guilty subjects. Measurement of skin conductance response recovery also produced significant effects with the sample of criminal suspects. Deceptive suspects showed slower recovery of responses to relevant questions, and truthful suspects showed slower recovery of responses to control questions. Thus, the slowness with which a skin conductance response returns to its pre-response level may be given some consideration as an index of response.

Cardio responses. The cardio responses were measured in Experiment II with the low pressure cuff inflated to a pressure between 50 and 60 mmHg. The changes in diastolic pressure were similar and somewhat better than those obtained with changes in systolic pressure. Diastolic pressure was measured on a second-by-second basis, and the changes in diastolic pressure are shown in Figure 2 for the 14 seconds following the beginning of the questions. The guilty subjects failed to show any differential response to control and relevant questions. However, the innocent subjects showed an increase in diastolic pressure following control questions and a decrease in diastolic pressure following relevant questions. The subsequent tests conducted with criminal suspects utilized inflation pressures of approximately 70 mmHg which appear to yield better reactions and more stable baselines. Using that pressure with criminal suspects yielded significantly greater increases in diastolic pressure following relevant questions for deceptive

Figure 2



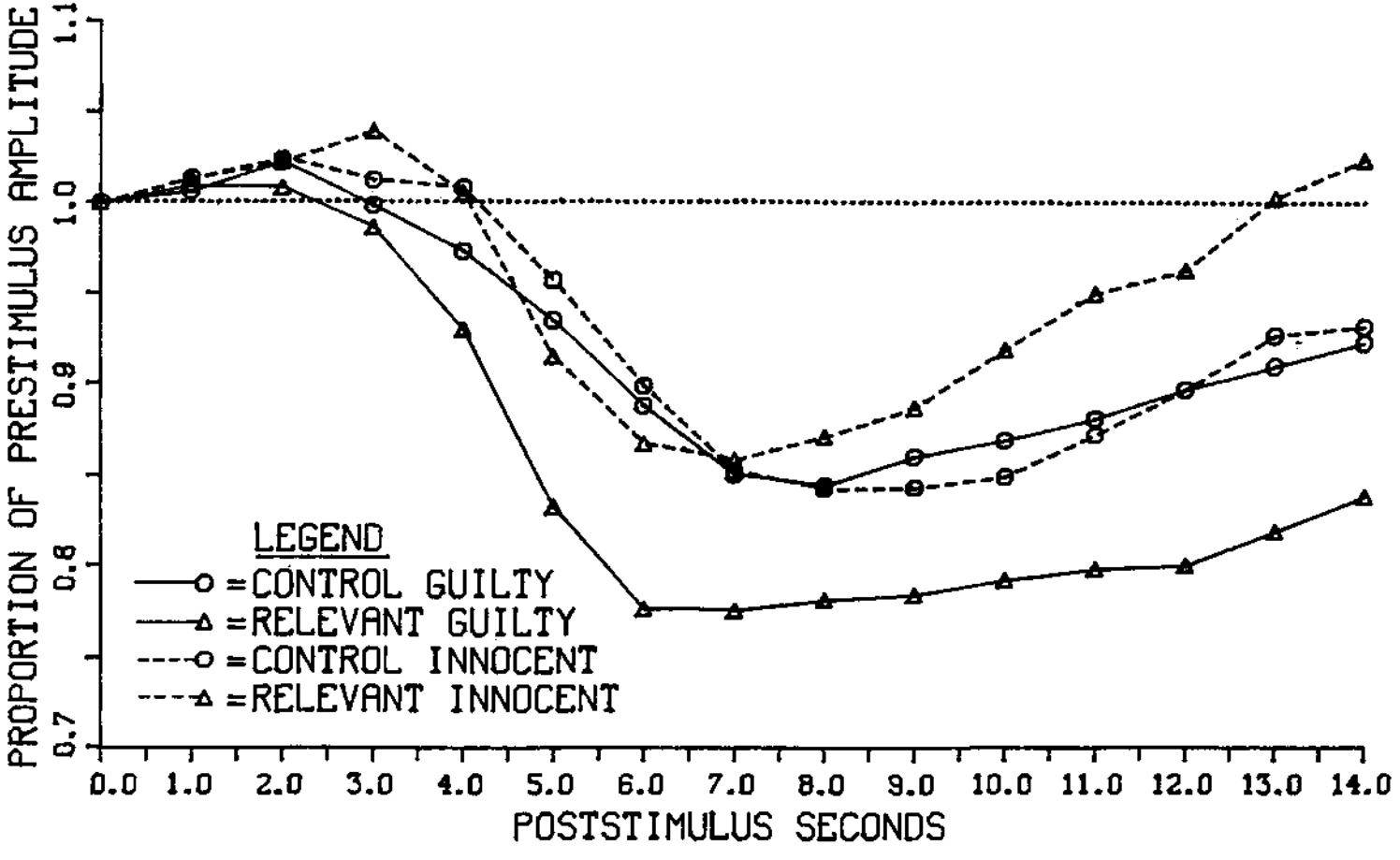
Mean cardio diastolic responses of guilty and innocent subjects to control and relevant questions.

suspects and following control questions for truthful suspects. In addition, significant decreases in diastolic pressure were obtained following the onset of the questions. The deceptive suspects showed greater decreases in diastolic pressure following control questions, and truthful suspects showed greater decreases following relevant questions. Since no reliable changes in cardio pulse amplitude were found in Experiment II, pulse amplitude changes were not measured with the criminal suspects. However, the improved quality of recordings obtained with 70 mmHg pressure showed some indications of appropriate decreases in pulse amplitude. Based on the obtained results with laboratory subjects and criminal suspects, it seems safe to conclude that increases in diastolic pressure are good indicators of reactions and decreases in diastolic pressure should be considered as lack of reaction.

Finger blood volume. Using a photoelectric plethysmograph, significant changes in finger blood volume were obtained in Experiments I and II. In both experiments guilty subjects showed greater decreases in finger blood volume following relevant questions, and innocent subjects showed larger reactions following control questions. With the guilty-knowledge test, guilty subjects showed significantly larger reactions to critical items. Significant results were obtained with the sample of criminal suspects, but only the deceptive suspects showed the effects. In Experiment II the duration of responses was longer to relevant questions for guilty subjects and to control questions for innocent subjects. Duration effects were not obtained with the criminal suspects. On the basis of the obtained results, it is clear that decrease in finger blood volume is a good indication of reaction, and duration of reaction may also be of some use.

Finger pulse amplitude. The amplitude of pulses was obtained from the same plethysmograph used for blood volume by recording with a short time-constant coupling. In Experiment I guilty subjects showed significantly larger decreases in pulse amplitude following relevant questions, but for innocent subjects there was no difference in magnitude of pulse amplitude changes following control and relevant questions. In Experiment II the changes in pulse amplitude were measured on a second-by-second basis for the 14 seconds following the beginning of the questions, and the results are shown in Figure 3. The guilty subjects showed significantly greater decreases in pulse amplitude following relevant questions, and the innocent subjects showed longer-lasting decreases following control questions. With guilty-knowledge tests significantly greater decreases occurred to critical items for guilty subjects. The measurements of decrease in pulse amplitude in the criminal suspects showed significantly larger decreases in pulse amplitude following relevant questions for deceptive suspects, but no differences between reactions to control and relevant questions were obtained for truthful suspects. Based on the obtained results, decrease in finger pulse amplitude can be considered a useful index of reaction.

Figure 3



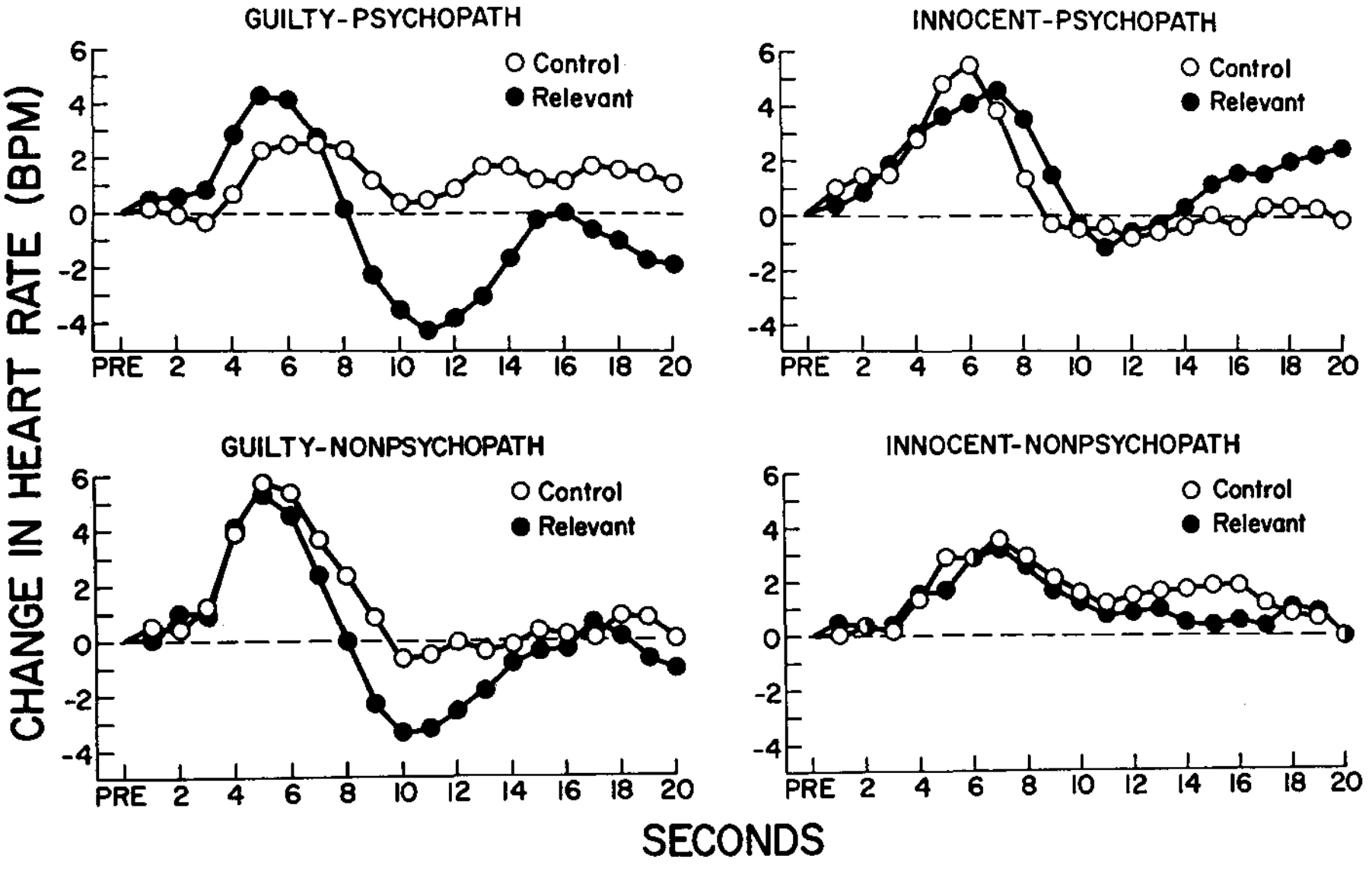
Mean finger pulse amplitude responses of guilty and innocent subjects to control and relevant questions.

Heart rate changes. In Experiment I heart rate in beats per minute was measured on a second-by-second basis from prior to the beginning of the questions through 20 seconds following question onset. The changes in heart rate are shown in Figure 4. Guilty and innocent subjects showed an initial increase in heart rate to control and relevant questions. Following that initial increase, heart rate returned to previous levels except for guilty subjects following their answer to relevant questions. They showed a clear slowing of heart rate which was more pronounced for the psychopathic group. In Experiment II virtually identical results were obtained with guilty subjects producing slowing of heart rate following their answers to relevant questions and innocent subjects showing no differences in heart rate responses to control and relevant questions. However, analysis of heart rate responses by the criminal suspects failed to produce any differentiation between control and relevant questions. Although the laboratory results appear to be encouraging with regard to slowing of heart rate as an indicator of reaction in guilty subjects, the results with criminal suspects failed to produce a similar result. At this time, the use of heart rate slowing as an index of reaction should be view with caution.

Cardio activity monitor. In Experiment II the systolic and diastolic levels obtained from the cardio activity monitor (CAM) were measured on a second-by-second basis from just prior to the beginning of the question through 14 seconds following question onset. Only the changes in systolic level were significant, and those results are presented in Figure 5. There was an early increase in systolic levels which did not differentiate between control and relevant questions for guilty or innocent subjects. However, there was a subsequent decrease in systolic levels which appeared to be greater for guilty subjects in response to relevant questions. A similar but substantially stronger result was obtained with the guilty knowledge test, and those data are presented in Figure 6. There was an early, non-differential increase in systolic level followed by a very pronounced decrease in guilty subjects responding to critical items. Those results are very similar to the results obtained with finger blood volume and finger pulse amplitude as measured by a photoelectric plethysmograph. However, CAM measures of changes in systolic levels failed to produce any significant results with the sample of criminal suspects. At this time, it appears that the CAM measures do not provide very much useful information, and what is provided by the CAM can be better obtained from a photoelectric plethysmograph.

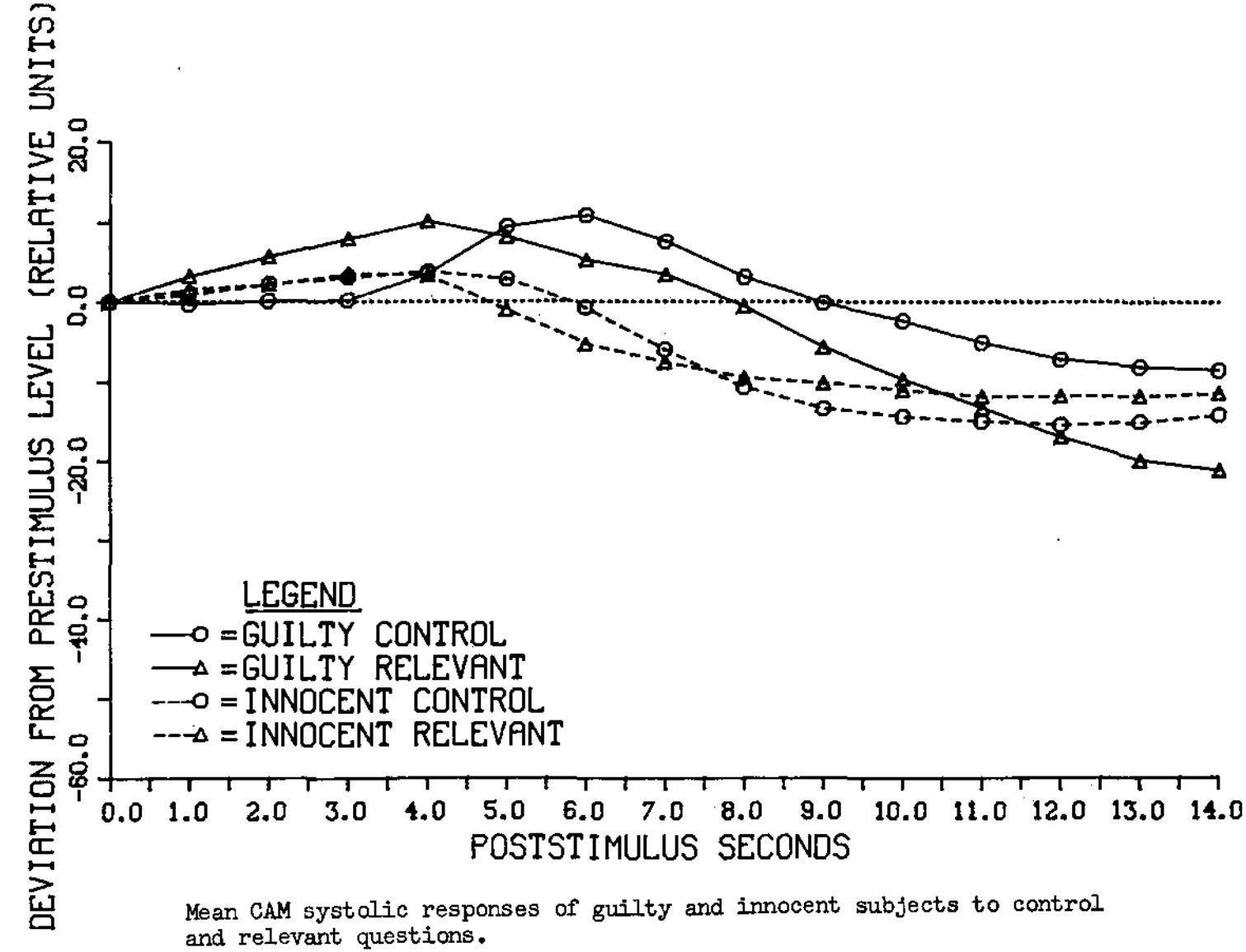
Skin potential responses. The negative and positive components of the skin potential response were measured in Experiments I and II. In Experiment I the significant results indicated that guilty subjects gave larger negative and positive skin potential responses to relevant questions than to control questions, but there was no differentiation for innocent subjects. There was also a significant effect for psychopathy which consisted of psychopaths producing positive skin potential responses which were disproportionately larger to relevant questions than those produced by nonpsychopaths. In Experiment II significant effects were obtained with the control-question technique only for negative skin potential, and the results with mean negative skin potential amplitude are presented in Table 10. They show that with exclusive control questions the guilty subjects produced larger responses to relevant questions and the innocent subjects produced larger responses to control questions. No differentiation was obtained with nonexclusive control questions. The

