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IMPLICATIONS OF LABORATORY RESEARCH FOR THE DETECTION OF DECEPTION

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Introduction

A considerable degree of misunderstanding has existed between the psychophysiologist interested in the mechanisms involved in the detection of deception and the practitioner who must daily make difficult decisions in the field of lie detection. The differences in training and orientation between the two would, in themselves, be a sufficient cause for miscommunication; however, even more serious is the tendency of each to view the work of the other with skepticism--or even distrust. As many others have pointed out, the application of psychophysiology to the detection of deception has been developed mainly by individuals whose basic skills were those of interrogation, and while the technique is often referred to as a scientific aid in investigative work, it usually has been taught either by apprenticeship with an established expert or through attendance at relatively brief seminars and courses. Despite the increasing concern with upgrading training standards and a growing awareness of the need for basic psychophysiological research in the application of the polygraph to the detection of deception, the effectiyeness of the technique still depends to an overwhelming degree on the skill and experience of the individual polygraph examiner carrying out the procedure--a point of view

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certainly shared by the members of this organization. Considering this state of affairs, it is particularly gratifying for me to again be asked to address this organization. I hope that some of my comments may help clarify and explain the differences in points of view between psychophysiologists and the practitioners of lie detection and make it somewhat easier for both to learn from each other.

When polygraphers explain the technique there is a tendency to emphasize the physiological nature of the recordings and point to the objective charts as evidence that the procedure is based on scientific principles. Research scientists, on the other hand, have tended to dismiss these claims, partly on the basis of trivial but technically correct objections to the somewhat primitive techniques of physiological recordings used. A more telling criticism, however, is the paucity of scientific evidence concerning the validity and reliability of the technique. The researcher emphasizes that merely recording physiological data, even with the best of instruments, does not make lie detection "scientific." He tends to demand clear, unequivocal evidence about how often and under what circumstances such data permit the accurate detection of deception. For reasons to be discussed later, such evidence has simply not been available.

In fairness, though, it should be pointed out that few researchers with the necessary scientific and psychophysiological sophistication have made serious efforts to evaluate the use of lie detection techniques in the field and, with a few notable exceptions, statements by scientists have tended to be based on very limited experience with the technique as well as strong prejudice against it. In the same vein, field polygraphers have tended to ignore and deprecate laboratory studies on the detection of deception. They correctly recognize that important differences exist between the suspect being interrogated about a crime and the volunteer laboratory subject taking part in a study, concluding--all too often, inappropriately--that little or nothing of importance can be learned from such research.

Lie Detection--A Misnomer

It is, of course, recognized by field polygraphers and psychophysiologists alike that the physiological changes often observed to be associated with lying are no different in kind than those seen whenever an individual is exposed to a novel situation or suddenly experiences emotions such as fear, anger,

elation, excitement, anguish, and so forth--in other words, any form of emotional arousal. Not only are the physiological changes as such unrelated to lying, but it is not even the act of lying per se which brings them about. This observation can readily be documented in laboratory experiments.

In one study (Gustafson & Orne, 1963) using a simple card test, subjects were asked to select a numbered card from among several and then to reply NO each time they were asked by tape recording whether they had selected a card with number 12, number 17, 14, 18, and so forth. The rate of detection under these circumstances, defined as an increased electrodermal response to a selected card, was hardly greater than chance. However, when the identical procedure was carried out with another group of subjects who had first listened to a short tape recording informing them that only intelligent and mature individuals had the kind of emotional control necessary to fool the lie detector--implying that this procedure served as a test of their emotional stability--they showed rates of detection far greater than chance. This and related evidence have led us to conclude that it is not lying but rather motivated deceptive intent which leads to recognizable augmented physiological responses.

A study by Kugelmass, Lieblich, and Bergman (1967) further documents this point, again using a card test with subjects motivated to deceive but now requiring them to answer YES each time a tape recording asked whether they had taken a particular card. Thus, if a subject had selected the number 15 and was asked, "Did you take the number 17?" he would be required to answer YES; if asked, "Did you take the number 12?" he would be required to say YES, and so on, in each instance lying. However, when the subject was asked, "Did you take the number 15?"--which he had selected--he would be telling the truth. Under these circumstances, subjects motivated to deceive could readily be identified at far greater than chance levels by their augmented physiological response while truthfully answering that they had selected their particular card. It is clearly not lying which produces an increased physiological response in this situation since the subject is required to lie every time except when responding to his card but the physiological response produced is less than that observed when he is telling the truth about his selected card. (Reid and Inbau [1966] suggest an analogous procedure for field use.) This

demonstrates that both in the laboratory and in the field it is the deceptive intent rather than the act of lying which yields an augmented physiological response.

The term "lie detector" tends to be misleading in yet another sense. Since there is no unique physiological pattern associated with lying and individuals differ widely in their physiological responsivity, no one can identify a given response as a lie or even as indicating deception without comparing it to the same individual's physiological response to other stimuli. In other words, the technique of lie detection depends upon developing adequate control questions with which to compare those questions where one seeks to evaluate deceptive intent. As every field examiner knows, the adequacy of a "polygraph test" depends upon the appropriate form of questions. Though there are technical differences between various approaches, all procedures seek to determine how the individual responds physiologically to both trivial and arousing questions when it is known whether he is truthful in order to permit inference to be drawn about his response to the items about which he is being examined. Ideally, the examiner develops control questions which, to an innocent suspect, would be at least as emotionally arousing as the critical questions, whereas to a guilty individual the critical questions should be far more arousing than these control questions. Consequently, with a guilty individual the critical questions will elicit a greater physiological response than the control questions but this would not occur with an innocent individual. The real skill in the use of the polygraph to detect deception lies not so much in obtaining an adequate physiological record but rather in the examiner's ability to develop appropriate comparison questions which permit a valid interpretation of the suspect's physiological response to crucial questions.

All lie detection tests are therefore preceded by a pretest interview which serves a number of important functions. It makes possible the developing of appropriate control questions, permits the polygrapher to evaluate the suspect, obtain necessary background information and establish the kind of relationship which facilitates the test by trying to maintain a level of concern likely to yield an optimal physiological record. Inevitably, the pretest must also serve to convince the suspect of the effectiveness of the polygraph.