Figure 4



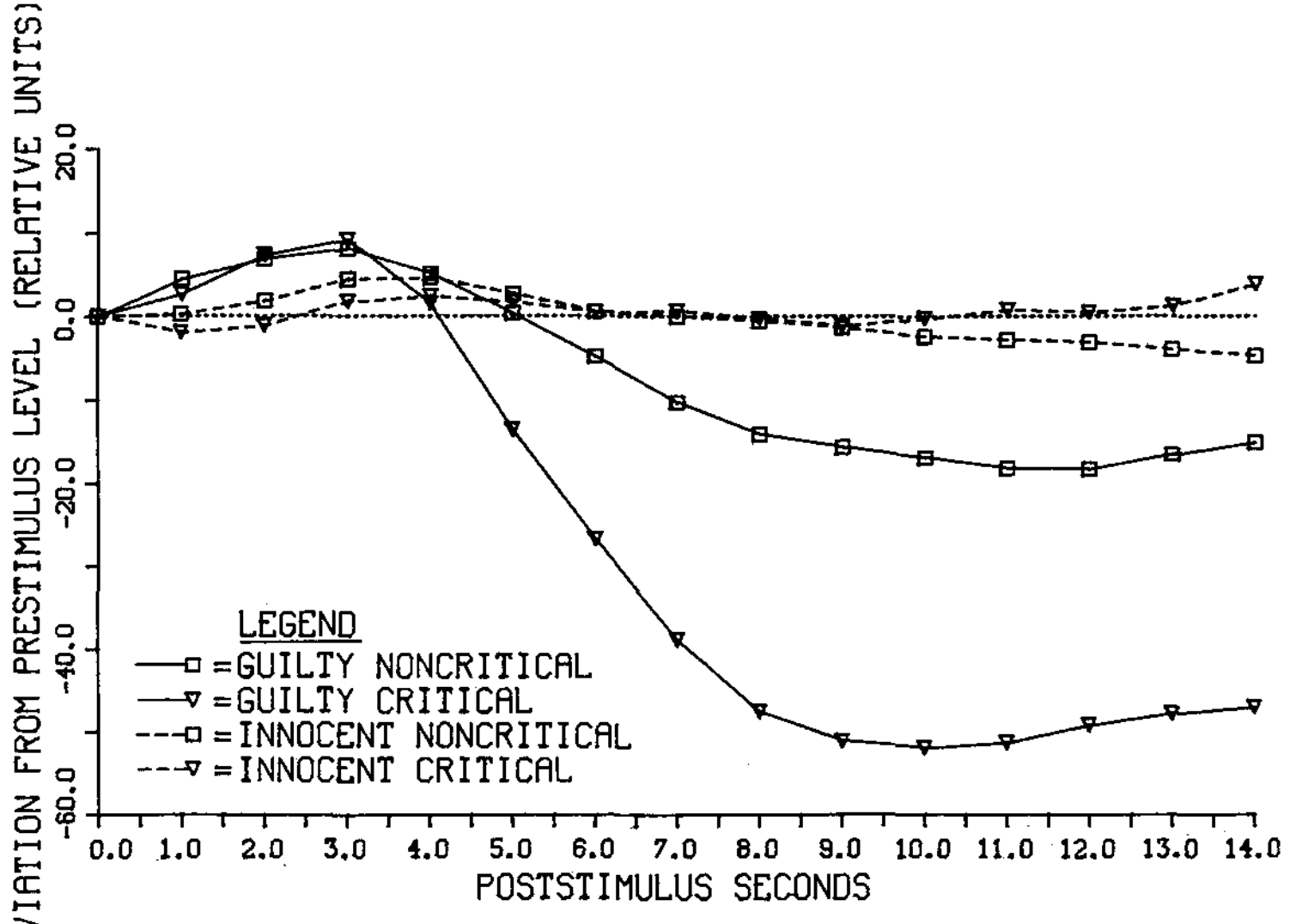
Mean heart rate responses to control and relevant questions for guilty and innocent psychopaths and nonpsychopaths.

Figure 5



Mean CAM systolic responses of guilty and innocent subjects to control and relevant questions.

Figure 6



Mean CAM systolic responses of guilty and innocent subjects to noncritical and critical items.

guilty-knowledge tests also produced significantly larger negative and positive skin potential responses by guilty subjects to critical items. The measurement of skin potential responses with criminal suspects showed larger amplitude of positive responses by deceptive suspects to relevant questions, but no significant results were obtained with negative skin potential. Thus, it appears that measures of skin potential may be of some use as an index of deception, but they appear to be inferior to other measures of electrodermal activity such as skin conductance amplitude and recovery time.

Table 10

Mean Negative Skin Potential Response Amplitude (mV) With the Control-Question Technique and Guilty-Knowledge Technique in Experiment II

		Control Question	
		Control	Relevant
Exclusive	Guilty	1.0	1.7
	Innocent	1.4	1.1
Nonexclusive	Guilty	1.1	1.2
	Innocent	.9	.8
		Guilty Knowledge	
		Noncritical	Critical
GKT	Guilty	1.3	2.5
	Innocent	1.4	1.2

Comparisons of Question Techniques

Laboratory Experiment II was designed to allow evaluations of several different approaches to question structure employed in polygraph examinations. Those features included comparisons of the effectiveness control-question tests with that of guilty-knowledge tests, evaluations of the relative effectiveness of exclusive and nonexclusive types of control questions, and the relative usefulness of a guilt-complex question utilized as a control questions. The results obtained with each of those questions are described below.

Relative accuracy of control-question and guilty-knowledge tests. The outcomes based on numerical scoring of control-question and guilty-knowledge tests are presented in Table 11. The rate of accuracy of decisions using control-question tests was 94% with exclusive control questions and 83% with nonexclusive control questions. Since the difference in accuracy rate for those two types was not significant, their combined accuracy rate was compared to that obtained with the guilty-knowledge test. The accuracy of

guilty-knowledge tests was 90% as compared to the combined decision accuracy of 89% with control-question tests. The types of errors which occurred consisted of false negative errors in all but one subject, who was tested with a control-question technique. Thus, the overall accuracy of decisions was virtually identical for control-question and guilty-knowledge tests. In addition, quantitative analyses of physiological responses produced a large number of significant results using both control-question and guilty-knowledge tests as previously described.

Table 11

Accuracy of Decisions and Types of Errors Using Exclusive and Nonexclusive Control Questions and Guilty-Knowledge Tests in Experiment II

	% Correct	% False Positive	%False Negative	% Inconclusive	%Correct Decisions
Exclusive	85	0	5	10	94
Nonexclusive	75	5	10	10	83
Guilty-knowledge	90	0	10	0	90

Comparison of exclusive and nonexclusive control questions. As indicated above, the tests which utilized exclusive control questions produced a slightly higher accuracy rate than those which utilized nonexclusive control questions, but that difference was not statistically significant. However, when the total numerical scores for the first three charts were compared, some differences were observed. The tests using exclusive control questions produced significant identification of innocent (mean score = +13.6) and guilty (mean score = -11.7) subjects, but the results with nonexclusive control questions were significant for innocent (mean score = +14.2) but not guilty (mean score = -6.3) subjects. Quantitative analyses of physiological responses also produced some results which indicated a superiority for tests utilizing exclusive control questions. As previously described, measures of skin conductance response recovery times and amplitude of negative skin potential responses showed stronger reactions to relevant questions by guilty subjects and to control questions by innocent subjects only with exclusive control questions. The test which utilized nonexclusive control questions showed no discrimination for either of those measures. Thus, it appears that control questions which are separated from the relevant issue by age or time of occurence have some advantage over control questions which do not have those esclusionary characteristics.

Effectiveness of a guilt-complex question. In order to evaluate the usefulness of a guilt-complex question as a control question, Experiment II included a guilt-complex question as the eighth question on each chart. The

reactions to that question were evaluated by using it as a control question for the relevant question at position 7 and performing a standard numerical scoring for that question pair on the first three charts. The scores obtained in that manner were then compared to those obtained by a numerical evaluation using the control question at position 9 and the same relevant question. The results of those evaluations are presented in Table 12. When the reactions to the standard control question were compared to those produced by the relevant question, the mean scores for guilty and innocent subjects were of approximately the same magnitude but in opposite directions, showing significant discrimination for guilty and innocent subjects. The guilt-complex question produced a negative mean score for guilty subjects but failed to produce any difference for the innocent subjects. In addition, the frequencies of scores in the wrong direction (positive scores for guilty subjects and negative scores for innocent subjects) were tabulated. With the guilt-complex question, scores of "0" with guilty subjects were considered to be in the wrong direction since the theory of guilt-complex questions predicts that only innocent subjects would produce scores of "0". Using standard control questions, there were 3 scores in the wrong direction with guilty subjects and 3 scores in the wrong direction with innocent subjects. With the guilt-complex question, there were 3 such errors with guilty subjects and 9 with innocent subjects. Thus, it appears that the standard control questions were clearly more effective than guilt-complex questions in identifying innocent subjects.

Table 12

Mean Field Scores of Guilty and Innocent Subjects When a Control Question and the Guilt-Complex Question were Compared with a Relevant Question

	Comparison Question	
	Control	Guilt Complex
Guilty	-4.2	-3.7
Innocent	4.0	0.0

The "Friendly Polygrapher"

Three sets of data were obtained in order to evaluate Orne's "friendly polygrapher" hypothesis. The first sample showed that defense cases produced 78% truthful, 20% deceptive, and 2% inconclusive outcomes. The law enforcement cases produced 76% truthful, 20% deceptive, and 5% inconclusive outcomes. Contrary to the "friendly polygrapher" hypothesis, there was no difference in frequency of truthful outcomes for defense and law enforcement examinations conducted by the same examiner. The second sample produced mean numerical scores of -4.7 for defense cases and -2.0 for law enforcement/employer cases. Although the difference between those means was not significant, it was in the opposite direction from that predicted by the "friendly polygrapher" hypothesis. The third sample produced mean numerical scores of -10.4 for defense

cases and -0.7 for law enforcement cases. The difference between those means was statistically significant and in the opposite direction from that predicted by the "friendly polygrapher" hypothesis. Thus, the three samples of data obtained to test the predictions from the "friendly polygrapher" hypothesis not only failed to produce any evidence to support that hypothesis, but some of the results indicated effects which were totally contrary to Orne's speculations.

Errors in Examinations

This project provided four different sources of possible data concerning errors. The first was the two laboratory experiments utilizing mock crimes. The second was the field study of criminal suspects using criteria of ground truth developed with a panel of experts. The other two sources consisted of independent evaluations by field examiners of confirmed cases provided by us and cases from our own laboratory and those referred to us by other examiners.

In the two laboratory experiments, there was a total of 8 errors in 108 subjects. They consisted of 3 false positives and 3 false negatives with control-question tests and 2 false negatives with the guilty-knowledge test. The laboratory results seem to indicate a low rate of errors equally divided among false positives and false negatives using control question tests and only false negatives using the guilty knowledge test.

The results obtained from examinations of criminal suspects were somewhat different. Using the panel criterion, there were 6 false positives and 1 false negative with 92 suspects. When polygraph examiners made 400 independent evaluations of polygraph charts of confirmed cases from our laboratory, 20 of the 33 errors were false positives. Only 8 false positives would be expected if examiners were equally likely to make either type of error when interpreting charts.

The last sample concerning errors yeilded 12 cases in which there was clear evidence of inappropriate physiological responses on one of the polygraph examinations. It appears that all but one of the cases yielded false positive results on the first examination, and one suspect produced a false negative result. The preponderance of false positives is not surprising since a guilty subject would be unlikely to insist that a truthful outcome was erroneous. The one case of a false negative appeared to be the result of deliberate countermeasures which produced substantial respiration reactions to control questions. A subsequent examination at our laboratory confirmed the deception and the obvious use of countermeasures. Among the false positive results, four were resolved by a truthful result on a subsequent polygraph test which followed a restructuring of some of the questions in order to separate a related but irrelevant concern expressed by the suspect. Such concerns were typically incorporated into new control questions or simply expressed by the subject as minor admissions prior to the second test.

There were a number of characteristics which seemed to be prevalent among the false positive cases. In all but one case, the suspect had no previous experience of being in serious difficulty with regard to criminal activity. They were generally well-educated (six had college degrees), had middle-class

values, and expressed strong concerns about their reputations and their personal distress from being charged with a criminal act. That pattern of characteristics is not typical of criminal suspects who are given polygraph examinations. In five of the cases the suspect was examined twice by Dr. Raskin or Dr. Barland and produced deceptive results on the first test. After being informed of the outcome, each of them described something which caused an emotional reaction to the relevant questions. In three instances minor, non-incriminating admissions were made, and the second test produced truthful results with the same relevant questions. In the other two cases the suspects described a feature of the situation which caused them to experience an emotional reaction to the relevant questions, e.g., the use of a certain name or feelings of guilt or responsibility. When such material was incorporated into control questions, truthful results were obtained on the second test.

Conclusions and Recommendations

The results of this project clearly indicate that polygraph examinations utilizing control-question or guilty-knowledge tests are highly accurate. In light of the available evidence from the laboratory and field, it seems reasonable to conclude that the accuracy of such tests is approximately 90% when they are properly conducted and evaluated.

With regard to specific techniques, it appears that the control-question test utilizing exclusive type control questions is the most accurate test which is suitable for a wide variety of criminal investigations. Although the guilty-knowledge test also produced high levels of accuracy, it is seldom possible to utilize that type of test due to the nature of most crimes or the lack of significant items of information which would be known only to the guilty person and the investigators. The relevant-irrelevant test possesses many weaknesses (Podlesny & Raskin, in press) and should not be used as a substitute for control-question tests.

The results of this project clearly indicate that numerical scoring of polygraph charts produces higher rates of accuracy and reliability of chart interpretation than other methods of chart interpretation. The basic scoring system taught by the U.S. Army Military Police School seems to produce good results using scores of ± 5 inclusive to define the inconclusive zone. However, the criteria for evaluating reactions may require some slight modifications on the basis of the results obtained from the studies of physiological responses performed on this project.

The results obtained with detailed analyses of physiological measures support the continued use of respiration, skin conductance (galvanic skin response), and cardiovascular (relative blood pressure) measures. Among all of the variables measured, the skin conductance response (galvanic skin response) was clearly superior in laboratory experiments and with criminal suspects in field situations. In addition, the results clearly indicated that a properly-designed photoelectric plethysmograph would make a useful addition to field polygraph instruments. Unfortunately, those which have been marketed in the past have not met the performance standards which are easily attainable. The substitution of an electronic, low-pressure blood pressure (cardio) device for the mechanical, high-pressure system seems clearly

beneficial and desirable. The results obtained with recordings made at pressures of 70 mmHg were quite good, and the use of inflation pressures below diastolic blood pressure have the clear advantages of reducing discomfort to the subject and allowing a slower rate (25-30 seconds) of question presentation. Although some positive findings were obtained with the cardio activity monitor (CAM) and measures of skin potential and heart rate, the results do not seem to warrant adding those measures to field polygraph instruments at this time.

There were a number of findings which have implications concerning the criteria for defining reactions and lack of reactions in different physiological measures. With regard to respiration, the results support the use of suppression of breathing, slowing of rate, and apnea as indicators of reaction. Speeding of breathing and increases in respiration amplitude were found to be associated with truthfulness and should be viewed as indicative of lack of reaction. Although no quantitative analyses were made on respiration baseline changes, their use in obtaining accurate results with numerical scoring was consistent with an interpretation of baseline arousal as a reaction. However, detailed analyses should be done to assess the usefulness of baseline arousal as an indicator of reaction.

Measures of the recovery times of skin conductance responses clearly demonstrated that longer-lasting responses are associated with reactions. Therefore, additional weight may be given to scoring skin conductance responses which show slower recovery toward baseline levels. Since the short time constant measurement technique which is employed in the automatic mode of recording such responses has the effect of eliminating information concerning recovery time, skin conductance (galvanic skin response) should always be recorded in the manual (long time constant) mode. Also, the use of the automatic mode can greatly distort the relative size and shape of those responses, and the use of the automatic mode should be eliminated.

The findings with regard to cardio (relative blood pressure) responses indicate that increases in diastolic level represent good indications of reaction. Furthermore, decreases in diastolic level were found to be associated with truthfulness and should not be used as indicative of reactions. There was little support for the use of decreased pulse amplitude as an indicator, but the measurements with the low pressure system may have greatly diminished the possibility of finding such changes. Therefore, at this time we do not recommend eliminating the use of decrease in pulse amplitude as an indicator of reaction.

The measures of finger pulse amplitude and finger blood volume provided excellent results. It seems clear that decreases in finger pulse amplitude and finger blood volume are very useful indicators of reaction. Since those measures are obtained by recording with greatly different time constants, manufacturers of field equipment should consider providing a photoelectric plethysmograph which offers a choice between a very short time constant (.1 second) and a very long time constant (28 seconds). With that option, the examiner could select the setting which provides the more useful recording with each subject.

The changes in physiological activity obtained on this project were measured from the beginning of the questions, and reactions were frequently observed beginning shortly after the question started and prior to the subject's answer. Although many field examiners are of the opinion that reactions which begin prior to the subject's answer are "listening reactions" and should not be utilized in arriving at decisions of truth or deception, the scientific evidence supports the use of reactions which begin soon after the start of the question. The use of such reactions would be a problem only if the questions had not been reviewed with the subject such as in the current practice with relevant-irrelevant tests, but such tests do not meet scientifically acceptable standards.

The investigation of problems associated with personality and psychopathy yielded a good deal of useful information. The results were strongly contradictory to the common belief that psychopaths (sociopaths) can "beat the lie detector" (Barland & Raskin, 1973). With convicted felons who were diagnosed psychopathic, not a single guilty subject was able to produce a truthful result. In fact, there were some indications that psychopaths may be somewhat easier to detect using polygraph examinations. The results with criminal suspects supported the postion that deceptive psychopaths are as physiologically reactive and as readily detected as nonpsychopaths. Thus, the fears that psychopathic criminals are able to be successful in deception during polygraph examinations can be dispelled. Perhaps the greatest danger is that a clever and convincing psychopath can talk a polygraph examiner into believing him, even though the polygraph charts indicated deception. Adequate training in chart interpretation and numerical scoring should prevent that from occuring.

With regard to a variety of personality, biographical, and circumstantial factors, the results failed to show any relationship between those variables and the polygraph outcomes. There were no differences attributable to aspects of personality as measured by the MMPI, age, sex, previous arrests or polygraph examination, educational attainment, or the type of crime involved. Thus, in the absence of very low intelligence or any incapacitating psychological or physical illness, it seems reasonable to conclude that polygraph examinations are effective with a wide variety of individuals with respect to the broad range of crimes typically investigated.