While the importance of the pretest interview is recognized among field examiners, its crucial significance is hardly ever

stressed in a court of law. Indeed, while examiners keep both their charts and questions, few keep tape recordings of the pretest interview. Yet control questions are formulated and their appropriateness evaluated during this interview which, by its very nature, plays a major role in determining how the suspect will respond physiologically during the actual test. Thus Reid and Inbau (1966) have often emphasized the danger of interrogation during the pretest interview and how such a procedure inappropriately carried out might inadvertently serve to sensitize an innocent suspect to relevant questions.

The Relationship Between the Laboratory Experiment and the Field Situation

Once it is recognized that the experimental subject's motivation to deceive plays a crucial role in his detectibility, it becomes self-evident that no laboratory situation is likely to produce as intense a desire to deceive the interrogator as is characteristic of the lie detection situation in the field. Since the consequences of detection in the laboratory can hardly approach those involved in actual interrogation, there is some justification in the practitioner's claim that the likelihood of detection in an experiment will tend to be greatly diminished when compared with most lawful situations. Why then do laboratory research at all? Would it not be best, as has been advocated by some, to answer all questions that need to be answered by lie detection in real life situations, using data from field interrogations? After all, these are the situations about which we wish to make inference. While such an approach would be desirable, unfortunately many pertinent questions cannot be answered economically with data obtained during actual interrogation, and some of the most important issues (to be discussed below) can hardly be dealt with at all.

Basic Questions Which Require Clarification

The first question which is typically asked about the detection of deception concerns its validity. How effective is the procedure in detecting lying? How frequently does the examiner conclude that a suspect is telling the truth when he is actually guilty (false negative), and how frequently does an examiner erroneously conclude that an innocent individual is in fact guilty (false positive)? This "simple" question turns out to be extremely difficult to resolve.

In order to clarify it, it would be essential to have absolutely reliable information about the truthfulness of a suspect during a lie detector test, and then it would be necessary to determine whether an expert polygrapher is capable of recognizing deception based exclusively upon his pretest interview with the suspect and a subsequent polygraph test. However, neither ground truth nor truly independent polygraph evaluations are available.

There are a number of ways in which these issues have been addressed. The most typical estimate of validity is based upon a retrospective study of polygraph examinations. The incidence of examiners' reporting deception, no deception, and inconclusives is recorded, and these conclusions are then examined to see in which instances evidence to the contrary has been developed. Thus, if an examiner has carried out 1000 tests and in only two instances did he later learn that his decision was challenged by information subsequently developed, he might conclude that the procedure is better than 99% accurate. Such an approach assumes that the decision of the examiner is correct unless proven to be wrong subsequently, an assumption which is hardly justified since, in many instances, subsequent data never come to the attention of the examiner and, for that matter, the truth may never emerge.

A somewhat more sophisticated procedure would involve comparing the judgment of the polygraph examiner with the ultimate disposition regarding a given set of cases. Thus, one would determine how frequently a suspect who is called guilty by the examiner is subsequently convicted of the crime concerning which he was tested; conversely, what the likelihood would be of a suspect who is considered innocent by the polygraph examiner actually being released. While such an approach appears objective, it too cannot yield a fully satisfactory answer about the effectiveness of the polygraph in ascertaining truth.

In police settings, for example, the polygraph is widely used as a means of establishing presumptive innocence. Usually, when a suspect successfully passes the polygraph tests this means he is eliminated from serious consideration. Granting that the polygraph has reasonable validity, such a procedure makes excellent sense in husbanding the investigative resources of our law enforcement agencies. On the other hand, from the point of view of establishing the validity

of the instrument, it is catastrophic. If a suspect actually is guilty but manages to successfully pass the polygraph examination, the likelihood that his guilt will subsequently be correctly identified is greatly diminished since the effort to turn up additional evidence is largely abandoned.

The situation is only slightly better in instances where the examiner finds evidence of deception. True, there are clear instances where individuals confess following such an examination and the confession is corroborated by other information developed subsequently. Nonetheless, there is always a marked effect of a suspect's failing to pass a polygraph examination on the course of the subsequent investigation even if an individual is, in fact, innocent. Being judged deceptive on a polygraph test might even increase the likelihood of his being found guilty, since law enforcement officials might well tend to dig harder for information corroborating the suspect's guilt insofar as their own convictions about his guilt had become strengthened by the outcome of the test. To the extent that such increased zeal could have an effect on the ultimate disposition of the case, regardless of the actual guilt or innocence of the individual, it would tend to distort the conclusions one might reach about the polygraph.

The only way ultimate disposition could meaningfully be used as a criterion by which to evaluate the validity of the polygraph examination would be to prevent the investigating officers from obtaining any information about the outcome of the polygraph examination. While of interest theoretically, such a procedure simply could not be instituted in actual practice.

One final point needs to be considered. Not only does the finding of the polygraph examination tend to affect the subsequent course of the investigation, but the amount of information available concerning the suspect's guilt at the time of the examination may also affect the results of the polygraph test. Since the polygraph is an investigative tool, the examiner is given whatever information is developed in the course of the examination prior to interrogating the suspect. Such a procedure is appropriate if one wishes to maximize the accuracy of the overall polygraph test procedure; however, it is not appropriate if one hopes to evaluate the polygraph test's unique contribution to the detection of deception. The problem is somewhat analogous to the use of

x-ray findings in clinical medicine. The referring physician provides a brief, relevant history which is available to the roentgenologist when he is reading the films. Clinical information of this kind helps tremendously in focusing his attention on the relevant aspects of the films and crystallizing the likely diagnostic alternatives about which he is being asked to comment. From the point of view of obtaining the best available judgment about an x-ray film, such a procedure is highly desirable; however, it is less than appropriate if one seeks to determine whether it is possible to make a correct judgment based on the film itself. To answer such a question would require that crucial information be withheld from the roentgenologist at the time the film is being read. Similarly, if one hopes to determine the effectiveness of the polygraph as a means of detecting deception, it becomes important to control the kind of collateral information available to the examiner. It is difficult to avoid having one's judgment influenced by reliable information about a case, especially in situations where the data upon which the judgment is to be based is somewhat ambiguous. However, the problem is considerably more complex in the case of the polygraph examination than in the evaluation of x-ray diagnoses. Thus the x-ray technician's beliefs about the likely diagnosis can have little, if any, effect on the nature of the actual x-ray film that is obtained; on the other hand, the polygraph test is not a cut-and-dried procedure and it is hard to believe that even a well-trained and experienced polygraph examiner's private biases about a suspect's potential guilt or innocence might not exert some significant influence on the manner in which he conducts his pretest interview and the examination itself. It must be emphasized that in a polygraph examination the suspect's physiological responses to questions depend in good part upon the nature of the pretest interview, his beliefs about how the interrogator views him, and on how the questions themselves are asked. Further, the interpretation of his responses to relevant questions depends upon the nature and quality of the control questions. Consequently, a polygraph examiner's biases not only could affect the manner in which he reads his charts but might also cause the suspect to respond differentially, resulting in charts which are, in fact, objectively different. Therefore, any attempt to determine the validity of the polygraph as a means of ascertaining truth in field situations would require the examiner to be ignorant of any information bearing on the suspect's guilt or innocence

that had already been developed.* Since such a limitation would tend to interfere with the most effective use of the technique, it too is unlikely to be imposed for the sake of validating data in actual field situations.

What I have tried to make clear here is that in a real-life context the outcome of the polygraph examination is likely to be influenced by evidence developed by others concerning a suspect's guilt or innocence and, similarly, the outcome is also likely to be influenced by the polygraph examiner's own prior suspicions about the suspect's guilt or innocence. For the purpose of establishing scientific validity, however, it is absolutely essential that the results of the polygraph examination be totally independent of the results of other aspects of the investigation, a condition that in practice cannot be met objectively in a real-life situation.

In response to this, highly experienced polygraph examiners have invariably been able to point to cases where at the beginning of the examination they were convinced of a suspect's guilt but found as the session progressed that the charts corroborated the suspect's asserted innocence. Their findings, distinctly at variance with their own strongly held convictions as well as those of their colleagues, were subsequently borne out as more evidence was developed and someone else was shown to be responsible for the crime in question. Similarly, they will point to cases where an individual apparently above suspicion, who was tested only to satisfy the requirement that everyone be examined, proved to be deceptive and ultimately guilty. Certainly such experiences are compelling evidence of the integrity of the examiners as well as of the polygraph's effectiveness in those particular instances.

It is my personal conviction that in proper hands, appropriately used, the polygraph examination can be a very powerful technique to ascertain truthfulness. Unfortunately, in real-life situations it is not possible to translate this belief into a meaningful, quantitative estimate of validity.

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*It should be emphasized that similar and closely related problems exist in the interpretation of a great many apparently objective procedures such as psychological tests and, of course, psychiatric examinations.

Of necessity, society demands more of us than our impression that the polygraph can be a useful procedure and, for the reasons outlined above, the problem of establishing independent criteria of truth and the outcome of the polygraph examination is incredibly difficult. This does not mean that one should cease trying to evaluate experience in the field.

Two Studies Bearing on the Validity of the Polygraph

Bersh (1969) developed an estimate of an individual's actual guilt or innocence by having three trained members of the Judge Advocate's staff go over all available information concerning an individual. This included information which would not be admissible in a court martial proceeding but had bearing upon the determination of an individual's actual guilt. The judgments made by these three individuals were then compared with the polygrapher's decision based on the polygraph examination which was carried out during the actual investigation. This retrospective study represents the kind of follow-up investigation that is possible though extremely difficult to carry out.

The findings are of considerable interest. Thus, when all three lawyers reviewing the case agreed about the guilt or innocence of an individual, their judgment agreed with the polygrapher's original judgment 92.4% of the time; when only two of the three lawyers agreed, the agreement dropped to 74.6%. The interpretation of these findings is somewhat difficult, however, and illustrates the problems outlined earlier. Thus, one could argue that in situations where ground truth was reliably determined, a very high degree of consensus existed between the polygrapher's initial decision and truth, but when there was some question about ground truth, leading the reviewing lawyers to disagree, the relationship between the polygrapher's judgment and the estimate of truth was greatly diminished. Indeed, it is entirely possible that in many instances the polygrapher was, in fact, correct.

On the other hand, it can equally well be argued that in those instances where all three attorneys agreed it is likely that a great deal of evidence had already been developed at the time of the original polygraph test and that the same evidence which influenced the attorneys' judgments also had a profound effect on how the polygrapher treated the suspect, how the suspect responded, and the

judgment the polygrapher subsequently reached. In other words, this study suffers from all of the problems of the non-independence of the polygraph examination from data about an individual's guilt or innocence that had been collected prior to the test as well as the non-independence of the course of the investigation following the polygraph examination from the decision reached by the polygrapher at that time.

In many ways the most interesting study is that by Horvath and Reid (1971) who used 40 records (20 each guilty and innocent) of moderate difficulty where truth was presumably known and the polygraph decisions were verified by independent evidence. The polygraph records and questions were given to several experienced examiners who were able to identify deceptive records with a high degree of accuracy, ranging from 85 to 97.5%. Since the examiners' statements were based exclusively on the physiological responses to specific questions, many of the objections raised previously do not seem to apply. Nonetheless, even here caution is necessary in interpreting the findings. The cases selected were originally correctly identified by the field examiners. One could argue that this identification depended upon an appropriate pretest which in turn led to recognizable physiological responses. Thus, the fact that other examiners can correctly identify guilt or innocence in these verified instances of the original examiners' correct judgments merely proves that individuals trained within the same laboratory tradition can identify those aspects which they view as indicative of deception in physiological data with considerable reliability. A true validity study would have to ask about the effectiveness of identifying deception in situations where ground truth is independently established and where the total procedure, including the pretest examination, is evaluated. If one selects cases where the pretest procedure led to a correct identification of guilt or innocence, one is inevitably stacking the cards for the technique and focusing on reliability which is only one of the requisites of validity.