With regard to the risks of errors, the findings provided information on important questions which have been raised. The concept of the "friendly polygraph" (Orne, 1975) has been used as an argument against the validity of polygraph examinations conducted confidentially at the request of defense attorneys (Dogin, 1974). The findings obtained with three different samples of criminal cases are contrary to the "friendly polygrapher" notion. There appears to be no increased risk of false negatives under such circumstances. If anything, the results indicated a higher likelihood of deceptive results on defense-conducted examinations. Therefore, the results of defense-offered polygraph examinations should be accorded careful consideration if the examinations have utilized adequate techniques employed by properly trained and competent examiners.

The findings showed that in the criminal suspect situation there may be a somewhat higher risk of false positives rather than false negatives. In the study with criminal suspects using the panel criterion, all but one of

the obtained errors were false positives. In addition, the chart interpretation errors by polygraph examiners showed a disproportionate number of false positives decisions, which is consistent with the report of Horvath (1974). Finally, among the criminal cases in which we were able to obtain fairly srong indications of an error, all but one appeared to be false positives. In the latter study, the increased risk of false positives occurred with suspects who were generally well-educated, had no prior history of criminal activity, and were very concerned about their reputation or standing in the community. When such subjects proclaim their innocence after having produced deceptive reactions on polygraph examinations, the examiner should provide opportunities for the subject to explain why he responded to the relevant question if he was actually being truthful. If the subject provides an explanation which could be incorporated into a restructured set of questions, the examiner should give serious consideration to administering a second test. That procedure should be followed in all cases where the deceptive results are strongly disputed by the subject, but particular attention should be paid in those cases where the subject fits the pattern described above.

The usefulness of behavioral cues (Horvath, 1973; Reid & Inbau, 1966) was investigated in the study of accuracy with criminal suspects. The results were not supportive of the claims that behavioral observations are effective in assessing truth and deception. Similar results were obtained in Experiment II, and they showed that decisions based on behavioral cues produced more than 50% incorrect designations of innocent subjects as deceptive. Unfortunately, many examiners are taught to place great emphasis on gestures, verbal behavior, and mannerisms in arriving at a decision. At this time the evidence does not support such procedures, and examiners should restrict their basis for decisions to the physiological recordings on the polygraph charts.

On the basis of the existing scientific literature and the findings of the research performed on this project, the following conclusions and recommendations are made:

1. Polygraph examinations can be highly accurate in determining truth and deception regarding specific issues in criminal investigations.

2. In order to obtain maximum accuracy, polygraph examinations should employ control-question tests or guilty-knowledge tests, when applicable. Control questions should employ time or age exclusions of the type utilized in the exclusive control questions.

3. Polygraph recordings should include respiration, skin conductance (galvanic skin response), and relative blood pressure (cardio cuff). Manufacturers of polygraph instruments are urged to develop and market an adequate photoelectric finger plethysmograph, and examiners are encouraged to use measures of finger pulse amplitude and finger blood volume. The use of an electronic low-pressure cardio cuff is encouraged, using inflation pressures of 70 mmHg. Lower inflation pressures appear to produce less satisfactory results.

4. Examiners should be given formal training in numerical scoring of polygraph charts. The numerical system should be of the type utilized by the U.S. Army and modified on the basis of the findings described above. The use of a total score of +6 or higher as a criterion for truthfulness and -6 or lower as a criterion for deception is supported by this research.

5. The results of control-question examinations should always be determined by numerical evaluation of the polygraph charts. When important investigative or judicial decisions may be influenced by the results of such tests, an additional numerical evaluation of the polygraph charts by an independent examiner is recommended.

6. If the above conditions are met, the results of this research indicate an accuracy rate of approximately 90% with criminal suspects. In light of that high rate of accuracy, the results of polygraph examinations should be given careful consideration in criminal investigations and judicial proceedings.

References

Backster, C. Technique fundamentals of the tri-zone polygraph test. New York: Backster Research Foundation, 1969.

Bailey, F. L. & Rothblatt, H. B. Investigation and preparation of criminal cases, federal and state. Rochester, New York: The Lawyers Cooperative Publishing Company, 1970, 296-299.

Barland, G. H. & Raskin, D. C. Detection of deception. In W. F. Prokasy & D. C. Raskin (Eds.), Electrodermal activity in psychological research. New York: Academic Press, 1973.

Barland, G. H. & Raskin, D. C. An evaluation of field techniques in detection of deception. Psychophysiology, 1975, 12, 321-330.

Barland, G. H. & Raskin, D. C. Validity and reliability of polygraph examinations of criminal suspects. (Report No. 76-1, Contract 75-NI-99-0001, U.S. Department of Justice.) Salt Lake City, Utah: University of Utah, Department of Psychology, March, 1976.

Bersh, P. J. A validation study of polygraph examiner judgements. Journal of Applied Psychology, 1969, 53, 399-403.

Dogin, H. S. Statement of Henry S. Dogin, Deputy Assistant Attorney General, Criminal Division, Department of Justice. In, The use of polygraphs and similar devices by federal agencies (Hearings before a Subcommittee of the Committee on Government Operations, House of Representatives, Ninety-third Congress, Second Session, June 4 and 5, 1974). Washington: U.S. Government Printing Office, 1974, 413-417.

Horvath, F. S. Verbal and nonverbal clues to truth and deception during polygraph examination. Journal of Police Science and Administration, 1973, 1, 138-152.

Horvath, F. S. The accuracy and reliability of police polygraphic ("lie detector") examiners' judgments of truth and deception: The effect of selected variables. Unpublished doctoral dissertation, Michigan State University, 1974.

Horvath, F. S. & Reid, J. E. The reliability of polygraph examiner diagnosis of truth and deception. The Journal of Criminal Law, Criminology and Police Science, 1971, 62, 276-281.

Horvath, F. S. & Reid, J. E. The polygraph silent answer test. Journal of Criminal Law and Criminology, 1972, 63, 285-293.

Hunter, F. L. & Ash, P. The accuracy and consistency of polygraph examiners' diagnoses. Journal of Police Science and Administration, 1973, 1, 370-375.

Lykken, D. T. The GSR in the detection of guilt. Journal of Applied Psychology, 1959, 43, 385-388.

Lykken, D. T. Psychology and the lie detector industry. American Psychologist, 1974, 29, 724-739.

Orne, M. T. Implications of laboratory research for the detection of deception. In N. Ansley (Ed.) Legal admissibility of the polygraph. Springfield, Illinois: Thomas, 1975.

Podlesny, J. A. & Raskin, D. C. Physiological measures and the detection of deception. Psychological Bulletin, 1977, in press.

Podlesny, J. A., Raskin, D. C., & Barland, G. H. Effectiveness of techniques and physiological measures in the detection of deception. (Report No. 76-5, Contract 75-NI-99-0001, U.S. Department of Justice.) Salt Lake City, Utah: University of Utah, Department of Psychology, August, 1976.

Raskin, D. C. Psychopathy and detection of deception in a prison population. (Report No. 75-1, Contract 75-NI-99-0001, U.S. Department of Justice.) Salt Lake City, Utah: University of Utah, Department of Psychology, June, 1975.

Raskin, D. C. Reliability of chart interpretation and sources of errors in polygraph examinations. (Report No. 76-3, Contract 75-NI-99-0001, U.S. Department of Justice.) Salt Lake City, Utah: University of Utah, Department of Psychology, June, 1976.

Raskin, D. C. & Barland, G. H. An evaluation of polygraph techniques currently practiced by law enforcement and private polygraph examiners. (Report No. 76-2, Contract 75-NI-99-0001, U.S. Department of Justice.) Salt Lake City, Utah: University of Utah, Department of Psychology, April, 1976.

Reid, J. E. & Inbau, F. E. Truth and deception: The polygraph ("lie detector") technique. Baltimore, Maryland: Williams & Wilkins, 1966.

Slowik, S. M. & Buckley, J. P. Relative accuracy of polygraph examiner diagnosis of respiration, blood pressure, and GSR recordings. Journal of Police Science and Administration, 1975, 3, 305-309.

* * * * * *

Answers to Polygraph Review on Peak of Tension Tests - pages 89-90.

1. b. A deceptive subject is more likely to know this than other information.

2. d. Certainly, responses in all three components at the same time and place are better than in any one component.

3. c. In known solution POT tests, the key must be based upon verified information.

4. d. The use of a false key, as described by Mr. Richard O. Arther, is an outstanding aid in evaluating POT tests, particularly for those of an NDI subject.

5. a. If the "key" question does have special meaning to a subject, and the examiner does not determine this, a false interpretation may be made.

6. False. Generally, the tension increases to the point of deception, then decreases.

7. False. Cover-all questions are used in searching POT tests.

8. True.

9. False. You want anticipatory responses in POT tests. That builds up the tension.

10. True. Another purpose is to reassure the truthful subject that the test is really working.

* * * * * *

FUNDAMENTALS, FICTION, AND INVESTIGATIVE PREPARATION FOR THE FIELD POLYGRAPH

By

Lynn P. Marcy *

Fundamentals and Fiction

Fundamentally speaking, the field polygraph is not a lie detector! It does not, and cannot detect lies. No mechanical or electronic device can detect lies. The tragic misunderstanding of this most basic fact is nowhere better illustrated than in those articles and court decisions referring to the "impossibility of cross-examining the machine." The responsibility for such total ignorance must be shared by our field and yours, because it is obvious to the most superficial student that the evaluation of truth or deception is a human diagnostic process. It may be subjective, objective, or both, but everyone of us has been evaluating the credibility of our fellow human beings since birth. We humans are the lie detectors!

What then is a polygraph? By definition from the Greek, it is any device which has several writers, or makes several tracings, whether it is used in our field, or for some entirely different purpose such as recording pressures and temperatures in a power plant.

A device which does not have more than one writer, or makes more than one tracing is not a polygraph, and by law, illegal to use in the evaluation of truth or deception in the State of Michigan. This would include both those devices which purpose to detect deception by evaluating changes in the tape recorded vocal response due to stress, and those which purpose to do the same through a dial reading galvanometer attached to the fingers or palm.

Section 4, Act No. 295, Public Act of 1972 states in part "such instrument or device, as minimum standards, shall be capable of recording visually, permanently, and simultaneously indications of a person's cardiovascular pattern and changes therein, and a person's respiratory pattern and changes therein."

Any device which does not meet this minimum standard is illegal to use in the evaluation of truth or deception - no matter what other capability it may possess and no matter what claims may be made for it.

The field polygraph is a diagnostic aid - a clinical tool - nothing more and nothing less. In its law enforcement applications, it is an investigative aid in the same sense as the comparison microscope. Both rely on the knowledge, observations, and conclusions of a human technician for the assistance offered an ongoing investigation.

 It originally appeared in the May-June and July 1976 issues of the Michigan Police Journal. The author is on the Board of Directors of the APA, Chairman of the Michigan State Board of Forensic Polygraph Examiners, Past President of the Michigan Association of Polygraph Examiners and Director of the American Institute of Polygraph Technology and Applied Psychology.

Various makes and models of suitable polygraph instruments are available, but all these have no diagnostic value unless properly utilized by a suitably trained Polygraph Examiner.

What is a Polygraph Examiner? A Polygraph Examiner is a specialist in using this clinical tool to aid the evaluation of human credibility. The accuracy of his evaluations will depend on his personal qualifications, his training, his experience, and his diligence in applying the diagnostic techniques which have been empirically developed for use during the polygraph examination. The importance of the training program cannot be overemphasized, since this determines the breadth and strength of the technical foundation upon which the Polygraph Examiner is able to build his professional skills and accuracy. Any limitations or deficiencies in training will be reflected in erroneous or inconclusive results, unless corrected. Training does make a difference!

What does the polygraph examination consist of? It is more than just a test, or series of tests. The entire polygraph examination includes everything that transpires regarding a given matter from the making of an appointment to the reporting of a diagnostic opinion. It is separated into three interdependent phases: The Pre-Test Phase; The Testing Phase; and the Post-Test or Diagnostic Phase.

The Pre-Test includes the obtaining and evaluating of case facts; isolation of target issues for question formulation, taking background information and a history from the examinee; and in conjunction with that examinee, formulating and reviewing the actual question areas which will be asked during the Testing Phase.

The Testing Phase includes the application of instrumental sensors; the balancing of the instrument to the person being examined; the obtaining of various individual tracing standards to determine the norms of that particular person at that particular time; and then intermittant periods of testing and resting until a number of different test charts have been obtained for diagnostic consideration.

The Diagnostic Phase includes an evaluation of all data obtained. This would include estimates of the examinee's suitability for testing; clinical notes and observations; consideration of any explanations advanced by the examinee; and evaluation of the various test recordings for inconsistencies or imperfections.

Finally, it involves the potential for quantification of the recorded responses in each of the separate tracings on each of the various tests through a numerical evaluation comparing each of the relevant issue questions to each of the control questions.

How accurate is the polygraph examination? Well, how accurate is any diagnostic process? It depends on the qualifications of the human being making that diagnosis. Highly qualified Polygraph Examiners will be highly accurate, less qualified Examiners will be less accurate, and unqualified examiners will be less accurate still.

Verified laboratory studies support our field statistical estimates which indicate a validity of at least 90% for the diagnostic opinions of a highly skilled Polygraph Examiner properly trained in diagnostic techniques. Compared to this, we find statistical estimates of 50%, or chance validity for annual physical examinations in detecting fatal illness, and almost no statistics or estimates on the accuracy of a psychiatric evaluation. For some strange reason, the criminal justice field has never required any as a prelude to expert testimony before a jury.

Are there ways to "beat the test" or cause a diagnostic error? I don't know of anything a person can deliberately and consciously do to cause a diagnostic error if the examiner is qualified and following proper procedures. The variety of counter measures that have been unsuccessfully employed seems limited only by the imagination of the examinee. They can generally be classified into the following categories: (1) Ingestion. The eating, inhaling, or drinking of something. (2) Injection. The introduction of some drug or medication into the body or blood stream. (3) Exertion. The attempt to deplete the body resources and response capability. (4) Mental Gymnastics. Directed concentration, fantasy, yoga, hypnosis, transcendental meditation, or rationalization. (5) Pain. Intermittant self infliction of some painful stimulus during testing. (6) Purposeful Distortion. Deliberate bodily activity in direct opposition to requested cooperation during testing.

Most of these countermeasure attempts are self-evident to the qualified examiner. Even if they are not self-evident, we have designed special anti-countermeasure techniques to discover or hypothesise their existence. You could not deliberately cause a mistake by a qualified examiner, and neither could I. The best we could do is cause an indefinite or inconclusive opinion by obliterating all responses in one way or another. Evidence of countermeasure activity is diametrically inconsistent with truthfulness, and is almost always self-indicative of deceptive intent. This is not to say there is no possibility of an examiner making a mistake. We can't, and won't make claims of perfection for any human opinion or conclusion. This holds true for judges, juries, lawyers, psychiatrists, police officers, and Polygraph Examiners. We can all be mistaken, and at some time all of us have been. However, contrary to statistical expectations, the probability of a Polygraph Examiner making an error is not equally divided between the truthful and the deceptive. Neither is it anywhere near as probable that a Polygraph Examiner will make an error in diagnosing credibility as might the other humans, including Judges and Jurors, who are not specialists in using the field polygraph for this evaluation.

Based on my personal experience, I believe the probability that a skilled and properly trained Polygraph Examiner will make an error on the truthful is almost non-existant for the following reasons: (1) Significant responses indicative of deception will not normally occur unless provoked or stimulated. (2) The polygraph technique provides safeguards against accidental stimulation, as well as procedures for eliminating or neutralizing those responses through numerical evaluation and comparisons for each of the various tests obtained in the testing series downgrades the possible mis-interpretation of an accidental response in favor of response consistency overall. (4) Polygraph Examiners also belong to that society which believes and teaches that all cases of reasonable doubt should be decided in favor of the individual - not the State.

The Investigator's Responsibility in Polygraph Examinations

Our purpose in this article is not to make Polygraph Examiners of you, but to inform you of the capabilities of the polygraph - commonly called the lie detector, along with its limitations and the investigator's responsibility in polygraph examination.

Better results may be obtained when you are better informed and when you have a better understanding of its possibilities and limitations. Collectively, we can help each other to do a better job. There is very little information available regarding the investigator's responsibility and opportunity in handling and conditioning the subject for a polygraph examination. This is rather unfortunate as to a very considerable degree the maximum effectiveness of the polygraph examination is dependent upon the pre-polygraph examination handling of the case facts and treatment of the subject. For instance, very often the investigators believe that it is necessary that they introduce a "psychological fear" of the "lie detector". It is known that some officers have told the subject that every time he lies the machine will shock him. This is one of the many things that should not be done as over-emotionality (over-sensitiveness) far outweighs the problems created by the under-emotional (non-sensitive) subject. The possibility of the subject becoming over-sensitive and nervous is greatly increased by threatening and exaggerating the polygraph procedures.

There are several areas that the investigator in the field should become acquainted with, regarding the conditioning of the polygraph subject and his responsibilities in preparing for polygraph examination which we will now discuss.

Polygraph Preparation and Procedures

The primary purpose of almost all polygraph examinations is to determine if the person being examined is being truthful or untruthful.

If this can be scientifically aided, the investigator can then better evaluate the evidence and ascertain what his next steps should be to conclude his investigation. Admissions or confessions obtained at this stage are frequent, and play an obvious role in the investigative process.

Procedures

The effectiveness of the polygraph is dependent upon the investigator and the examiner working together as a team. To be successful, both must follow certain basic procedures. The most important of those for the investigator are as follows:

A. The polygraph examination should be a supplement to, not a substitute for, a proper field investigation.

B. As the examination should not be used as a last resort, the examiner should be contacted for his recommendations as early in the investigation as possible.

C. During an investigation in which the polygraph might be utilized, the investigator should not resort to any misleading statements. If the person can determine that he was deceived, and if he later takes an examination, he may be hostile and overly suspicious of both the procedure and the examiner.

D. Such a mental attitude may cause the person's reaction to be so erratic that no conclusive chart interpretation can be made.

E. The investigator must emphasize to a person who may take an examination that the polygraph is an extremely effective method of establishing the truth. Confidence should be expressed in both the accuracy of the procedure and the impartiality of the examiner.