Despite their limitations, both of these studies represent major advances and hopefully will be followed by additional efforts in this direction. Nonetheless, it seems clear that we need to be very careful about validity statements based on field data. Unfortunately, the typical data which are cited are largely based on the unverified experiences of individual field examiners. Thus there is a tendency for polygraph examiners to believe that their decision was accurate

unless subsequent information proves it to be wrong--in other words, when an individual is considered innocent and no subsequent proof of guilt emerges or when an individual is considered deceptive and he is not hired or dismissed from his job. However, it is by no means improbable that such groups will include instances where an individual who is judged to be innocent is, in fact guilty but no proof of his guilt is ever developed; further, it could well include individuals who were considered deceptive and therefore excluded from a position they were applying for but who were, in fact, innocent. If such instances exist, it is unlikely that they would come to the attention of the polygraph examiner.

Above and beyond these issues there are further difficulties in interpreting the statistical observations obtained in the field. Consider the hypothetical example of an office in which 100 people are employed and a theft occurs. All employees claim to be innocent and they are tested on the polygraph. The guiltlessness of each of the 100 individuals is corroborated by the test. Subsequently one individual is identified from among this group by some other means and it is established that he, and he alone, was responsible for the theft and that none of his coworkers had any knowledge or connection with it. Would the polygraph expert therefore be justified in claiming that this experience shows the polygraph was 99% accurate?

An assertion such as this is, of course, ludicrous since from the point of view of an outside observer it represents a failure for the polygraph. When the situation is seen through the eyes of the polygrapher, however, he, in fact, has tested 100 individuals and in each instance was forced to reach a judgment of deception or no deception, and this judgment was actually correct for 99 of the 100 individuals. The difference is that subjectively the polygrapher feels as though he must weigh the likelihood of guilt or innocence equally every time he examines a suspect; from his point of view the probability of guilt or innocence of each individual case is 50%. If the situation were really such that there were as many guilty as innocent individuals and he correctly identified 99 out of 100, the claim of 99% accuracy based on such data would be justified. The only reason why his view is incorrect is that the group contained only one guilty individual and the polygraph expert presumably knew that the likelihood of innocence was far greater than the likelihood of guilt.

In other words, the probability of finding the guilty person was 1 in 100, and in order to demonstrate that the technique is effective it is necessary to show that it does better than chance. Obviously, this in not true in this instance. It seems clear that in order to avoid reaching conclusions which seem naive on the one hand, or unfairly penalizing the polygraph expert on the other, studies must be designed in a way to include a sufficient number of guilty individuals to permit intelligent assessments of the separate probability for false positives and false negatives. Thus, the correct observation based on this hypothetical example would have been that in 99 instances there were no false positives; however, in the only instance when a false negative could have occurred, it did occur. Consequently there were 0% false positives and 100% false negatives (though the latter figure is based on only one case.)

The Importance of Conservative Criteria

This problem is not unique to lie detection as it can be met in both psychiatry and medicine. Indeed, evaluating the effectiveness of a given treatment shares many of the difficulties we have discussed above. The physician's belief in the effectiveness of a given treatment will affect how he and the family treat the patient and what the patient himself does, which may in turn have a profound influence on the outcome. These ancillary effects, known collectively as the placebo component, are quite independent of the therapeutic effect itself. Invariably, as new treatments are developed, there is a tendency to report significant results, arising in part from the doctor's enthusiasm and in part from the natural tendency to assume that patients who do not return for treatment are improved. These problems were sufficiently serious to force medicine to develop some very rigid rules in evaluating results.

An example of such rules is the five-year cure rate used to evaluate various cancer treatments. The concept of a five- and ten-year cure rate has subsequently become basic in all efforts to evaluate cancer treatment. For instance, surgery for cancer of the breast is performed and if the woman is alive five years later she is considered as a five-year cure; even if she is dying of cancer she is still considered a five-year cure as long as she is alive at the end of five years. Similarly, if she is alive ten years later, it would be considered a ten-year cure. The crucial point here, however, revolves around the fact that if the

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operation is successful, and she is alive and well with no evidence of cancer at the end of four years, but is hit by a car while crossing the street and dies and therefore is then not alive at the end of five years, she must still be listed as a failure of surgery. This is done simply because she is not alive, regardless of cause. You might say this is obvious nonsense because the woman who was hit by the car and had no evidence of cancer was, in fact, more successfully treated than the woman who was dying of cancer but still alive at five years--and you would be correct.

The inherent difficulty here, of course, is that it is not possible to determine whether the woman who died as a result of the auto accident at four years might not also have died of cancer during the fifth year. If this seems like a trivial objection and you decide to accept the four years, what do you then do with the woman who dies of an auto accident after two years, etc.? In other words, it is best to develop rigid, and of necessity conservative, criteria. This makes possible a meaningful comparison of different treatment methods since the chance errors even themselves out while the possibility of bias affecting the results is reduced. In establishing criteria of these kinds one is forced to make estimates which are generally highly conservative in order to limit oneself to hard evidence but, in the final analysis, such data are far more compelling.

In presenting the case for lie detection to the public in general and the legal profession in particular, hard data is essential--and conservatism is likely to be far more convincing than undocumented enthusiasm. Recently a number of well-known polygraph experts during court testimony were asked first how many polygraph tests they had administered and, after indicating their extensive experience, they were asked, "How many inaccurate polygraph tests do you know of by your personal knowledge?" Typically the answer was none or at best one or two, a very small number indeed when compared to the total number of tests administered.

This is a very impressive answer and perhaps, in the position of an adversary proceeding, many here would also have been tempted to elicit testimonials of this kind. On the other hand, care should be exercised since such statements tend to sound too good to be true. Further questioning would also reveal that follow-up evidence is not systematically collected in the usual course of a polygrapher's professional duties. Indeed, you yourself might try a little

experiment of your own. Speak to some of your friends in police departments who are detectives and who interrogate many suspects--not using the polygraph but just interrogating--until they form a conviction about the individual's guilt or innocence. Ask them how frequently their considered judgment after an extensive interrogation has been shown to be inaccurate. I suspect that you will find few detectives indeed who will report more than a very small number of instances where their considered judgment was proven wrong. This is not only because errors of this kind fail to occur but more due to the selective nature of memory when dealing with subjective data. One wonders if perhaps it is the intuitive awareness of these difficulties which makes an individual seem more credible when he is able to recall instances of being wrong!