F. During the investigation, the investigator should withhold from the persons to be examined, certain information believed to be known only to the victim, the investigator, and a person with guilty knowledge. This admonition applies equally to supervisory and command personnel up to, and including especially all department spokesmen involved in media releases!

1. Details of crime to be withheld:

a. The investigating officer should avoid disclosure of certain crucial details or facts established during the investigation.

b. These crucial facts concerning the crime, which could only be known to the perpetrators should never be told the suspect, media, or the general public! These facts will be of vital importance to the success of the investigation and subsequent prosecution as will be discussed shortly.

c. Examples of details which should not be divulged:

(1) Method of entry - tools used to effect entry; point of entry; extent of damage at point of entry; whether or not entry was made by use of key.

(2) Property taken - specific amount; denominations of currency; unusual articles; description of articles.

(3) Weapon or force used to commit crime - club; gun; knife; poison; also number and location of wounds and bruises.

(4) Evidence left at the scene of the crime by suspects - tools; weapons; articles of clothing.

(5) Unusual acts of perpetrator before, during, and/or after the commission of the crime.

(6) Means of exit from the scene - if by vehicle, anything unusual about same, such as dents, missing portions, loud muffler, damage - if on foot, direction taken from scene, if noted.

(7) Location from which property was taken - where safe or cash box was located; type of container from which money or articles were taken; such as metal cash box, cigar box, laundry bag, paper sack; as well as colors of articles; brand names; victim's clothing; etc.

G. When requesting a person to submit to an examination, it shall be clearly stated it must be entirely voluntary.

H. If the person exhibits fear of the test procedure, the investigator should assure the person that the examiner will thoroughly explain the procedure prior to any examination.

I. No attempt should be made by the investigator to explain the procedure except to express complete confidence in its reliability.

J. Threats to use the polygraph in trying to obtain a confession should not be made.

K. In certain cases, the complainant, victim, or witness should be examined first. In the event the victim cannot be examined for some reason (e.g., age, physical disability), the examiner should be given an opportunity to interview the victim prior to the suspect's examination where necessary to pin down certain case facts.

L. The polygraph should never be used as a bluff. Don't assume the suspect to be innocent just because he agrees to an examination. Statistically, this has absolutely no significance as indicating guilt or innocence!

M. The investigator should provide the examiner with as many case facts and documents as possible, including the complete complaint file. Physical evidence (such as the forged instrument in a forgery case) will also be helpful. Crime scene photos and sketches are extremely important, especially where the examiner cannot visit the scene.

N. In addition, information concerning the background of each person being examined should be available.

O. At least one officer working on the case should be present at the examination facility during every examination.

P. Should the person or persons being examined be under arrest, the officer should also have custodial responsibility both before and after the examination.

Q. The responsibility for all polygraph related procedures lies with the Polygraph Examiner. In addition, he should have the sole responsibility to determine if any particular examination should take place.

R. If an examination is given, it should be removed in time and place from the original offense, as well as any subsequent arrest or interrogation. Attempts to examine an emotionally distraught party frequently produce

no useful results, and may result in error. This holds true for both suspects and victims.

S. No examination should be given to any person under the age of legal majority without written permission from at least one parent, a guardian, or a probate judge having jurisdiction.

T. Prior to discussing a possible examination with a juvenile, parent, guardian, or probate judge, the investigator should first consult with the examiner for his advice and recommendations.

U. As the well-being of the person to be examined is of importance, care should be taken that the person be in reasonably good mental and physical condition. He should have had food, rest, and relief from lengthy interview prior to the examination.

Factors That May Prohibit Examination

A. A polygraph examination should not be conducted on any subject if the examiner feels the subject is physically or mentally unfit, or the examination may be a detriment to his health.

B. An examination should only be given a subject who has voluntarily agreed to submit to the examination.

C. Juvenile Subjects:

1. Juvenile subjects under the age of 14 years make very difficult subjects to examine because of a lack of maturity, both physical and mental. Many times a conclusive opinion cannot be obtained by the use of a polygraph because of these factors.

2. Consent forms for juveniles to be tested must be signed by parent or legal guardian prior to the examination. In absence of parent or legal guardian, an appropriate judge having jurisdiction may authorize the examination.

D. Physical Factors:

The investigator must keep in mind that there are several other factors, especially of a physical nature, that sometimes can be the cause for non-examination. Examples of questionable subjects are:

1. Females during menstrual periods

2. Females that are more than 100 days in known pregnancy

3. Subjects with paralysis

4. Subjects with amputations, affecting placement of instrument sttachments

5. Subjects who have undergone recent major surgery

6. Subjects who suffer from various chronic or transitory physical disabilities

7. Subjects suffering from a severe cold or respiratory disorder

Whenever some question arises regarding the advisability of examining a particular subject, the investigator should obtain a signed letter from the subject's doctor authorizing the examination.

a. A good hypothetical question to ask the doctor (who may be unfamiliar with the stresses of a polygraph examination) would be the following: "Would yourpatient's health be endangered by the emotional stress which might be encountered during vigorous cross-examination under oath in court, or during a verbal interrogation by law enforcement officers?"

E. Narcotics Addicts and Alcoholics: During period of withdrawal or deprivation of their "drug", these are usually untestable subjects. However, when at their "norm" they may be suitable subjects for examination.

F. Mental/Emotional Factors: The fact that the subject might be suffering from some personality maladjustment, or some emotional problem does not automatically disqualify him for valid examination. A relatively high percentage of the prison population is comprised of those who fit the classification of a sociopath (psychopath); yet field studies and field experience both indicate that these are suitable subjects for polygraph examination.

Severe emotional stress and disorganization following an incident of a very traumatic nature might interfere with successful examination. This holds true for victims, witnesses, and perpetrators if they were to be examined too closely after the incident.

For this reason, investigators should be advised against scheduling examinations too closely after the event in cases of this kind. They will have to weigh carefully the dangers of a prime suspect becoming unavailable for subsequent questioning versus the danger that his polygraph records may show little response capability due to his emotional turmoil, even though he is lying about the crime in question. This is most likely to be encountered in crimes of passion involving homicide suspects.

At least 24 hours should be allowed for the regaining of emotional composure in cases of this kind.

G. Insufficient Nourishment or Rest: These factors may render a subject temporarily unsuitable for examination, and might also invalidate any admissions made.

H. Low Mentality or Insanity:

Subjects of very low mentality who could be categorized as retarded are generally most difficult and frequently unsuitable subjects for

polygraph examination. This is not to be confused with those functional individuals who lack a formal education.

Subjects suffering from serious mental derangement or classified as psychotic may not be suitable subjects for examination, depending on their awareness of reality at the time of the examination.

NOTE: An additional problem presented by these last categories is the serious question of whether they could satisfy the Miranda requirements for an intelligent waiver of rights and/or voluntary consent!

Factors That May Contribute to Error

Lack of training in, or application of the broad range of polygraph techniques developed to reduce error represent a lack of adequate qualifications on the part of the Polygraph Examiner. As we have already mentioned, the examiner's qualifications are the single most important consideration.

Next to this, the investigator's failure to conduct a thorough investigation and/or present accurate case facts to the examiner are the primary factors which may cause error or an inefficient examination.

The examiner must depend on the field investigation for his case facts. The better the case facts, the better job he can do in learning the truth of a given situation.

If the case facts are insufficient or faulty, or if some key bit of information is denied the examiner, the probability of an incorrect or inconclusive polygraph examination is increased - even with a well-qualified examiner. Investigators should never mislead or deceive the examiner, even though it may be a bit embarrassing to admit he failed to check, or just doesn't know the answer to some investigative detail. Neither should he conceal key facts in the hope of personal glory for "cracking" the case.

This may seem self-evident, yet it's one of the greatest dangers qualified examiners have to contend with. Remember, most field examiners were selected for training in the first place because they were top-notch investigators and interrogators. In most cases their field investigative experience will be far greater than that of the investigator, and it's only logical to expect them to ask questions about some detail the investigator overlooked, or some element of the case he failed to verify.

Investigators should not present theory as verified fact. They should not say they've verified an alibi, if they haven't. They should not pretend to be positive about a weapon, a cause of death, a point of entry, a time of day, a date, or any other detail, unless such information is factually verified.

The unwitting use of incorrect information by the examiner in questioning the subject and formulating the questions for the examination can give a tremendous psychological advantage to the guilty suspect, both during the examination itself, and during any subsequent interrogation. This is true even though

deception is indicated, which it may not be, especially on any question containing faulty information!

Peak of Tension Testing

Earlier I mentioned the importance of withholding from the suspect, the media, and the public - including in some cases even other officers not directly involved in the investigation - certain details about the crime.

Where such information is indeed withheld, and made known to the examiner, it permits him to develop a special form of polygraph test known as the Peak of Tension Test.

This is perhaps the most accurate type of test ever developed for eliminating innocent suspects, and not only positively identifying the guilty, but also creating the necessary psychological stress for a subsequent confession.

If you take away nothing else from this presentation, recognize and utilize the tremendous investigative benefits that will result from concealing and protecting "Peak of Tension Material"!

The Peak of Tension Test involves the formulation of a series of several questions. One of those questions contains the crucial correct fact or detail, while all the others contain equally plausible but absolutely ficticious facts or details.

The questions are similar in every other respect. The only person who should know and recognize the crucial correct fact is the guilty perpetrator, or someone who has criminal guilty knowledge of the crime.

The innocent suspect should not know or place special significance on the crucial question. In fact, a stimulation procedure has been developed which can actually cause the innocent to respond to one of the absolutely ficticious questions, thus largely avoiding the possibility of even an accidental response on the crucial question.

The guilty will recognize the threat which the crucial question represents and will reach a psychological/psysiological "peak of tension" with resulting deceptive response at, or just prior to that crucial question.

Some examples may help to illustrate: Consider the case of a homicide victim whose hands and feet were bound together with a pair of purple pantyhose. Other information has been released to the press, but this single detail has been preserved in confidence by the investigating agency.

The Polygraph Examiner could develop the following Peak of Tension tests:

I. Do you know if (victim's) hands were tied with baling wire?

Do you know if (victim's) hands were tied with fishing line?

Do you know if (victim's) hands were tied with binder twine?

Do you know if (victim's) hands were tied with pantyhose?

Do you know if (victim's) hands were tied with extension cord?

Do you know if (victim's) hands were tied with clothesline?

Do you know if (victim's) hands were tied with a silk scarf?

II. Do you know if (victim's) hands were tied with something colored metallic?

Do you know if (victim's) hands were tied with something colored green?

Do you know if (victim's) hands were tied with something colored tan?

Do you know if (victim's) hands were tied with something colored purple?

Do you know if (victim's) hands were tied with something colored white?

Do you know if (victim's) hands were tied with something colored yellow?

Do you know if (victim's) hands were tied with something colored orange?

Obviously, significant emotional responses recorded on the polygraph charts at both the crucial questions in these two hypothetical test examples would make any doubt about the criminal involvement of the suspect almost non-existent. It would also represent a tremendous psychological level for subsequent interrogation of that suspect.

The more of these crucial details protected by the investigating agency personnel, the more certain and efficient any subsequent polygraph examination for either eliminating or pinning down suspects on the specific crime under investigation!

Obviously, the tremendous reduction in investigative effort; the tremendous savings in man hours; the tremendous increase in successful case clearances; and the tremendous benefits in confession-supported convictions make this one of the most frequently used types of polygraph tests - right?

Wrong!!!!

Pick up any newspaper, or tune in on any newscast, and you will learn the facts of life about Peak of Tension Testing. Law enforcement representatives from the department head down, absolutely destroy almost any hope of using this most efficient of all the various polygraph techniques!

Whether through ignorance or design, the most crucial and unique details about a crime become public knowledge in direct proportion to the seriousness and consequent pressures for solving that crime as quickly and as surely as possible.

Either directly through commission, or indirectly through omission, the departmental chief must accept responsibility for this sad state of affairs.

You, and every one of you, who release or permit the release of this crucial information are crippling your investigative mission for clearing the innocent and identifying the guilty.

In addition to the tremendous benefits which you can realize from the polygraph examination where such information has been protected and concealed for use by the examiner, there is a second and equally important reason for withholding these details - even where a polygraph examination is not used!

This material can be used to corroborate and verify both verbal and written confessions where these hidden details are mentioned without prompting by the confessing party. Much greater reliance can be placed on any such confession, and it should carry much more weight in future legal proceedings. It also helps to discover the "false confessor" who suffers from mental disturbance which requires that he seek publicity by confessing a spectacular crime - or who is attempting to protect some other party.

Summary

1. The investigator should keep in mind from the very inception of the investigation that he may find it necessary to request the aid of the polygraph. Protect crime details for peak of tension use as you would physical evidence. Discuss problems with the examiner.

2. Polygraph examinations should be considered as supplement to a thorough and complete investigation. The most minute and seemingly unimportant details are sometimes the ones that actually break the case. The more thorough and complete the investigation, the better the chance of a conclusive opinion from the examination.

3. Never withhold any pertinent information on either the crime or the subject from the Polygraph Examiner. Don't deceive or mislead the examiner. Don't threaten, or otherwise upset the subject.

4. The effectiveness of the polygraph examination is dependent upon the investigator and the polygraph examiner working together. The professional Polygraph Examiner will be sure the investigator properly receives credit due for breaking the case. He shouldn't need or want the court time.

5. Never use the polygraph examination as a bluff. Do not ask the subject to agree, unless you follow through.

6. The polygraph examination is a diagnostic technique. No activity involving a human opinion is perfectly error-free, including this one, but it has a far better "batting average" than anything else available, and it can be more productive at less cost, as well!

7. The polygraph examination conducted by a qualified examiner, and based on good case facts supplied by a good field investigator, is the best investigative method ever developed for eliminating the innocent and identifying the guilty!

8. The departmental leader and his investigative personnel have the main responsibility for determining the value of this investigative aid to the department. It can be great or small, depending on the crucial information you protect; the way you approach and handle your prospective polygraph subjects; and the nature of the case facts you supply to the examiner.

Acknowledgements

Thanks are due both the Michigan Department of State Police and the Texas Department of Public Safety for portions of this material.

* * * * * *

DRUGS FOR HYPERTENSION AND POLYGRAPH RESULTS
A CASE EXAMPLE

By

Norman Ansley

Subject of the examination was a 62 year old male caucasian, 5' 11" and 165 lbs. who had hypertension and related problems. He had been under medical supervision for two years, after his doctor found his blood pressure was 195/105 mmHg. The evening before the examination his doctor reported the pressure as 130/70 mmHg. Half an hour before the examination his pressure was 130/80 mmHg. Subject had been on the medication listed below for two years. Generic terms are in parenthesis behind the proprietary names:

Drug	Amount per day
propranolol hydrochloride (Inderal)	180 mg
hydralazine hydrochloride (Apresoline)	150 mg
hydrochlorothiazide (Hydrodiuric)	150 mg
allopurinol (Zyloprin)	300 mg
furosemide (Lasix)	40 mg

At the time of the examination the Subject was taking his medication on schedule. He was not in pain, had no nausea or illness, was not tired or suffering from a lack of sleep, had no history of heart trouble, had no respiratory problems, and reported his health as excellent, except for the blood pressure problem. Subject stated that he has had a high blood sugar count in the past but that is not now a problem. He noted that one of the side effects of his hypertension is a high uric acid problem. That is also under control, with medication.

Subject said that his doctor told him that propranolol was not indicated in the United States for treatment of high blood pressure, but has been recommended in Britain for some years.

Three medical authorities reviewed the list and stated that these are unusually high amounts, and one suggested that the subject may be over medicated.

Instrumentation

The instrument was a Lafayette model 76164, a polygraph which has amplifiers on the pneumograph channels as well as the cardiosphymograph and electrodermal units. This model used heated pens to record on heat sensitive paper moving at 2.5 mm per second. Four polygraph charts were produced.

The cardiosphymograph controls were set at maximum activity, sensitivity 1.5, normal notch. In the Lafayette model "activity" is the control for sensitivity or reactivity, while "sensitivity" is only a control of the size of the cardio pattern. The blood pressure cuff (child's size) was on the right forearm inflated at 86 mmHg. The electrodermal setting was balanced at 251K ohms, on the first chart. The second chart was balanced at 336K ohms, the third at 308K ohms, and the fourth at 278K ohms. The electrodermal sensitivity was 2.5 throughout, and after balancing the automatic mode was used on each chart. The upper pneumograph (thoracic) amplifier was set at a sensitivity of 5 and the lower (abdominal) amplifier at 4.

The cardiosphygmograph pattern was nearly constant throughout all four charts (see figure 1). The rate remained almost unchanged, and the slight change was very gradual, not in response to a stimuli. The vascular volume ("blood pressure") pattern showed only mild reactions, a rise (see figure 2), and those were to control questions.

The pneumograph and electrodermal patterns were normal, showing selective and typical responses of ordinary magnitude (see figure 2).

Drugs

Probably the most significant drug, from the polygraph viewpoint was the propranolol hydrochloride. The drug is primarily used to suppress ventribular ectopic activity and rapid supraventricular tachyarrhythmias (fast heart rate) that do not respond to the usual antiarrhythmic drugs. However, in this case it was prescribed to reduce blood pressure. Of particular importance, it is a beta-receptor blocker and antagonizes the activity of epinephrine, norepinephrine, and isoproterenol. When access to beta-receptor sites is blocked by propranolol the chronotropic, inotropic and vasodilator responses to beta-adronergic stimulation are decreased proportionately. It does not otherwise influence the automatic nervous system.

Propranolol may also cause bronchial constriction by interfering with andrenergic bronchodilator activity.

Hydralazine hydrochloride is a drug used in the treatment of essential hypertension, alone or as an adjunct. It reduces blood pressure, but does not ordinarily affect the automatic nervous system.

Hydrochlorothiazide is a diuretic and antihypertensive drug which is sometimes used to enhance the effect of other drugs in severe hypertension. The mechanism by which it reduces blood pressure is not known, but sodium depletion appears to be involved. Thiazides are also known to decrease arterial responsiveness to norepinephrine.

Allopurinol is a diuretic which increases urinary excretion of uric acid and is often used in the treatment of gout, uric acid nephropathy, and prevention of uric acid stone formation.