Advantages of Laboratory

Although the laboratory setting has its own problems in contrast to the field situation, it is nonetheless possible to create scenarios in the laboratory where subjects become highly involved and are then required to take polygraph examinations. The test can be administered by a different investigator who is not privy to the particular experiences the subject has had during the earlier parts of the experiment. Consequently there is little difficulty in creating subjects who are known to be truly innocent concerning the matters about which they will be interrogated and to create others who are truly guilty in the sense that they will have committed some kind of mock crime or been given access to some secret information. It is also possible to create yet a third group of individuals who have varying degrees of information about a crime but are innocent. These would be analogous to bystanders who, for one reason or another, have access to knowledge about a crime and might be subject to interrogation.

Again, in contrast to the field situation, it is relatively easy in an experiment to make certain that the examiner does not have access to any information about the actual guilt or innocence of the subject. Further, since the interrogation of all the subjects concerns essentially the same crime, it is possible to standardize it and carry out objective analyses on the data. Under these conditions we can establish truly independent criteria of guilt and innocence in relation to detection by the polygraph. Further, we have control over the proportion of guilty and innocent

subjects, making it possible to obtain meaningful data about the incidence of false negatives as well as false positives. Such information is particularly difficult to obtain in the field because of the relatively low percentage of guilty individuals among the total number who are tested.

Most important, however, in the laboratory it is feasible to have perfectly designed control questions without the need to painfully develop them during a pretest interview. For example, in a card test the numbers on the cards which the subject did not select serve as appropriate control questions. The availability of almost perfectly matched comparison questions may in large part compensate for the inability to create the intense motivational factors inevitably present in the extra-laboratory context.

It should be emphasized, however, that the primary virtue of laboratory studies is not to provide a measure of validity; rather it is to help us understand the mechanisms which affect the likelihood of detection. It becomes possible to systematically vary such factors as the subject's motivation to deceive by varying the consequences of being detected, to vary the amount of involvement of the subject with the experiment, to vary the subject's beliefs about the effectiveness of the polygraph and his ability to deceive the interrogator, and so on. As mentioned earlier, in a series of studies we have been able to demonstrate that the motivation to deceive greatly increases the probability of detection. We have also shown that if the subject is given evidence that he can successfully defeat the polygraph examination he will be far less likely to be detected on subsequent polygraph tests. In other words, it has been possible to examine some of the psychological factors which affect the probability of detection.

One can ask questions about the effectiveness of different common, real-life patterns of polygraph questioning, comparing, for example, the peak-of-tension approach with the relevant-irrelevant method. Here, as always, it is crucial that the laboratory situation appropriately reflects the salient aspects of the field situation. For example, in our effort to compare peak-of-tension with relevant and irrelevant questions, Gustafson and Orne (1964) initially observed that in an experiment the relevant-irrelevant technique was far more effective than peak-of-tension. The procedure employed was to ask subjects to select one card

from several numbered cards. In one instance all the numbers were then asked randomly as an analog to the relevant-irrelevant method; in the other, they were asked sequentially such as 34, 35, 36, as an analog to peak-of-tension procedures.

We noted that subjects attempting to deceive were able to do so successfully on some of the peak-of-tension trials by choosing to give false responses to an incorrect number in the laboratory context. This procedure, as any of you gentlemen would recognize, would, of course, not be effective in a real-life context since any competent examiner would merely ask the suspect to explain his response and thereby undercut this rather simple countermeasure. Accordingly, the experimental procedure was modified. Subjects were again told to select one numbered card from several. They were also informed that among these cards were some which were blank, as was actually the case. Their task this time, however, was to convince the investigator that they had in fact drawn a blank card. This was explained as analogous to a real-life interrogation where they would need to document their innocence and at the same time not appear guilty of another crime. With this relatively minor change of procedure we observed that the peak-of-tension technique became extremely effective, perhaps even slightly more effective than the relevant-irrelevant procedure.

The evolution of this experiment is described in order to show the care with which research must be designed in order to adequately reflect the life situation. A failure to do so may lead to erroneous conclusions. We cannot afford to give up the insights that can be gained from laboratory research because it is possible to misinterpret laboratory results, but we can and must evaluate procedures carefully lest inappropriate inference be drawn.

Thus far I have carefully avoided mentioning any statistics concerning the rate of detection obtained in laboratory contexts. This has been deliberate because such data are essentially meaningless unless care is taken to understand the details of the experimental procedures employed. In contrast to the field, almost all laboratory research uses a procedure analogous to the card test. The subject selects one of several numbered cards and he is then asked about all of the cards in order to see whether his response to the card he selected can be correctly identified. As in an actual interrogation, the first question

is always a "dummy" since the initial response of an individual is routinely augmented. Usually, but not necessarily, on the basis of the electrodermal response a determination is then made concerning which physiological response was the greatest. If the response to the selected card was, in fact, the greatest, then the subject would be considered detected; if another response was equal or greater, he would not be considered detected. While there are many variations on this procedure, most laboratory studies use quite objective but highly arbitrary means of analysis in order to establish whether or not detection took place. Consequently the researcher loses the very important clues which the polygrapher has available from asking the suspect to explain his response. He also tends to deal with individuals at a much lower level of arousal. On the other hand, he has the major advantage of perfectly matched comparison questions--a luxury not usually available in real life. On the other hand, this alone may make up for the much lower motivation to deceive found under laboratory circumstances.