Furosemide is a diuretic, distinct from thiazides, which inhibits the reabsorption of sodium. It is also used in the treatment of hypertension alone or in combination with other agents.

Effects

The synergistic effect of these drugs on the subject's autonomic nervous systems are unknown. The subject stated that he felt well, his blood pressure and associated uric acid problems were said by his doctor to be under control. Aside from the inconvenience of frequent urination, caused by the diuretics, and the need for frequent and careful administration of the drugs at the exact time each day, the subject was not apparently impaired. In this particular case, which is not typical, the cardiosphygmograph pattern was almost constant throughout the examination, with only slight reactions in vascular volume. Except for the weak reactions, there was no other cardiovascular reaction to stimuli during the examination. The subject's patterns and reactions in the other channels were normal.

Considering its pharmalogical properties, I suspect that the propranolol hydrochloride suppressed autonomic responses in the cardiovascular system, but hydrochlorothiazide may have played a separate or combined role. I cannot say with certainty that any of the drugs had an effect on the subject's reactions. Nor can I discount the possibility that the subject took other drugs which he did not mention. No deception was indicated, there were good reactions to controls in the other channels, and there was no indication of attempts at countermeasures. This case is presented as an interesting single example, and lacking other cases of this type, it does not support general assumption about the examination of hypertensive subjects who are using prescribed drugs.

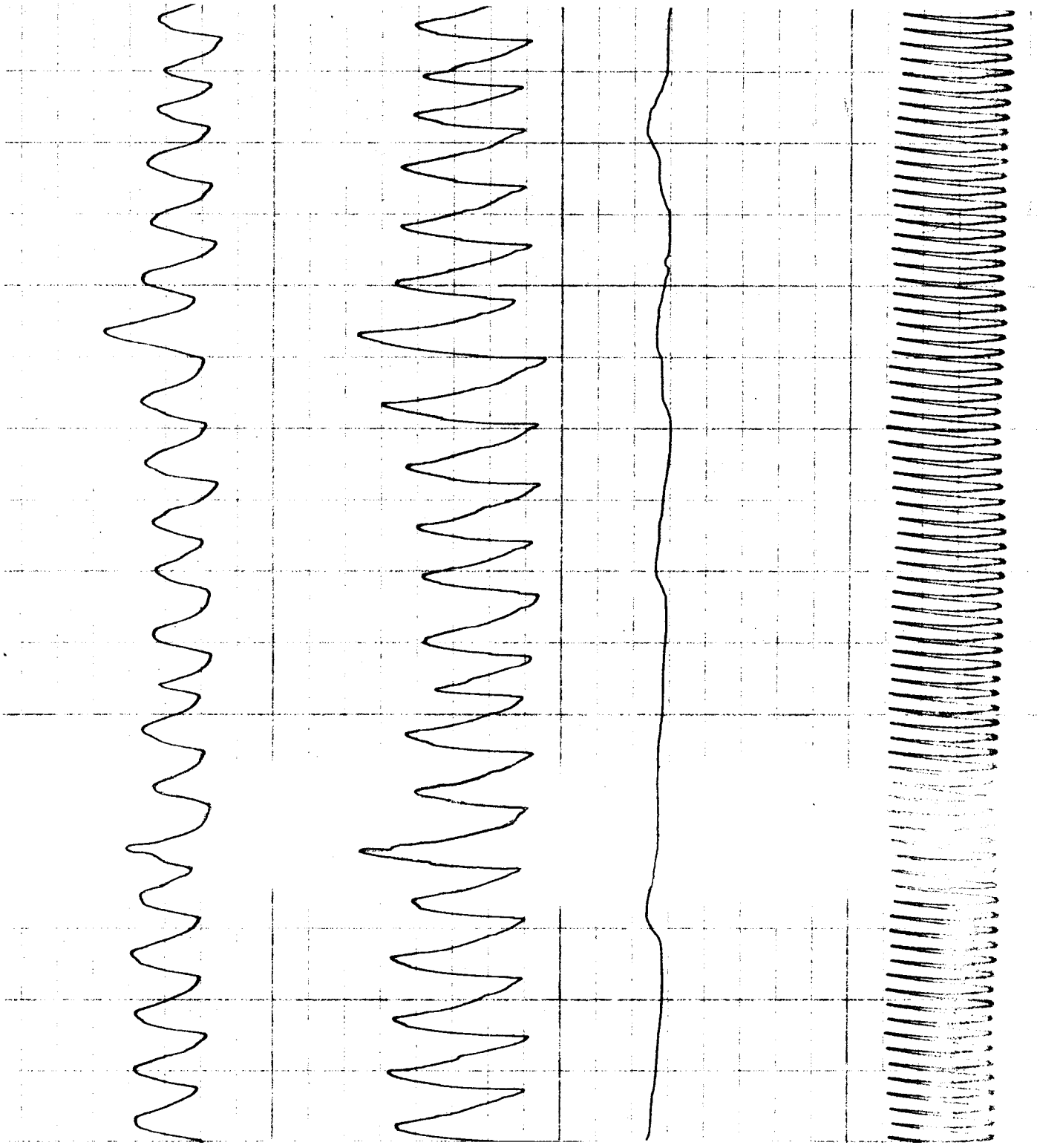
References

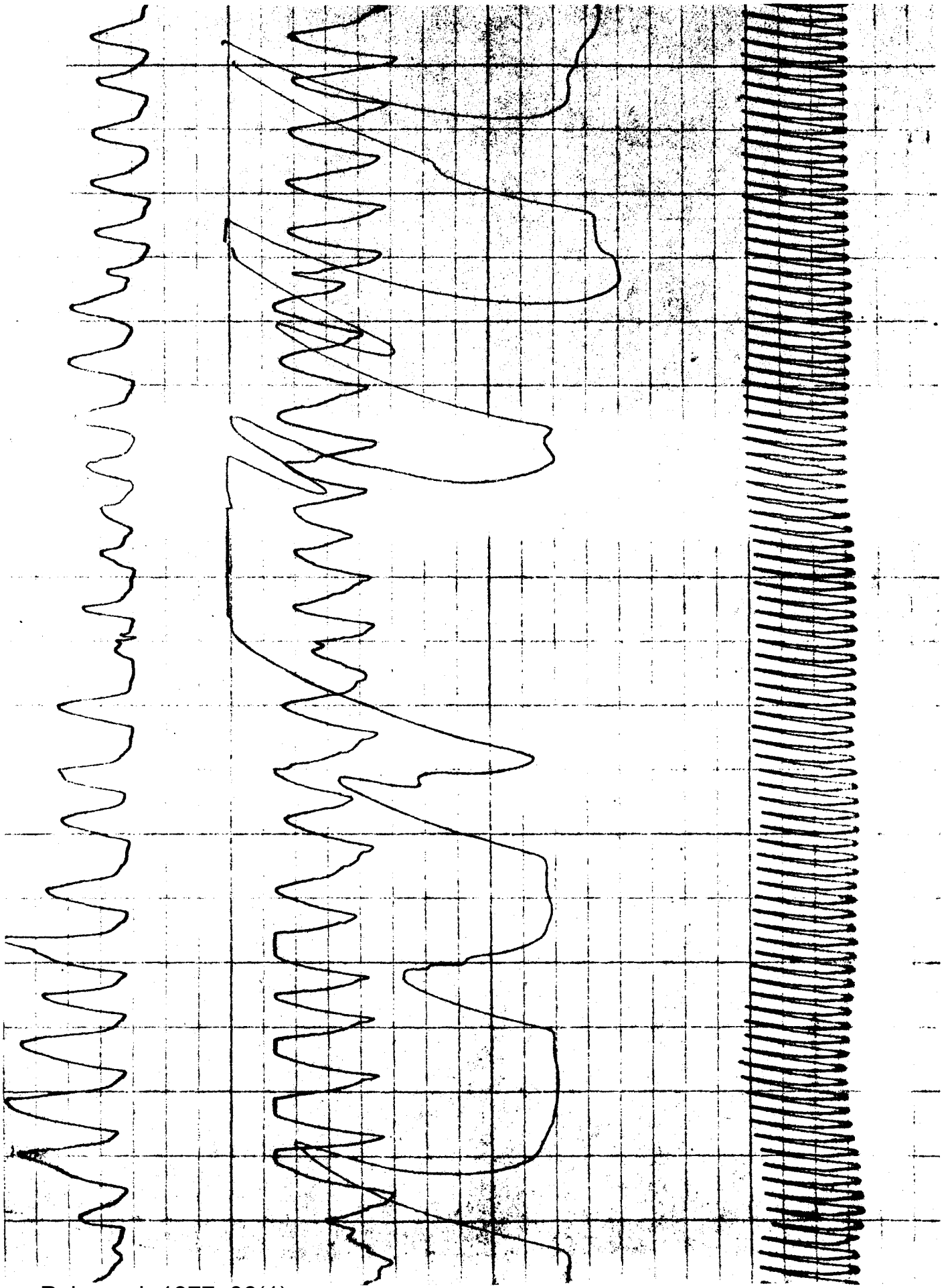
Berman, Milton A. "Prescription Drugs and the Polygraph." Polygraph 4 (4)(December 1975): 329-338.

Master, Arthur M., Garfield, Charles L., and Walters, Max B. Normal Blood Pressure and Hypertension, New Definitions. Philadelphia: Febiger, 1952.

Physician's Desk Reference. Oradell, New Jersey: Medical Economics Company, 1975 with Supplements A and B, 1976.

* * * * * *





Polygraph 1977, 06(1)

IN THE SUPREME COURT OF BRITISH COLUMBIA

HER MAJESTY THE QUEEN

AGAINST

WILLIAM WONG

REASONS FOR HOLDING AS ADMISSIBLE OPINION EVIDENCE OF POLYGRAPH EXAMINERS

Vancouver Registry

No. CC760628

November 3, 1976

J. Wood, Esq. and D. LaCroix, Esq. — for the Crown;

K. S. Westlake, Esq. — for the Accused.

My reasons for admitting the opinion evidence of polygraph examiners must be prefaced by some explanation of the circumstances under which the examinations were performed.

The accused is charged with the murder of Ken Chiu. On February 13, 1976, before the charge was laid, the accused, at the invitation of Sergeant Desmarais, quite readily agreed to take a lie detector test concerning his denial that he was at the scene of the crime. The accused now confesses that he was not truthful when he told Sergeant Desmarais that he was at the home of his aunt on the night in question. In fact, he now says, he was in a car not far from the scene of the crime. Evidently the accused was gambling that it would be better to risk the test and possible exposure on the question of his alibi than to refuse to take the test at all. The test was conducted by Sergeant Smith of the Vancouver City Police. As it turned out, the relevant questions posed to the accused were directed to whether he committed the crime rather than to his alibi. The questions posed were these:

> "On Dumfrees Street, on January 23rd, did you cut someone with a knife?"

and

> "On Dumfrees Street, on January 23rd, did you stab another man?"

The accused answered "no" to both questions; Sergeant Smith, with the aid of a polygraph or lie detector, gave as his opinion that the accused was truthful. David Raskin, an expert in polygraph technique, later reviewed the charts used in the examination conducted by Sergeant Smith and agreed with Sergeant Smith's opinion. Dr. Raskin himself conducted a polygraph

examination of the accused and was of the opinion that the accused was truthful in his denials that he cut anyone with a knife on Dumfrees Street on January 23, 1976, that he stabbed Ken Chiu on January 23, 1976, or that he actually saw Ken Chiu get stabbed.

The Crown opposses the introduction of the evidence of the opinions of Sergeant Smith and Dr. Raskin, based as they are on the polygraph, as being inadmissible as wholly unreliable. The Crown adds in any event that the introduction of the answers given by the accused to the relevant questions posed is objectionable on the rule that evidence of previous consistent statements are generally inadmissible as irrelevant.

A voir dire was held. Opinions pro and con were expressed as to the validity of the polygraph technique; pro chiefly by Dr. Raskin but as well by Sergeant Smith, con by Dr. Lykken and Dr. Heseltine. I decided to admit evidence of the two tests as probative, not without some misgivings, particularly becuase of a decision to the contrary four years ago by Van Camp, J. in R. v. Phillion, 10 C.C.C. (2d) 562, confirmed by the Court of Appeal of Ontario, 20 C.C.C. (2d) 191. I have also read the indictment of the principle and function of the polygraph by Morand, J., sitting as Royal Commissioner examining Metropolitan Toronto Police Practices.

In the Phillion case Van Camp, J. considered the admissibility of a polygraph test which, as here, seemed to point to the innocence of the accused. Her Ladyship excluded the evidence as too unreliable to meet the test of acceptability as expert testimony. She said at page 563:

> "... but one main reason for the exclusion of this kind of evidence of opinion must remain, and that is when its reception would not assist and might mislead. Where a jury, by reason of the technicality of the evidence, might be tempted blindly to accept the witness' opinion, then it is important that the witness' opinion must be free from all possibility of error; and in assessing this test I am indebted to the witness, who has made no exaggeration of its claims; who, on the basis of over thirty years of experience and the examination or supervision of examination of some forty thousand people, has reported on how the examination is given. In his cross-examination he stated that since 1960 there have been no major changes in the instrument used and so I am also indebted to the article in the Yale Law Journal, vol. 70, by Mr. Skolnick, for the analysis of such a test, which analysis was again in many respects corroborated by the witness.
>
> I find that in the test it is stated that the design of the questions affect the accuracy; that it is important to obtain the confidence of the subject; that the accuracy figures of one per cent possible error (and this was a maximum, because even only one-tenth of one percent has been proven) and ten per cent inconclusive tests are unsatisfactory, in that only a part of the tests have been checked and, even

if checked, the results were inconclusive as there was no independent means of checking.

The theory is based on two fundamental assumptions: that there is a regular relationship between lying and the emotional state, and a regular relationship between emotional state and body change. It was given in evidence that the act of lying evoked a variety of responses and that there were individuals who, for various reasons, believe in or are unconcerned about lies. The examiner has to assess whether the subject was physiologically, socially, mentally or emotionally disabled; the examiner had to assess his emotional tendencies, his control of his emotions and his behaviour attitude. The questions are adjusted on any of those would affect the questions and accuracy. Multiple skills are demanded of the examiner: interpretation is required by the examiner and the examiner is asked to state not only a general tendency, but whether there has been a particular lie.

The point that cuases difficulty is that the test may provide as good if not a better clue as to veracity than visual observation; but because of the weight that is put upon it and because of the various factors which introduce variables, I cannot find that it satisfies the test of expert opinion."

The Court of Appeal held the rejection to be proper since "the witness was being asked to express his opinion directly, that the accused had not committed the act constituting the offence charged".[1]

Morand, J. Held the polygraph worthless as an instrument for use, at least in judicial proceedings. He said at pages 262-263 of the report:

"The polygraph test may be better than chance, and it may be that individual examiners are perceptive and skillful in examination and interview techniques, although on the evidence of the operator's themselves, most are not. Nonetheless,

---

[1]The court also stated "However, a psychiatrist may testify as to the accused's veracity and may give the basis of his opinion including information not before the jury. He may refer to the results of psychological, sodium amytol and polygraph tests and statements of the accused and answer hypothetical questions based on evidence given provided the criteria for admissibility set out by the court are followed." The Court concluded, "Dr. Arboleda may refer in evidence as the basis of his opinion to the psychological tests, examinations made by the doctor, the results of the sodium amytol test, the result of the polygraph test, and the statements made by the accused to the doctor." The doctor, C. K. McKnight, M.D., Chief of Forensic Science, Clarke Institute of Psychiatry, 250 College St., Toronto, Canada, is a trained polygraph examiner. He introduced an eleven page annotation on the polygraph into the case. It is reproduced along with the court's opinion in C.R.N.S., vol. 21, pp. 169-181. [Editor.]

there is great chance of error mainly because in my view, all the test amounts to is a subjective interpretation of behaviour and conduct. It is no more useful than other psychological tests, and may be even less helpful in view of the fact that it is one of the few without so much as a standard test format. It might have a place as an investigative aid or in the hands of a psychiatrist or psychologist, but it does not meet the standards for judicial use: it is neither scientifically reliable nor scientifically accepted. The American courts that have accepted it have, in my opinion, done so on a faulty premise; in view of its shaky foundations even agreement and stipulation merely legitimizes trial by ordeal. One American jurist stated:

'I would not base the admissibility of the test on the concept of "general scientific acceptance." Rather, in my opinion, the requirement for admissibility is evidence that the tests are reasonably reliable, reasonably precise and evidence that the tests are substantially accepted by experts whose competence includes the subject matter of the test.'

In my respectful view, even these moderate standards are not met and have little likelihood of being met.

A Commissioner appointed under The Public Inquiries Act, 1971 has a right to hear relevant evidence whether admissible in a court of law or not. It may be that he has not the right to act on evidence that is neither probative nor cogent in law. I need not comment on this, in view of my finding that the polygraph is neither scientifically valid nor accurate and that I should give no weight whatsoever to this evidence in making my determination of the individual cases."

I do not share Van Camp, J.'s concern on the evidence led in this case, that the jury "by reason of the technicality of the evidence, might be tempted blindly to accept the witness' opinion." Here the evidence is reasonably comprehensible and I believe the jury will have sufficient information to give proper assessment to its weight. The evidence certainly does not suggest that the polygraph technique is infallible; I do not think the jury will treat it as such.

Dr. Raskin believes that where responses are detected which can be reasonably safely regarded as either truthful or deceptive, the polygraph technique is at least 90% accurate. He says that where responses are of sufficient magnitude upon which to base positive findings of "deceptive" or "truthful", the errors where they occur are almost always false-positives, that is to say, a guilty or deceptive person is rarely shown to be truthful in denying his guilt. The error, where one is detected, is almost always where the truthful (innocent) person is falsely shown to be deceptive (guilty). I will return to this aspect later. On Dr. Raskin's evidence in particular, the tests given in this case, for the purposes particularly of this case, are sufficiently reliable to perhaps be of assistance to the jury in reaching a conclusion.

I am not aware of any convincing reason to exclude the opinion of the polygrapher because it bears on almost the very question the jury is called upon the answer, unless the jury may be inclined to give undue weight to it. Moreover, opinion evidence, I would have thought, is frequently admitted in our courts going directly to issues to be resolved by judge or jury. Take for instance a charge of threatening where the threat is conveyed by letter. The accused denies having written the letter; "hard" evidence pro and con is produced; a handwriting expert is called (his testimony is acceptable); the expert testifies that in his opinion the handwriting is not that of the accused. The evidence of the expert goes to the very issue that the jury is to determine: did the accused write the letter? The expert makes no pretence to infallibility. I think the jury might well consider the evidence in this way: is there enough evidence other than that of the expert to satisfy us beyond a reasonable doubt of the guilty of the accused? If not the jury will acquit without reference to the expert opinion. But if other evidence is extremely convincing the jury must then decide whether the opinion of the expert casts such doubt upon the conclusion of guilty as to render it unsafe to convict. A jury will have regard to the qualifications of the expert and the degree of certainty with which he expresses his opinion. The "hard" evidence of guilt may be so overwhelming that the jury can only conclude that however well qualified the expert and however convincing his testimony, on the basis of other facts he must be wrong. There is a close parallel here between the opinion of the handwriting expert and the opinion of the polygraph examiner.

It seems to me the difference between the two examiners is that one is examining the handwriting alleged to have been created by the accused, the other is examining the accused himself. As I will attempt to show, the polygraph reveals expressions of the mind of an accused. Where the accused is found to be lying, the mouth says no and the mind says yes. The theory is that the responses of the mind are unconscious and uncontrollable. The submission to the examination by the accused is, let us say, voluntary but the confession of his mind read by the polygraph is involuntary. It may be that an argument could be made for the exclusion of the evidence in some circumstances on these grounds.

Here the evidence led by the Crown on the whole tends to impeach the validity of the polygraph technique, but the Crown has led evidence on the voir dire demonstrating that the polygraph was employed by the police in the investigation of the incident here, that for the purposes of the investigation the polygrapher's opinion was that the accused was innocent. A witness for the Crown, as I will explain, has himself conceded that the lie detector does have in fact substantial credentials. The defence has led evidence that the results of the polygraph were verified by an expert in the field, and that the expert, Dr. Raskin, on a subsequent occasion and as a result of a separate test, came to the same conclusion as the police polygrapher. In view of these factors, and the margin built in against risk of error, and the fact that error where it does occur usually finds the innocent guilty rather than the guilty innocent, I consider that it would be unfair to the accused to exclude the opinions of the polygraphers, for what the jury may think they be worth, especially on a charge as serious as this.

I hasten to say that it may well be that polygraph evidence led by the Crown as evidence of guilty, not of innocence, should be excluded as highly

prejudicial and less reliable.

Before turning to the evidence concerning the lie detection technique, I will attempt to describe briefly the polygraph instrument and the theory behind lie detection. The polygraph depicts on various "channels" of a graph, physiological responses to psychological stimuli. The measurements of changes in body function, physiological responses that is to say, are achieved by attaching leads from the instrument to various parts of the body of the subject. For purposes of lie detection several dimensional measurements are taken usually of breathing, heart beat and blood pressure, and electrical conductivity of the skin in the palm of the hand. A fourth "channel" is employed in more modern machines measuring vascular activity and pulse amplitude in the finger. There is no doubt that the instrument accurately measures physiological occurrences. The theory of lie detection is that a question which threatens the subject produces emotion, the emotion results in unconscious and uncontrollable nervous bodily responses which may affect breathing, heart function, vascular capacity and sweat gland activity, or all or any of these functions, at any given time in any given subject. The changes in the various functions are graphically recorded on the polygraph instrument.

The simple measurement of the intensity of physiological response by a subject to a threatening question concerning a crime will not of itself distinguish truth from deception if only because the subject may consider the question threatening whether he is deceptive or truthful, that is to say whether innocent or guilty. For instance, if a suspect is asked whether he shot X, the question is threatening whether he is guilty or innocent, although admittedly probably less threatening to most innocent suspects than to the guilty. Ways have been sought to discriminate between the responses of the innocent (truth) and the guilty (lie). The device now commonly employed is what is called the "control question" technique. The examiner employing painstaking and subtle psychological measures, evolves, with the cooperation of the subject, a question related to the central or relevant question directly concerned with guilt or innocence but set apart in time. In the present case one of the relevant questions was, "Did you stab Ken Chiu on January 23, 1976?" A control question was, "Before 1974 did you ever try to seriously hurt someone?" (the accused is 21 years of age). The expectation is twofold, first that a controlled question will not be truthfully answered, or not altogether so, so as to trouble the subject, and second that a concern is built up in the subject's mind that the control question is a matter of considerable importance. A truthful person, innocent of the crime, will theoretically react emotionally more strongly to the control question than to the relevant question since he has less to fear from the relevant question. The deceptive person on the other hand, theoretically at least, will react more strongly to the relevant than the control question because of the threat that the relevant question poses to him. Thus truth or deception is determined by measuring the difference between responses to the control and the relevant questions. If the total of the responses point in one direction or the other and, according to the scoring method adopted by the examiner, are sufficiently prominent, the examiner gives his opinion whether the subject is telling the truth or not.

One may well be skeptical of mechanical means which purport, even with human help, to detect mental reactions as subtle as are here involved. It

comes as no surprise then that the basic theory that the lie-emotion-body reaction chain is attacked as unlikely and unverified. It is no surprise either that the control question technique is attacked as implausible and the theory quite unlikely if only on the fact of its explanation. The surprise is, not that the lie detector works well, but that it works at all.

To attack the basic theory underlying lie detection the Crown called Dr. Hesseltine, a well-known and qualified psychiatrist and psycho-physiologist. Dr. Heseltine has conducted many experiments involving the operation of the polygraph and is fully familiar with the instrument. He has no experience with the instrument as an aid to lie detection. Amongst other reasons for which one is to infer from the evidence of Dr. Heseltine that the lie detection theory is subject to much doubt are these:

- The responses said to be produced by a lie may well be caused and interfered with by other physiological responses to other emotions such as, for instance, anger or excitement of one sort or another.

- Many variables, internal and external, affect skin conductivity: e.g. the conditions in the examination room such as heat and humidity, the attitude of the examiner, the sex or ethnic or cultural background of the person examined, the degree of detachment that the subject by his nature or consciously attains. Dr. Heseltine holds the skin response to be the most unreliable indicator of all of arousal in a subject.

- The blood pressure cuff is a primitive and inadequate device to measure varying cardiac conditions. Transmission of information is slow.

- Measuring variables in respiration in unreliable - there are many various types of responses in various parts of the chest and abdominal cavities and in any event these responses are easily subject to conscious control.

- The examiner, convinced of the accuracy of the instrument and method, can unconsciously influence the subject to an expected outcome.

- The vascular response is the more accurate but cannot be equated to specific amount of arousal.

- The stimuli causing reactions is never the same and thus the reactions must differ and be unpredictable. The stimuli must necessarily increase or decrease with repetition; so must the response.

- What have hitherto been regarded as autonomic responses have recently been shown to be in fact subject to conditional control; thus experiments have shown that the function of the heart and even the sweat glands are subject to conscious control.

The Crown also called Dr. Lykken, a respected and highly regarded member of the psycho-physiology fraternity. Dr. Lykken has been interested in the use of the polygraph in crime detection. He advocates, as reliable, the use in crime detection of a test known as the "guilty knowledge test". His test differs essentially from the technique of lie detection in its fundamental methods but the test is founded nevertheless on a somewhat similar premise. The premise

is that a subject guilty of a crime will react emotionally to a recognition of the elements of a crime placed in some form before him. Those elements will be known to only himself and the investigator. The emotions thus evoked in the guilty suspect give rise to autonomic physiological reactions detectable on the polygraph in the same way that proponents of lie detection claim that responses are recorded to control and relevant questions employing their technique. It seems to me that Dr. Lykken's claim that the guilty knowledge test is valid goes some distance to rebutting the inference to be drawn from Dr. Heseltine's evidence that would suggest that the theory underlining the lie detector is wholly improbably. The guilty knowledge test depends, as does the lie detector test, upon measuring autonomic responses. It must be conceded therefore that many people do respond automatically to stimuli, that physiological change results, and that the change can be measured - propositions seemingly denied by Dr. Heseltine.

Dr. Lykken as a psycho-physiologist many years ago abandoned any idea of pursuing experiments in lie detection as being so unlikely a prospect as to be a waste of time. I take it from his evidence and several articles of his that I have read, (The Lie Detector Industry: Just Nine Years More to 1984, Modern Medicine, October 1, 1975 and Psychology and the Lie Detector Industry, American Psychologist, October, 1974) that he has relented a little. His basic reservations lie in the implausibility of the control question theory. He considers, or has considered, as I understand it, that the lie detector is a psychological test and that the polygraph instrument itself may be little more than a stage prop, albeit a useful one for some purpose. He thinks the success rates depend less upon what the instrument says, than the insight of the examiner. In his article in the American Psychologist noted above, Dr. Lykken points out the difficulties of proving the validity of lie detector results. He makes three points, two of which are of particular interest.

First Dr. Lykken says, "estimates given by professional polygraphers on the basis of their own experience are essentially worthless." The reason seems obvious; in most cases there is no way to test the results.

Second Dr. Lykken says, "laboratory studies cannot provide adequate validity estimates". His explanation here is of interest particularly in the present case:

> "This may be the only value judgment in the present article with which the majority of professional polygraphers would agree. Laboratory experiments involving mock crimes or other contrivances of even less ecological validity have commonly achieved a hit rate of from 70% to 85%, usually against a chance expectancy of from 20% to 50%. Professional examiners dismiss such studies as irrelevant parlor games and insist, reasonably, that in a police investigation, with real crimes and real punishments, the results might be altogether different and the hit rates much higher. Since this coin has two sides, one should also point out that moving from the laboratory to the field situation might also serve to lower hit rates. While a guilty suspect may indeed be more apprehensive and hence more reactive when interrogated in the jail than with a mock-guilty college sophomore in the

laboratory, it is also true that the innocent suspect will be more reactive in the real-life situation, and, thus, more likely to become a false-positive."

The explanation is of particular interest as it suggests that in the field the error will be on the side of the false-positive. This has obvious significance to the present case where the accused has been shown by the polygraph to be truthful. We may conclude from Dr. Lykken's remarks that this is the side least likely to reflect error in real-life situations.

Dr. Lykken makes the further point that "adequate criteria against which to measure lie test validity are next to impossible to attain in the field." He goes on to explain:

> "Although slightly less dogmatic than the previous two, this proposition is stated strongly enough to emphasize that, while field investigations are the only trustworthy source of estimates of lie detector validity, it is exceedingly difficult in the field to establish an adequate criterion of whether the lie test diagnosis was in fact correct. For this reason, only a single field study has so far been published in which this criterion problem seems to have been handled well enough for the data to be taken seriously. Bersh (1969) obtained records on a fairly large sample of criminal investigations conducted by the military in which a standard lie detector examination had been given to the (serviceman) suspect. Each complete case file (minus only the polygraph findings) was evaluated independently by four attorneys from the office of the Judge Advocate General. These attorneys were instructed to 'disregard all legal technicalities and to judge each case solely on the evidence ...' Each judge was asked to eliminate cases in which he felt the evidence was insufficient and then to arrive at a positive determination of guilt or innocence on the remainder.
>
> Using the unanimous verdict of the four-judge panel as a criterion, it was found that the polygraphers' diagnosis agreed with the criterion on 92.4% of 157 cases. On 59 additional cases for which only three of the four judges were in agreement, the hit rate was lower, 74.6% possibly because the majority-agreement criterion was less valid than the unanimous-agreement criterion. As Bersh (1969) pointed out, polygraphic examiners in the military are undoubtedly better and more uniformly trained on the average than polygraphers generally, so that these findings probably represent the state of the art as favorably as possible."

Dr. Lykken proceeds to say that the Bersh findings must be interpreted with caution. He emphasizes this:

> "Most important, however, is the fact that none of these findings tell us anything definite about the validity of the polygraphic lie test itself because, as a matter of routine, the examiners had complete access to the case file - the evidence against the

suspect - as well as any information that they could descry in the pretest interview, the subject's appearance and demeanor and the like, prior to the examination, and there is no way of determining the relative weights that were subjectively allotted to this information, as opposed to the polygraph records themselves, as the examiner arrived at his diagnosis. Since the validity criterion was a judgment based on the file records, a jaundiced appraisal of Bersh's findings might be that he has shown merely that when four judges agree that the evidence indicates guilt or innocence, a fifth judge is very likely also to agree on the basis of the same data. Such an appraisal is probably unduly harsh: Bersh pointed out that the files were often less complete at the time of the lie test than when evaluated by the attorneys. Still, however, it has to be admitted that one cannot say with certainty that the polygraph charts contributed anything at all to the accuracy of the original diagnosis."

He adds:

"Before continuing, however, it would be only fair to emphasize the important positive conclusion that can be drawn from Bersh's data concerning the validity of the human lie detector. In a criminal investigation situation, where the evidence against a suspect is suggestive but not yet overwhelming, and where that suspect still maintains his innocence, a well-trained polygraphic interrogator can in about one hour's time arrive at a diagnosis of guilt or innocence that is likely to be correct 9 times out of 10. It would be interesting to know whether that hit rate would be greatly reduced if the polygraph pens were to be activated by random-noise generators rather than by transducers connected to the subject. It would also be interesting to compare the polygrapher's hit rate against the validity of judgments made by an experienced policeman who has interviewed the suspect at about the same time, without benefit of the polygraphic props and ritual. But, in any case, it should be apparent that a method which can achieve such a degree of accuracy at so little cost could be of great benefit both in increasing the efficiency of investigation and if protecting the innocent. When the polygrapher says "Guilty", all efforts can be concentrated on finding the physical evidence that will prove the suspect's guilt; when the polygraphers says "Innocent", those same efforts can be redeployed in another direction. As long as the polygrapher's diagnosis is regarded as tentative and advisory rather than as conclusive and the investigating officers remember that the polygrapher will be wrong perhaps 10% of the time, the use of this (human) lie detector can be of real social benefit."

The concept of testing the validity of the lie detector against the decision of a panel is of interest because it seems to concede that the panel (or jury perhaps) will in all cases reach the correct conclusion while the

lie detector will not. Thus the lie detector, always the instrument in error, would have no place in court proceedings. But I suppose the conclusion might also be that the polygraph produces true results and that the human results themselves are the subject of error.

Dr. Lykken, in evidence, estimated the overall success rate of lie detection, using polygraph techniques, at 80%. In this estimate he said he was being generous. However, in his article, as we have seen, he gives a higher "hit rate" although emphasizing the human element. In a letter to Dr. Raskin dated March 25, 1975, Dr. Lykken said:

> "As long as the current mystique about the magical powers of the polygraph persists in the public mind, thus inducing an unjustified sense of confidence in the technique among innocent and guilty alike, I am prepared to believe until further notice that skilled operators, such as yourself, may be able to produce hit rates as high as 90 percent. But I will fight for every inch above that point."

Dr. Raskin, on commission by the United States Department of Justice, has undertaken recent studies to test further the validity of polygraph techniques, and, among other things, to determine the extent to which the polygraph instrument itself, interpreted by an examiner who did not himself conduct the polygraph examination, reveals information upon which a polygrapher's opinion may be reliably based. I will describe several of the studies very briefly insofar as they may be of interest in considering the validity of the polygraph technique for purposes of this case.

The purpose of the first test was to determine the effectiveness of the polygraph technique with actual criminal populations. A mock theft was evolved; 24 subjects were guilty of the theft and 24 were not. A reward was offered if the guilty subjects could avoid detection. In the result not one of the guilty group was able to show himself innocent. Excluding inconclusives, 95.5% of the subjects were correctly categorized.

Recently a further study was done, similar to the one just described, but involved 60 people picked at random from the general population. 30 of these each "stole" a ring. All were examined with the aid of the polygraph. All were offered a small reward; the "thieves" to win if they showed themselves truthful and the innocent to win if they showed themselves truthful. 20 guilty and 20 innocent subjects were given control question tests. The charts were read "blind" by an independent evaluator who had no contact with the subjects. Excluding inconclusives, the decisions were 89% correct. On this test apparently the errors were on the side of the false-negatives (guilty persons falsely shown innocent). This test, it seems, rather refutes the proposition which I have above stated that the errors usually are on the side of the false-positives.

I refer finally to a "field" experiment conducted by Dr. Raskin and associates. A total of 102 criminal suspects were examined at the request of the police and lawyers for the defence and prosecution. 92 independent cases were selected from those. The polygraph charts were subsequently evaluated

by an independent examiner who had no knowledge of the case or the original outcome and the results reported are based on those evaluations. Actual truth was determined as described in the report:

> "Three criteria were developed for assessing ground truth in order to evaluate the accuracy of the polygraph results. The first consisted of the independent judgments of a 5-member panel of experts composed of two criminal defense attorneys, two criminal prosecuting attorneys, and a judge. In cases where at least 3 of the 5 panel members agreed on a decision of guilty or innocent, the judgment of the panel was used as the criterion for ground truth. The second criterion consisted of judicial outcomes in which the polygraph results played no role and the case was not dismissed for insufficient evidence. The third consisted of a full confession or plea of guilty to the original charge. The latter criterion was used only for analyses to assess the effectiveness of the three physiological components with guilty subjects."

The results of the field study are described in the report:

> "The results of the comparisons between the outcome of the polygraph examinations and the decisions based on agreement among at least a majority of the panel are shown in Table 3. When both the panel and the polygraph scores yielded a decision, the polygraph outcome agreed with the majority panel in 86% of the cases. More than half of the suspects found truthful with the polygraph produced inconclusive outcomes from the panel, and 6 of the 7 disagreements were false positives (deceptive polygraph results on subjects considered innocent by the panel).
>
> The polygraph results were also compared to the judicial outcomes which were considered conclusive and were not influenced by the polygraph results. Those results are presented in Table 4 and they indicated that there was 88% agreement between the polygraph decisions and the judicial outcomes. All of the disagreements (4) occurred on suspects who produced deceptive polygraph charts and who were acquitted in court."