Many laboratory studies involve questions about several different items. Thus, an individual may be required to deceive about a number of different items of information. If, for example, the subject was given six different sets of questions, the probability of correct detection could range from 0 to 6. A detection rate might be based on the percent of times the individual is correctly detected. Thus, if he is detected three times correctly, one might say the rate of detection is 50%. Note that in this instance the detection rate is within the individual subject. In terms of discriminating guilty subjects from innocent subjects, however, the rate of detection takes on different aspects. If each question had four items, the likelihood of detection by chance each time would be 25%. A group of innocent subjects would tend to have an average detection rate of 1.5 items, or one-fourth of the total number of questions, though an occasional innocent subject might by chance have two, or very occasionally even three, correct detections. The likelihood of an individual with three detections being innocent would be extremely low--1.6%. Thus, if an individual was detected four out of six times, one would be almost certain he was in the guilty group, even though the overall rate of detection of information was only 66 2/3%. This principle of using multiple questions in order to make discrimination between guilty and innocent individuals more reliable was employed particularly successfully by Lykken (1959) who

constructed a series of questions based on individualized information and was able to obtain accurate discrimination between individuals who had guilty knowledge and those who did not in approximately 90% of the cases. In one experiment, using a refinement of this procedure with 25 questions, he was able to correctly detect individuals with guilty knowledge 100% of the time.

Caution is required in reading the experimental literature since the rate of detection in some studies is meant to apply to the number of times a correct response is identified; in other studies, to the number of times the correct individual is identified. Different studies use widely differing social interactions as well as differing in the number of sets of questions asked. Not surprisingly, therefore, detection rates ranging from random to 100% have been reported under different circumstances. In the abstract they have little meaning beyond documenting that under some specifiable circumstances a highly reliable level of detection can be achieved. However, in attempting to extrapolate from the laboratory to the field, it must be kept in mind that the polygrapher lacks the many advantages inherent in perfect control questions. In theory, the peak-of-tension procedure has precisely these virtues, but as Reid and Inbau (1966) have outlined and as Barland (1972) has extensively discussed, the ideal situation is rarely available in real life.

While the absolute figures on detection rates in the laboratory are of very limited significance, one instance when they become extremely useful is in clarifying the effects of different psychological mechanisms on the probability of detection. Probably the most important finding from all laboratory research is the overwhelming importance of psychological factors in determining whether an individual will or will not be detectible in the lie detection situation. Perhaps the strongest disagreement scientists would have with polygraphers is in the extent to which psychological factors rather than physiological factors are seen as crucial in making the detection of deception possible. Thus, in testimony before courts and in presenting the lie detection interview to the suspect about to be interrogated, the polygrapher tends to speak about the physiological response to lying. As has been discussed earlier, there is no evidence whatsoever to indicate any specific physiological response associated with lying; on the contrary, whether or not an individual

can be correctly detected in any given situation tends to be a function of his motivation, his concern about the consequences of being found out, his past experience in lie detection situations, the manner in which he is questioned, the extent to which he can be persuaded that the instrument is effective, and so on. Factors such as these are, of course, psychological though they will determine whether or not there is an augmented physiological response to the critical stimulus about which the suspect is trying to deceive.

There may well be some important virtues in presenting the technique of lie detection to a suspect as if augmented physiological response was an invariant, unavoidable concomitant of deception. Such an assertion, while useful in increasing the probability of the suspect's detection, is not, in fact, true. Indeed it is used in the field because the suspect's belief in the lie detector is important in maximizing the likelihood of a physiological response while lying. The obverse is equally true, namely that under some circumstances the likelihood of an augmented physiological response while lying is greatly reduced. The factors which determine whether this is the case are also almost overwhelmingly psychological as opposed to physiological. Thus neither drugs, fatigue, or even anxiety tend to have very pronounced effects in reducing detectibility provided the individual remains responsive, concerned about the outcome of the test, and shares the belief in the likelihood of deception being detected by the test.

On the Validity of Polygraph Data

As I have tried to point out, the information is simply not available to permit a reliable estimate of the validity of the polygraph in life situations. Extrapolating from the laboratory, however, one can say that when a subject is very concerned about the probability of detection, he does become more detectible. Assuming that the psychological conditions of the polygraph test are appropriately met and that the polygraph examiner is truly competent in carrying out an effective pretest interview and designing appropriate comparison questions, it is likely that the detection rates will exceed those observed in the laboratory. On the other hand, it is by no means clear how frequently the average examiner in the field meets the high standards of competence and objectivity which characterize some of the outstanding

practitioners, nor how carefully the optimal circumstances for an examination are created. Nonetheless, I would certainly agree that a competent interrogator, trained in the use of the polygraph, attempting to evaluate deception with the aid of the polygraph test will be significantly more effective than without it. Further, I believe that in appropriate hands the reliability of the polygraph is far greater than what one could expect from accounts of eyewitnesses who briefly observe a stressful and arousing event. Certainly it would be more reliable than other available techniques of ascertaining truth such as psychiatric evaluations or more esoteric procedures such as the use of hypnosis or "truth serum."

Countermeasures

While it is difficult and risky to extrapolate a validity estimate for the field from laboratory data, other questions can be asked with greater assurance in the laboratory. One of these concerns the circumstances under which the polygraph becomes less reliable. Here one is concerned not with the absolute detection rates, but rather with the effect of various interventions on relative detection rates. It is no longer necessary to extrapolate from the detection rate in the laboratory to that in the field; as long as the laboratory reflects the same mechanism observed in a field situation, the estimates of relative effects of various countermeasures are meaningful. Unfortunately, very few systematic studies are available. The early work of Kubis (1962) suggested that yoga-like control was not effective in some instances but various muscular-techniques and imagery were reasonably effective. Our own data clearly show that a subject who strives to escape detection and is provided with experience in a polygraph test which convinces him that he is able to fool the machine will become very significantly less detectible on subsequent tests. (Conversely, if it is demonstrated to him that he can be detected, he will become more detectible.) This observation has important field implications which will be discussed later.

Aside from some anecdotal reports, little is known about the effects of specific drugs on detection or the effects of systematic training procedures using conditioning, repeated retests, feedback techniques, and similar potentially meaningful approaches.

The Assumptions of the Polygraph Test

One tends to describe any test as though it matters little when, where, how and by whom it is administered; however, even in the case of highly objective tests it is implicitly assumed that certain conditions are met for the procedure to be valid. Consider, for example, the taking of blood pressure in a doctor's office: for the readings to be valid it is necessary that the patient be cooperative and reasonably relaxed. Readings can be distorted by an unduly high level of anxiety as well as a wide range of drugs. Further, one must assume that the individual who is taking the patient's blood pressure carries out the procedure correctly. The findings will validly reflect the general state of the patient's vascular system--as opposed to its momentary response--only if the conditions under which they were obtained meet these assumptions. Similarly, in order to obtain a valid test of an individual's intelligence it is essential that the subject be cooperative, motivated, not unduly frightened, have had a reasonable amount of rest and be free from the deleterious influence of drugs. The findings from an individually administered intelligence test are further predicated on the assumption that reasonable rapport exist between subject and examiner, and that the latter follow a carefully standardized procedure in administering the examination. An I.Q. determination is a meaningful, objective measure of abilities only to the extent that all of these assumptions are met, though one inevitably obtains a score regardless of the circumstances under which the test was administered.

The assumptions upon which a valid administration of a particular test depends are usually well known within the field but are rarely spelled out. Not infrequently, violations of these assumptions fail to be recognized because the factors that distort the results are relatively subtle, even though the circumstances under which the test has been administered may lead to inappropriate comparisons. For example, intelligence tests administered to subjects of a different cultural background with different sets of values and no experience in taking tests often result in gross underestimates of ability. Incorrect conclusions can be drawn from such data if the investigator fails to recognize that the changed circumstances prevent the test from validly reflecting the subject's abilities.

It would seem worthwhile to make explicit the underlying assumptions which guide the behavior of the good polygraph examiner and the circumstances under which the overwhelming bulk of his experience is obtained.

All polygraph examiners strive to maintain a professional relationship with the suspects they are about to examine. The nature of this relationship is patterned after that between the interrogator and suspect though there may not be any formal interrogation. The fact that polygraph examiners are drawn from the ranks of interrogators helps assure this aspect of the relationship to the individual about to be tested. Though styles of interrogators vary widely, all maintain an arm's length relationship with the interrogatee. Even when the style is one of extreme friendliness and solicitousness it is still clear that the interrogator is in control of the situation, "calls the shots," and makes the judgment.

Polygraph examiners vary in the manner of the pretest interview but these interviews are inevitably designed to accomplish three major goals: (1) to subtly but effectively convince the suspect about the effectiveness of the polygraph, (2) to develop appropriate comparison questions, and (3) to make certain the suspect understands the questions he is to be asked and what the examiner means by an honest answer. The pretest interview also serves to evaluate the suspect, to gauge and appropriately modify his level of anxiety, and to subtly establish the examiner's competence in the field.

Considerable emphasis is placed by all examiners on the need for professionalism and a professional relationship with suspects. Inevitably such a relationship serves to increase the examiner's prestige and effectively communicates his high degree of competence. Finally, much of the examiner's behavior is designed to emphasize the importance of the polygraph test to the suspect, specifically to make him acutely aware of the consequences of being adjudicated as non-deceptive or deceptive. While most modern workers emphasize the objective aspects of the examination and behave as though their role was merely that of an expert technician who views himself as a scientific tool, it is always clear to the suspect that the examiner's judgments will have a material effect on his future life. It is, of course, also assumed that the suspect is well rested, and that his level of concern

while high is not incapacitating.

Though various schools differ about the most effective kind of comparison questions and how they should be asked, all polygraph examiners agree that such questions are essential for a meaningful interpretation of the charts. Further, it is assumed that the examiner asks relevant questions with no more emphasis than that used in asking comparison questions, that the examiner avoids "springing" any questions on the suspect, especially relevant ones, and that appropriate rapport is maintained throughout the test.

It is assumed that appropriate physiological sensors are appropriately applied, that the equipment is in good working order, and the examiner appropriately marks his records. Though different examiners vary in their emphasis on different aspects of the physiological records, it is assumed that some rational and reproducible method of evaluating the charts is utilized. Although the number of charts that are obtained and the role of interrogation before and between the charts are not fully agreed upon, all examiners concur in the need to verify the judgment of deception by using several relevant and several comparison questions and by obtaining more than one chart.

Finally, there is consensus that repeating polygraph examinations a large number of times will tend to affect the nature of the charts obtained, though it is not established what kind of changes will occur and at what point they may serve to invalidate the test.

In considering the validity of polygraph examinations, it is necessary that these conditions of the polygraph examination have been reasonably approximated. It will be clear, of course, that the examiners themselves vary widely in experience, competence, social experience and interrogative ability. Factors such as these can hardly help affect the likelihood of detection. Furthermore, the crucial role of the pretest interview has not received adequate attention, especially when polygraph findings are discussed in court. While in truly expert hands the pretest interview is carried out in a manner which assures optimal conditions for the polygraph test, one can readily conceive of situations where inappropriate handling of the pretest situation can produce charts leading to false positives or false negatives. For this reason it seems vital that, in addition to maintaining records of the actual questions asked and the polygraph charts, tape

recordings of the pretest interviews be kept. Without such information anyone seeking to interpret the objective charts must assume that the pretest interview was appropriately carried out but is unable to judge the adequacy of the procedure itself. If the polygraph were to be considered, for example, in courts of law, recordings of this kind should certainly be made available as one of the bases for cross examination.

The Friendly Polygrapher

Recently a series of attempts have been made to introduce polygraph evidence in courts of law as the basis for corroborating a defendant's assertion of innocence. These cases all shared an important feature: they involved a polygraph test administered by a polygraph examiner at the behest of the defense attorney. In several instances these examiners have been highly respected and competent in their field. Obviously, it is desirable in such cases to have an examiner whose reputation and character are above reproach for him to be effective were the polygraph evidence to be admissible in court.

While the examiner himself may have had vast experience and great competence, assuring thereby that the test itself meets most major assumptions, the very situation in which such tests are given in fact tends to violate some of the most important aspects of the situation which makes polygraph tests work.