On this evidence I concluded the emotion-body reaction sequence has been established; that the body responses are to a degree autonomic; that the responses can be measured; and that the control question technique does seem to bring fairly accurate results where a positive result is achieved. On the evidence there is doubt about the degree to which the polygraph has been accepted as a scientific instrument or technique among psycho-physiologists. But I have held for the purposes of this case that there is shown to be support sufficient to permit the introduction of the evidence.

The further objection by the Crown that the polygraph evidence should be excluded because the answers given by the accused to the test questions put to him on the examination are previous consistent statements and self-serving or irrelevant. This objection is easily met by a warning to the jury.

Note

These reasons have been completed since the jury reached its verdict. The accused was found guilty in spite of the results of the polygraph examination.[2]

(signed) _____
(Meredith, Judge)

Vancouver, B.C.
November 3, 1976.

---

[2]Found guilty, but of a considerably lesser charge than murder. [Ed.]

* * * * * *

FOREIGN COUNTERINTELLIGENCE TODAY

By

Clarence M. Kelley
Director
Federal Bureau of Investigation

I believe that of all the vital responsibilities Congress and Presidents have given the FBI through the years, its foreign counterintelligence mission must rank at the top.

And in my opinion, the importance of that mission hasn't diminished since enactment of the Espionage Act in 1917. That was the first in a series of Congressional and Presidential actions vesting in the FBI national security responsibilities - actions also taking official cognizance of the vital need for counterintelligence.

In a very real sense, the proficiency with which we discharge those responsibilities may very well affect the kind of lives future generations of Americans will live.

And it would be folly, indeed, for us who are engaged in counterintelligence endeavors to underestimate the continuing threat posed to national security by hostile foreign intelligence services.

Let it be clear that we have no intention of committing such folly.

A weak and ineffective counterintelligence effort would most certainly lay bare the breast of our democracy to its enemies.

But in any discussion of national security it is easy to lapse into fits of demagoguery. To overstate the threat posed by hostile intelligence services could unduly alarm the people. But to minimize the magnitude of the threat would be a breach of faith with the people.

And it is important that we have the support, confidence and cooperation of the people.

It must suffice to say that the intelligence initiatives of the communist powers against the United States continue unabated.

Their daily endeavors include the collection of military, economic, political, scientific and technical information for uses detrimental to our national defense and foreign policy.

This speech, given before the Lawyers Association of Kansas City, Kansas City, Missouri on February 9, 1977 is printed with the permission of Clarence M. Kelley.

Counterintelligence, then, is an integral part of our national defense and, by definition as well as its very nature, it is primarily a defensive reaction to the intelligence initiatives of hostile intelligence services.

Our counterintelligence, however, is not wholly static or passive. Like any good defense, it requires both sound preventive measures and an energetic, sustained counterattack.

Now we are a government agency, functioning in a democracy, and as such we are answerable to the people for our activities. We must operate legally, and in a manner conscionable to American people. Such is the nature of our democracy. And this is a blessing for which I give thanks regularly; but the fact remains, the hostile intelligence services we contend with are not bound by any such legal or moral obligations.

It would be simply great if we could lay before the people the specifics of our counterintelligence targets, and the predication for them. I'm sure public support would be enthusiastic.

The problem is, in counterintelligence work, secrecy is an indispensable element.

Still, I'm sure we would all agree that many of the efforts of our nation's intelligence community are now much less secret than they were two or three years ago.

Some of these efforts have been not only revealed, but widely publicized, painstakingly analyzed and resoundingly criticized.

Now there is no question all that exposure and criticism caused some consternation within our intelligence community.

But I'm convinced some good came of it.

For example, the rules by which the FBI must operate in its counterintelligence work have been clarified.

With our assistance and cooperation, the Attorney General drafted and issued guidelines for these investigations. These guidelines became effective June 1, 1976. And, among other things, they defined those activities which the Attorney General has authorized the FBI to undertake in fulfilling its foreign counterintelligence responsibilities.

Also, we are now working more closely with Congress, through appropriate committees, with regard to our counterintelligence activities.

This all boils down to the fact that the intelligence community has been given a set of rules comeasurate with American principles of human dignity, decency and legality as these principles are perceived in 1977.

It sometimes seems that public, and official, concern regarding threat posed by hostile foreign powers, competes with their concern over possible abuses of our own government's power. Their concern understandably shifts back

and forth in the constantly changing currents of national attitudes and priorities.

The Department of Justice issued a superb report last month that placed in excellent perspective the sort of thing I'm talking about.

The report dealt with the Department's investigation and prosecutorial decisions with regard to CIA mail opening operations. Basically, these operations involved opening first class mail from the Soviet Union and the People's Republic of China. It's no secret that the FBI also gained intelligence information from those operations, which occurred between 1953 and 1973. The Department's inquiry developed documents and other information strongly indicating that knowledge regarding these mail openings may have extended all the way to the White House.

No one questioned the obvious value of these operations from a counterintelligence point of view. The issue was whether violations of law had occurred in opening first class mail moving through regular postal channels and whether persons responsible should be prosecuted.

The Department's report concluded prosecution was not feasible, for a number of reasons.

The report pointed out that the state of the law that prevailed at the time of the mail openings was different from its state today, and it further noted:

> "It would be mistaken to suppose that it was always clearly perceived that the particular mail opening programs of the CIA were obviously illegal. The Department believes that this opinion is a serious misperception of our nation's recent history, of the way the law has evolved and the factors to which it responded - and substitution of what we now believe <u>is</u> and must be the case for what <u>was</u>."

> The report continues,

> "A substantial portion of the period in which the conduct in question occurred was marked by <u>a high degree of</u> public concern over the danger of foreign threats. The view both inside and, to some extent, outside the government was that, in response to exigencies of national security, the President's constitutional power to authorize collection of intelligence was of extremely broad scope ...

> For, a variety of reasons judicial decisions touching on these problems were rare and of ambiguous import. Applied to the present case, these circumstances lead to reasonable claims that persons should not be prosecuted when the government rules of law have changed during and after the conduct that would give rise to the prosecution."

So, in a word, the point so well made by the report was, it would be unfair and perhaps not possible to prosecute persons engaged in a

Polygraph 1977, 06(1)

counterintelligence operation that, though clearly wrong and illegal by today's standards, was not so construed at the time of the operation.

A trial of such a case, the report said,

> "Would open a searching inquiry into the perceptions of a generation of Americans; it would be, as (Columbia University) Professor of Law (Herbert) Wechsler put it during his consultation with the Department, to 'indict an era' and would raise fundamental questions concerning the application and use of criminal law."

Nevertheless, the Department made clear in its report that any repetition of such mail opening operations today would violate the law, and that the Department "would not hesitate to prosecute any persons, whatever their office, who may be involved in such a program."

Times, do indeed change.

And so must we in the intelligence community.

It befalls us, then, to discharge our responsibilities in behalf of the American people and their government, effectively, while remaining within new parameters established by current law, as well as prevailing public, official and judicial attitudes.

Let no hostile foreign intelligence service dare to think that we cannot.

We know the challenges that confront us, and I think the American people should be aware of them also, if we are to expect their confidence, support and cooperation.

One of the basic essentials of our counterintelligence program is the detection and identification of hostile foreign intelligence personnel dispatched to this country by communist-bloc countries. It demands a considerable allocation of our resources.

And the ever-increasing influx of communist-bloc officials compound the problem.

In the last ten years, the number of Soviet-bloc officials in the United States has increased more than 100 percent (from 806 in July, 1966, to 1,955 in December, 1976.)

In the last two years the number of Soviet officials alone has increased 20 percent.

The People's Republic of China also has appreciably increased its official presence in the United States.

In addition, since 1973, the number of Soviets entering the United States under special exchange agreements, such as students and scientists, has more

than doubled - more than 5,000 visit each year. There has been a concurrent increase in the number of Eastern European officials and visitors coming to the United States.

Our experience has shown us that a substantial number of these Soviet-bloc and Chinese officials are directly connected with their intelligence services.

Their targets are virtually all-encompassing, including our political, economic, agricultural, military and scientific and technical resources.

It's no secret that we constantly endeavor first to identify and then neutralize these intelligence operatives, as well as to penetrate hostile intelligence services.

By necessity, our successes are seldom publicized. Occasionally there are arrests but they are rare, because an arrest is often the least desirable action. Spies, after all, are replaceable. And once an intelligence agent is identified, he can be monitored to determine who sent him, his contacts and objectives. Patience usually pays off.

But occasionally there are arrests. For example, last month we arrested a Soviet immigrant in New Jersey for espionage. He was charged with attempting to obtain a classified, sensitive document relating to a satellite communications project at the RCA Space Center at Princeton. The document allegedly was to be delivered to the second secretary of the Soviet Mission to the United Nations. The Soviet was named as a co-conspirator.

Also, last month we arrested a California man for espionage. He had a top secret security clearance. He was charged with passing classified information concerning the work of a military contractor to a colleague who sold it to Soviet Agents. A science attache to the Soviet Embassy in Mexico was named as a conspirator.

One highly publicized case was a classic illustration of the determined efforts of hostile intelligence services to penetrate the United States policy and decision making process.

A native-born U.S. citizen allegedly cooperated for years with an East German intelligence organization, undoubtedly under Soviet control. He allegedly maintained clandestine contact with his East Berlin principals, and allegedly received training, assignments, and money, in return for information.

Congressman Paul Findley of Illinois, disclosed in the Congressional Record of April 8, 1976, how this individual was recommended and was considered for a sensitive foreign policy position on Capitol Hill in 1975.

While complimenting the FBI, the Congressman characterized the experience as a sobering reminder that the real world is one of spies, intrigue, and double-dealing. He said "It swept aside any illusions that communist governments closely allied with the Soviet Union have dropped their undercover work in this era of detente."

So, from time to time, these cases surface into public view; but for the most part, counterintelligence investigations are silent and unseen.

In the overall foreign counterintelligence program, much of our work is targeted against actual or potential violations of criminal statutes by international terrorists directed by foreign powers or elements. Since 1972, the FBI has had primary jurisdiction and overall responsibility for direction of operations against such terrorists.

Naturally this involves cooperation and liaison with other government agencies and friendly foreign intelligence services. Terrorism is global. One of our primary goals in this field is to detect terrorists entering this country to prevent them from carrying out their missions of death and destruction.

An inkling of the magnitude of our responsibilities in the field of foreign counterintelligence perhaps can be provided by one or two figures.

Last fiscal year, we received 57,009 such matters for investigation. That represented a slight decline from Fiscal Year 1975; but that occurred primarily because we have begun to concentrate on quality cases, those with the greatest possible impact on our national security.

I have not touched upon domestic security, and I will not do so in any detail. But basically, we have greatly narrowed our activity in that field. Our investigations are tied as closely as possible to criminal statutes and are in accordance with new guidelines drawn up by the Attorney General, with our assistance and cooperation.

Under our new policies with regard to these cases, we reduced our domestic security cases from 21,414 in July, 1973, to 4,858 by March 31, 1976 - before the Attorney General's new guidelines took effect.

We are handling even fewer cases now, and, as I have mentioned, they are confined to matters relating to criminal violations.

A number of factors increase the challenge of counterintelligence work other than the newly imposed restrictions. The world is much smaller, what with swifter transportation and instant communication. These things, along with increasingly sophisticated technology, enhances the spy's capabilities and underscores the lethal threat of the international terrorist.

We are in an age of rapid transition, where previously unimagined forces of instability are present. We are certain we can meet our responsibilities, but the level of the threat currently posed necessititates full utilization of all existing counterintelligence resources.

What this means for the FBI is that we will have to be that much more diligent in insuring that we fulfill our obligations to the American people.

In the shambles of the attack on Pearl Harbor in 1941, the Army Board that exhaustively studied the circumstances surrounding that attack came to this conclusion:

"The Japanese Armed Forces knew everything about us. We knew little about them ... This should not come to pass again. We must know as much about other major world powers as they know about us. This is an absolute condition precedent to intelligent planning by those charged with formulating our international policies and providing for our security."

You may be assured that the FBI, working cooperatively with other government intelligence agencies, and with the support of the people, will do everything within its power to assure such a tragedy will, indeed, "never come to pass again."

Thank you.

* * * * * *

OREGON POLYGRAPH LICENSING REGULATIONS *

Board on Police Standards and Training

Polygraph Examiners Licensing Regulations

3000. OBJECTIVES

The objectives of the BPST Polygraph Licensing Regulations are:

(1) To regulate all persons who purport to be able to deduct deception or to verify the truth of statements through the use of instrumentation or mechanical devices, including but not limited to lie detectors, polygraphs, and deceptographs.

(a) By establishing minimum standards for applicants for polygraph examiner's licenses.

(b) By establishing minimum qualifications for licensed polygraph examiners, including appropriate examinations to measure competency of applicants.

(c) By enforcement of all provisions of the Polygraph Examiners Act.

3001. DEFINITIONS

(1) "Board" means the Board on Police Standards and Training.

(2) "Executive director" means the executive director of the Board.

(3) "The Act" means the Polygraph Examiners Act (S.B. 257, July 1, 1975, Chapter 608 Oregon Laws).

(4) "Internship" means the study by a trainee of polygraph examinations and of the administration of polygraph examinations under the personal supervision and control of a polygraph examiner in accordance with the course of study prescribed by the Board at the commencement of such study.

(5) "Person" means any individual, firm, association, partnership, or corporation.

(6) "Polygraph examiner" means a person who purports to be able to detect deception or verify the truth of statements through the use of instrumentation or of a mechanical device and licensed as such under the Act.

(7) "Trainee" means a person licensed under the Act to engage in an internship.

*The law was passed in 1975. The regulations went into effect July 1, 1976.

3002. MINIMUM STANDARDS FOR A POLYGRAPH EXAMINER TRAINEE LICENSE

(1) Have graduated from a polygraph examiners course approved by the Board.

(2) (a) Be at least 18 years of age.

(b) Be a citizen of the United States.

(c) Established to the satisfaction of the Board that he is a person of honesty, truthfulness, integrity, and good moral character.

(d) Not have been convicted of a crime involving moral turpitude.

(e) Be fingerprinted and have identification records on file with the Oregon State Police Bureau of Identification.

(f) Submit a fully completed application as prescribed by Regulation 3012., accompanied by documentation of qualifications as may be required by the Board.

(g) Submit to the Board appropriate fees as prescribed by Regulation 3007.

(3) The Board may prescribe the requirements for internship of any person who is licensed as a trainee under this regulation.

3003. MINIMUM STANDARDS FOR A POLYGRAPH GENERAL EXAMINER LICENSE

(1) Any applicant for a license as a general polygraph examiner must:

(a) Be at least 18 years of age;

(b) Be a citizen of the United States;

(c) Establish to the satisfaction of the Board that he is a person of honesty, truthfulness, integrity, and good moral character;

(d) Not have been convicted of a crime involving moral turpitude;

(e) Be fingerprinted and have identification records on file with the Oregon State Police Bureau of Identification;

(f) Have received a baccalaureate degree from a college or university that is accredited by the American Association of Collegiate Registrars and Admissions Officers; or, in lieu thereof, be a graduate of an accredited high school and have at least five years of active investigative experience before the date of his application;

(g) Have graduated from a polygraph examiners course approved by

the Board and have satisfactorily completed at least 200 examinations, or have worked as a polygraph examiner for a period of five years for a governmental agency within the State of Oregon, and have completed 200 examinations.

(h) Have successfully completed an examination conducted by the Board to determine his competency to act as a polygraph examiner. The Board shall prescribe the manner and contents of any examination conducted by it under sections 2 to 28 of the Act;

(i) Submit a fully completed application as prescribed by Regulation 3012., accompanied by documentation of qualifications as may be required by the Board; and

(j) Submit to the Board appropriate fees as prescribed by Regulation 3007.

(2) Should an applicant fail to pass the first examination, the applicant may submit a new application six months after the date of the initial examination. If the applicant fails to pass the second examination, subsequent applications may be submitted at twelve-month intervals.

3004. SPECIAL LICENSES

(1) The Board may license a person who is not a resident of this state as a polygraph examiner as otherwise provided by the Act. However, any such person must include with his application for a license or renewal thereof an irrevocable written consent permitting the executive director to act as his agent for the service of all legal process in this State.

In any action in a court of competent jurisdiction in this state, service of process may be made upon a polygraph examiner who does not reside in this state by mailing two copies of the process to the executive director. The executive director shall retain one copy of the process in the records and immediately send, by certified or registered mail, the other copy to the polygraph examiner at his most current address as indicated by the records of the executive director.

(2) The Board may issue a license as a polygraph examiner to any person who applies thereof within 90 days after the effective date of this Act upon a finding by the Board that such person meets the qualifications specified in subsection (a) of this Regulation. A license granted under this subsection shall not be valid for more than one year from its date of issuance.

(a) Any person applying for a license as a polygraph examiner under subsection (2) of this section must be engaged actually in the occupation, business, or profession of a polygraph examiner on the effective date of the Act. Such person must

remit to the Board the proper fee as specified in Regulation 3007. Such person must meet the requirements of subsections (a), (b), (c), (d), (e), and (h) of Regulation 3003. Such person must be using, in the course of his work as a polygraph examiner, instrumentation or mechanical devices that comply with the minimum requirements specified in Regulation 3009.

(3) The Board may grant a license as a polygraph examiner in this State to a person who is licensed as a polygraph examiner by another state or territory of the United States, without examination, upon application by such person in the manner prescribed by the Board and upon payment to the Board of a fee of $50, payable to the Board, if the Board finds that such person:

(a) Is at least 18 years of age;

(b) Is a citizen of the United States;

(c) Has been fingerprinted and has identification records on file with the Oregon State Police Bureau of Identification.

(d) Was licensed pursuant to the requirements of such other state or territory that, at the date of the issuance of such license by such other state or territory, were substantially equivalent to the requirements of the Act for licensing and regulation of polygraph examiners in this state;

(e) Has lawfully engaged in the administration of polygraph examinations in such other state or territory for at least two years prior to the date of his application to the Board.

(f) Is licensed by another state or territory that grants reciprocity to polygraph examiners licensed in this State; and

(g) If a nonresident of this State, has complied with the requirements of section (1) of this regulation.

3005. EXPIRATION AND RENEWAL OF LICENSES

(1) Each polygraph examiner's license issued by the Board under provisions of the Act shall be issued for a period of one year. The Board may renew the license of a polygraph examiner, unless such license has been suspended or revoked, upon compliance by the person with such conditions as the Board may prescribe.

(2) A person whose polygraph examiner's license has expired may obtain a renewal license without examination upon application thereof within two years after the date of the expiration of such license and payment of the required fee for such renewal.

(3) A person whose polygraph examiner's license has expired while he was employed by any federal agency or while he was on active duty as a member of the Armed Forces of the United States or on active

duty as a member of the National Guard of this State may obtain a renewal license, without examination, upon application therefor within two years after the date of his termination of such employment or active duty and payment of the required fee for such renewal.

3006. DENIAL, REVOCATION, OR SUSPENSION OF LICENSES

(1) The Board may refuse to issue, or may revoke or suspend the license of any person as a polygraph examiner or trainee, if it finds that the person:

(a) Failed to inform an individual being examined as to the nature of the examination or failed to advise the individual or his representative of the results of the examination;

(b) Failed to inform an individual being examined that his participation in the examination is voluntary;

(c) Made a material misstatement in his application for an original or renewal license under provisions of the Act;

(d) Wilfully disregarded or violated any provision of the Act or any rule adopted pursuant thereto, including but not limited to the wilful making of a false report of a polygraph examination;

(e) Made any wilful misrepresentation or employed any false or misleading advertising to obtain business or the services of a trainee;

(f) Has demonstrated any inability or incompetency to carry out the duties of a polygraph examiner;

(g) Has permitted a license granted to him under the Act or any rule adopted pursuant thereto to be used by another person;

(h) Has wilfully aided or abetted any violation of provisions of the Act or any rule adopted pursuant thereto; or

(i) Has failed, within a reasonable time, to provide any information requested by the executive director after the receipt by the Board of a complaint alleging that such person has violated a provision of the Act or any rule adopted pursuant thereto.

(2) Upon receipt of written notification of the suspension or revocation by the Board of his license, a polygraph examiner or trainee shall surrender immediately his license to the executive director. The Board may restore a suspended or revoked license to the prior holder thereof, or may issue a license previously denied under subsection (1) of this regulation, at such time and under such conditions as the Board deems appropriate.

(3) The Board shall conduct all proceedings under the Act in accordance with ORS Chapter 183. Judicial review of an action of the Board shall be provided in ORS 183.480 to 183.500.

3007. LICENSE FEES

The following fees shall be charged by the Board in carrying out provisions of the Act:

(1) The fee of $50 for the issuance of each original license as a general polygraph examiner.

(2) The fee of $50 for the annual renewal of a license as a general polygraph examiner.

(3) The fee of $50 for examination by the Board to determine the competency of an applicant as a polygraph examiner.

(4) The fee of $35 for the issuance of a trainee license.

(5) The fee of $35 for the extension or renewal of a trainee license.

(6) The fee of $20 for issuance by the Board of a duplicate polygraph examiner or trainee license upon satisfactory proof that the original license has been lost or stolen.

(7) All fees, moneys, or other revenues received or collected by the Board under the Act shall be deposited in the Police Standards and Training Account.

3008. LICENSE DISPLAY AND REGISTRY

(1) A polygraph examiner shall display prominently his license at his place of business or employment, and a trainee shall display prominently his license at the place of his internship.

(2) A polygraph examiner shall notify the executive director in writing of any change in his principal place of business within 30 days after the date of such change. Upon discovery by the executive director of failure by a licensee to comply with this section, the executive director shall suspend immediately such license.

(3) Each polygraph examiner shall register with the county clerk of each county in which he maintains a business address. The county clerk shall maintain a list of all the polygraph examiners registered in his county.

3009. POLYGRAPH INSTRUMENTS

(1) All instruments or mechanical devices that are used to test or question individuals for the purpose of detecting deception or of verifying the truth of statements made by the individuals at least shall record visually, permanently, and simultaneously the cardio-

vascular pattern, the respiratory pattern, and the galvanic skin response of each such individual. The patterns of other physiological changes of any such individual also may be recorded.

(2) No person may use any instrument or mechanical device to test or question individuals for the purpose of detecting deception or verifying the truth of statements made by the individuals that does not comply with the minimum requirements therefor under subsection (1) of this section. The Board may, in the name of the State of Oregon, initiate and maintain appropriate judicial proceedings, in the manner provided by law for such proceedings, to enjoin the use of any instrumentation or mechanical device that does not comply with the minimum requirements specified in subsection (1) of this section.

3010. PENALTIES

Section 28. Violation of any provision of the Act or of any rule adopted thereunder is a Class A misdemeanor.

3011. ADVISORY COMMITTEE

(1) The Board may appoint a polygraph examiners licensing advisory committee whose function shall be to assist and advise the Board concerning the administration of the Act. The advisory committee's duties may include, but not be limited to, providing advice and assistance to the Board in matters of content and procedures for required examinations, evaluation, and selection of polygraph examiners courses to be approved by the Board, evaluation of applications received for polygraph examiners licenses, examination and approval of instruments, investigation of complaints which could lead to license suspension or revocation, and general enforcement of all provisions of the Act.

(2) The advisory committee shall consist of a minimum of five members to be appointed by the executive director, each appointment to be subject to ratification by the Board at its next regular meeting. Two members of the advisory committee shall initially be appointed for a term of one year. Other members of the committee shall be initially appointed each for a two-year term. All subsequent appointments to the advisory committee will be for two-year terms.

(3) The advisory committee shall select one of its members to serve as chairman, one to serve as vice-chairman, and one to serve as secretary.

(4) The advisory committee shall coordinate its activities and scheduling of regular or special meetings with the executive director and submit written reports as requested by the executive director.

(5) Membership of the advisory committee shall consist of at least four members qualified as general examiners - one a member of the Oregon State Police, one a member of a county sheriff's department, one a member of a city police agency, and one from the private sector. Additional members of the committee may be selected on the basis of special qualifications to be determined by the executive director, subject to the provisions of subsection (2) of this regulation.

3012. APPLICATIONS

(1) Applications for polygraph examiner trainee licenses and general polygraph examiners licenses shall be submitted on forms prescribed by and furnished by the Board.

(2) Applications for polygraph examiners licenses shall be accompanied by copies of certificates and such other documents as may be specified and required by the Board.

(3) Applications for polygraph licenses shall be accompanied by a check or money order payable to the Board on Police Standards and Training in the amount specified in Regulation 3007.

3013. LICENSES

(1) Polygraph examiners trainee licenses and general polygraph examiners licenses will be issued on forms approved by the Board. Each license will:

(a) Clearly designate the type of license awarded.

(b) Display the licensee's name.

(c) List the expiration date for the license.

(d) Bear the signatures of the executive director and the chairman of the Board on Police Standards and Training.

3014. RIGHT TO AMEND

The Board reserves the right to amend by deletion or addition to these rules and regulations at such time as deemed appropriate, pursuant to ORS 183.335.

3015. NOTICE TO INTERESTED PERSONS ON PROPOSALS TO ADOPT, AMEND, OR REPEAL ANY ADMINISTRATIVE RULE AFFECTING POLYGRAPH EXAMINERS AND TRAINEES

In accordance with Oregon Laws 1975, Chapter 759, Section 6, to provide a reasonable opportunity for interested persons to be notified of the proposed actions affecting polygraph examiners and trainees the Board on Police Standards and Training shall give notice of the proposed adoption, repeal, or amendment before action is taken:

(1) In the Secretary of State's Bulletin referred to in ORS 183.360 at least fifteen (15) days prior to the effective date.

(2) By mailing a copy of the notice to the following associations:

a. Northwest Polygraph Examiner's Association

b. Oregon State Sheriff's Association

c. Oregon Association of Chiefs of Police

d. Oregon Police Officers Association

(3) By mailing a copy of the notice to persons on the Board mailing list established pursuant to ORS 183.335(3).

* * * * * *

TWO ASSOCIATE EDITORS JOIN POLYGRAPH

The APA welcomes two new Associate Editors to the journal staff. They are Andre A. Moenssens, J.D., LL.M. and David W. Murdach, J.D.

Andre A. Moenssens is a Professor of Law at the University of Richmond, Virginia. He has long been associated with the polygraph field, and is a noted author and editor of books and articles on law and law enforcement. Before joining the faculty at the T. C. Williams School of Law at the University of Richmond, he was a professor of law at the Illinois Institute of Technology and the Chicago Kent College of Law.

David W. Murdach is a charter member of the APA who served on the staff of John A. Reid and Associates from June 1964 until March 1970. He holds a B.S. in Police Science and Administration from Washington State University and a J.D. from Chicago Kent College of Law. He has been a frequent lecturer on the polygraph technique for legal associations, including the National District Attorneys Association and the Washington State Bar Association. From 1970 to 1975 he was Deputy Prosecuting Attorney for the Peirce County Prosecutor's Office, and for over a year was head of the special White Collar Crime Unit. Since January 1975, he has been in private practice with the firm of Healy, Healy and Murdach, 724 South Yakima, Tacoma, Washington 98401.

* * * * * *

ABSTRACTS

Podlesny, John Andrew. Effectiveness of Techniques and Physiological Measures in the Detection of Deception. Ph.D. dissertation, University of Utah, December 1976. [Department of Psychology.]

Control-question (CQ) and guilty-knowledge (GK) techniques for the detection of deception were studied in a mock theft context. Subjects from the local community received $5 for participation, and both guilty and innocent subjects were motivated with a $10 bonus for a truthful outcome on the polygraph exam. They were instructed to deny the theft when they were examined by experimenters who were blind with respect to their guilt or innocence. Eight physiological channels were recorded, including a cardio activity monitor (CAM) and a low pressure blood pressure cuff (cardio). Numerical field evaluations of CQ tests produced 80% correct, 10% errors, and 10% inconclusives. Excluding inconclusives, CQ decisions were 89% correct. Control questions were more effective than guilt-complex questions, particularly in identifying innocent subjects. There was some evidence that exclusive control questions were more effective than nonexclusive control questions. Numerical evaluations of GK tests were 90% correct with no inconclusives. Thus, there was no difference in accuracy of decisions using CQ and GK techniques. Quantitative analyses of the CQ results revealed significant discrimination between guilty and innocent subjects with measures of skin conductance response (SCR) amplitude, SCR recovery halftime, negative skin potential response (SPR) amplitude, heart rate response (HRR), finger blood volume (FBV) response amplitude and time, and finger pulse amplitude (FPA) response. Results were negative SPR amplitude, SCR recovery half-time, and SCR recovery half-time width indicated that exclusive control questions identified guilty and innocent subjects significantly better than nonexclusive control questions. The GK technique significantly discriminated between guilty and innocent subjects with SCR amplitude, SCR recovery half-time, negative and positive SPR amplitude, FBV response amplitude, and CAM systolic, diastolic, and pulse amplitude responses. The low pressure cardio identified only innocent subjects with the CQ techniques and did not significantly discriminate guilty and innocent subjects with the GK technique.
[Author abstract.]

Peak of Tension (Guilty Knowledge)

Lieblich, I., Shakhar, G. B. and Kugelmass, S. "Validity of the Guilty Knowledge Technique in a Prisoners' Sample." Journal of Applied Psychology 61 (1) (1976): 89-93.

An attempt was made to evaluate the guilty knowledge technique, a form of peak of tension, as a detector of knowledge held by a sample of prisoners in a maximum security prison in Israel. In an initial interview prisoners responded to twenty questions designed to elicit personal responses. During a later interrogation, the prisoners were presented verbally with the same questions, and five alternative responses including their own personal response and four neutral control responses. During the interrogation, subjects listened quietly while their galvanic skin responses were monitored. On the basis of the galvanic skin responses, a significant proportion ($p < .01$) of

the subjects were correctly matched with their personal questionnaire responses. Although better overall matching had occurred with college students, no differences between the samples appeared on items involving strongly personal information. [Ed.]

Voice and EKG

Ciofu, I. "Audiospectral Analysis in Lie Detection." Archiv fur Psychology 126 (2-4)(1974): 170-180.

The experiment involved processing verbal responses through an audio-frequency analyzer and through the sound aspect of the electrocardiogram. The subject was given an electric shock as punishment for contrived lies, as a conditioning for additional lies. The responses are reported to result in quantitative spectral changes or differences in lies and truths. The author is with the Institute of Psychology in Bucharest. [Ed.]

Interrogation

Link, Frederick C. "Behavior Analysis in Interrogation." Military Police Law Enforcement Journal 3 (4)(Winter 1976-1977): 16-19.

The paper describes and illustrates with photographs, the behavior patterns exhibited by untruthful persons. Nonverbal or "body language" is described in detail, and useful observations are made about the types of answers, interruptions, and common verbal responses given by the untruthful. All examiners and interrogators have observed the characteristics described here, but it is a useful reminder for the experienced and an excellent opener for the beginner. The author is an instructor in polygraph technique at the Army Polygraph School. [Ed.]

Psychopathy

Treves-Brown, Christopher. "Who is the Psychopath?" Medicine, Science and the Law 17 (1)(January 1977): 56-63.

The paper describes different approaches to the problem of the classification of psychopathy. It thus draws attention to a paradox in the approach of professional workers to patients suffering from the disorder. This is that, although psychopathy is often considered, by definition, to be untreatable, professional staff often continue to treat psychopaths. This in turn means either that those with experience of the condition do not regard it as untreatable, or that the professional staff are displaying psychopathic characteristics themselves by giving treatment knowing it to be ineffective. [Author abstract.]

Note: The journal Medicine, Science and the Law is the official journal of the British Academy of Forensic Sciences. The President of the Academy is A. Fraser McIntosh, Esq., TD, OBE, MPS. The Editor is Professor J. Malcolm Cameron. The Agent in the U.S.A. is Fred B. Rothman & Co., South Hackensack, N.J.

* * * * * *

POLYGRAPH REVIEW

Peak of Tension Tests

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. The review in this issue is on Peak of Tension Tests. (Answers are on page 39.)

1. In a test concerning larceny of a $475 check, payable to Samuel Jones, and which was stolen from a desk top at ABC Liquor Company, the subject denies knowledge of any details of the offense. The Best peak of tension material to use First would be the:

   a. name of the payee.
   b. face value of the check.
   c. location of the offense.
   d. object from which the check was stolen.

2. In a peak of tension test, the subject is placed under tension. The most reliable indication of subject's "peak" is in the:

   a. pneumo tracing.
   b. GSR tracing.
   c. cardio tracing.
   d. three tracings at the same time and place.

3. Which one of the following is NOT a basic rule of known solution[1] POT test construction?

   a. Contains 5 to 9 questions.
   b. Contains only one key question.
   c. Key question is based upon information that investigators feel is relatively certain.
   d. Key question must be located near the center of the question sequence.

4. A "False Key" POT test is one in which:

   a. the subject is instructed to intentionally lie to a particular key question.
   b. none of the key questions are based upon factual information in order to test the subject's reaction capability.
   c. the single "key" question is based upon false information to determine if subject is a "guilt reactor."
   d. a false or misleading key question is built into the sequence to work as a type of control question.

1. Known solution peak of tension = Keeler Type A

5. Which one of the following is NOT true for POT tests?

   a. The examiner should not attempt to determine if the "key" question has any special meaning to the subject as this could invalidate the test.
   b. At least two charts are run, except for stimulation tests.
   c. A preparatory question is used in both known solution and searching POT tests.
   d. All questions, as well as question sequence, are always reviewed with the subject prior to the test.

6. (T) (F) Generally, a deceptive subject's tension will increase from the beginning to the end of the test.

7. (T) (F) A known solution POT test must always contain a cover-all question.

8. (T) (F) The searching POT test is evaluated the same as the known solution POT test.

9. (T) (F) To prevent anticipatory responses, question sequence should not be revealed to the subject.

10. (T) (F) One purpose of a stimulation test is to increase apprehension with a lying subject.

* * * * * *

THE ASSASSINATION TAPES - A BOOK REVIEW

By

Michael F. Barton

George O'Toole, The Assassination Tapes. New York: Penthouse Press Ltd., 1975, 243 pp., Index, Appendix, Illus., $8.95.

This book was written by an Ex-CIA Computer Specialist turned author. The sub-title sets the mood for the book; "An electronic Probe into the Murder of John F. Kennedy and the Dallas cover up".

It is Mr. O'Toole's contention that the Warren Report was biased, and the commission was fed misinformation by several sources including the FBI and the Dallas Police Department.

Of interest to polygraph examiners are three chapters; 3, 4 and 10. In chapter three, O'Toole gives an in depth discussion of the "technology of truth". The author explains the polygraph: instrument, question techniques, history, legal status, psychology, validity, reliability and some of the uses for the polygraph. Chapter four is a short course in the Psychological Stress Evaluator (PSE), covering the PSE from the same stand point as chapter three covered the polygraph. The reader should flip back to the illustrations at the back while reading chapter four. Some PSE charts are reproduced and help the reader get a better understanding of the instrument. The final chapter of special interest to examiners is chapter ten entitled "The Phantom Polygraph Test." The author uses his PSE to come to the conclusion that everyone he discussed a certain polygraph test with was lying, or as he says, "Wham! Near maximum stress appeared."

Basically, the book is a first rate "who done it". If the subject material didn't have such an emotional impact on the public, the author would have a hard time finding a publisher. As it is, O'Toole does a good job of research and points to some areas that were not completely answered by the Warren Commission. The real problem with reading the book is the author's melodramatic asides, such as how he managed to "put many miles between myself (O'Toole) and Dallas". The author felt he was getting to close to the truth that someone or some group was planning his death. The author would lead us to believe that the Dallas Police Department was, if not responsible for the President's death, at least responsible for a cover-up.

After reading the book and letting the significance of the author's accusations sink in, I was shocked and appalled by the possible damage that one man with severly limited training could do on a topic that effects us all. Mr. O'Toole used a machine, that is illegal in Texas, to attempt character assassination on a multitude of public servants. One can only guess at just what the results would be if O'Toole had more time or money to pursue his project. The book is important, in my opinion, because it shows just what can happen if the PSE is allowed to be operated without an ethical man at the controls.

* * * * * *