Whereas the usual polygraph examination is carried out in a situation where the polygrapher is at arm's length--in the employ of a law enforcement agency, a potential (or actual) employer or in some similar relationship, where his decision would inevitably have a direct effect on a suspect's future--the context in which the friendly polygrapher carries out his test is inevitably different. In the latter case the suspect realizes that his attorney has employed the polygraph examiner to help in the preparation of his defense. For the innocent person this may matter relatively little; however, for the guilty individual it alters the situation considerably. The guilty individual when tested by a friendly polygrapher knows that the results of the test if he is found deceptive will not be used against him. The only kind of findings which his attorney would utilize are ones where his innocence is being corroborated by the polygraph. As a consequence, the client's fears about being detected are

greatly reduced. As we have been able to show in the laboratory, and as is acknowledged by all polygraph experts, a suspect's fear of detection is the major factor in assuring his augmented physiological response while lying. It is precisely this aspect of the situation which is most dramatically altered when the polygraph is employed by the defendant's attorney. The respect and perhaps even deference accorded to the client by the polygraph examiner will tend to convince the client that the polygrapher is really attempting to help his cause and thereby make him less afraid and less detectible, even if he is guilty.

In addition to this basic problem, there is an almost inevitable difference in the manner in which the polygraph examiner actually treats his client. Whereas interrogators commonly address suspects by their first name and act aloof, the polygrapher in the employ of the defense attorney will tend to be more cordial and more pleasant. He will have a far greater tendency to address the client formally by his last name and will tend to show subtle signs of respect far more readily than when he is examining a suspect at the behest of the authorities or an employer.

Typically, the pretest information given to the polygrapher by the defense attorney will emphasize all the evidence substantiating his client's innocence, and the attorney will appeal for his help to establish for the authorities a fact which he presumably already knows--that his client is innocent. Whatever effects a bias to believe in a suspect's innocence may have on the subsequent polygraph examination will work in favor of the examiner's perception that the client is innocent.

It should be emphasized that these difficulties will tend to distort the results of the polygraph examination even with an extremely competent and highly experienced examiner who is genuinely trying his best to make an honest evaluation of an individual's truthfulness.* Most troubling about this situation is the fact that the polygraph examiner will, of course, interpret the charts against a background of his vast experience with individuals who have been tested

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*Obviously the far greater likelihood for conscious or unconscious bias to distort the manner in which the test is administered and how it is interpreted when examiners other than the most outstanding are employed hardly requires comment.

in an arm's length situation, usually failing to recognize the potentially serious distortions of the situation introduced by his altered relationship to the client. It goes without saying that, even under these adverse circumstances, competent polygraph examiners have frequently identified clients as deceptive. This speaks to the competence of the examiners and to their integrity. It does not, however, permit any inference to be drawn about the validity of the test in those instances where the client appears innocent. Information would have to be sought in these specific contexts and no such data has ever been developed. It would certainly be inappropriate to conclude that any validity estimates based on other experience with the polygraph are relevant to the friendly polygrapher context. Whatever problems exist in estimating the validity of the polygraph in more usual situations are compounded in this context.

From a purely legal viewpoint, it is, of course, clear that if polygraph data were used only when a client is considered non-deceptive and otherwise suppressed, the meaning of the polygraph test would inevitably be diminished, even if its validity were not seriously impaired in this situation.

It would seem much to the best interest of polygraph examiners in general to avoid permitting themselves to be used in the friendly polygrapher situation. For the reasons outlined above, their findings are inevitably less likely to be valid; further, since only data supporting the innocence of a client would ever be introduced, the respectability of the polygraph procedure would in the long run be diminished, especially as instances of its inaccuracy under these circumstances come to the attention of the public. This seems particularly germane since these difficulties can readily be avoided. It would merely be necessary for professional polygraph examiners to decide that they agree not to administer tests and subsequently testify concerning them unless the findings were stipulated in advance by both defense and prosecution. While such a situation would, of course, place a tremendous responsibility on the examiner and raise complex legal and moral issues, it would prevent a serious potential misuse of the technique which could in the long run only serve to damage rather than enhance its acceptance. On the other hand, by refraining from carrying out tests except under circumstances where the existence of real consequences for the suspect is assured and unfavorable reports cannot simply be excluded, examiners would take a major step toward the ultimate acceptability of the technique.

Needed Future Research

I have tried to indicate how laboratory research on the detection of deception can help clarify some of the mechanisms which appear to be operative in the field situation. Certainly many of the conclusions which can be drawn from laboratory studies can and should be explored in field situations. However, some questions can be addressed adequately only in experimental contexts and many of these are as important to the basic sciences as they are to the polygraph examiner. Despite the intrinsic interest of the phenomenon and the tremendous growth of the field of psychophysiology, there has been remarkably little systematic research specifically directed at the basic issues underlying the detection of deception. Recently we have tried to summarize the literature and outline some of the important psychophysiological issues (Orne, Thackray, & Paskewitz, 1972). It seems clear, however, that a great many important questions remain to be clarified, and surprisingly many of these can be appropriately addressed at the research laboratory.

The technology of lie detection is based almost exclusively upon three physiological measures: the pneumograph, the "cardio" and the electrodermal response, and utilizes techniques of measurement which have not been significantly altered since the 1920s. While the pneumatic system of recording respiration and the cardio channel are probably adequate for purposes of the test,* the electrodermal response is recorded by relatively primitive but reasonably effective systems (though the electrodes can and should be improved even for the field situation). On the other hand, the use of other physiological sensors has received little attention in field situations. Of particular promise are various kinds of plethysmographs to measure peripheral vascular responsivity more directly. The potential use of EEG recordings has received little attention, nor has there been much effort to utilize muscle tension which, under some circumstances, may prove to be particularly interesting. Similarly, the interpretation of charts has not been standardized nor, with the exception of the work of Baxter (1962), has

*Though, of course, for more detailed analysis by computer it is necessary to make analog tape recordings of the signals and alternate forms of recording then become necessary, such techniques are neither required nor desirable for most field applications.

much attention been paid to its quantification. All these issues are of interest; however, the importance of an improved physiological technology in terms of sensors and parameters of analysis can easily be overemphasized. The most important questions about the detection of deception remain psychological.

The overriding effects of some psychological factors have been reliably identified; however, many others remain to be clarified. Questions such as the effect of multiple testing on detection, an eminently practical problem if the technique is to become more widely used, have never been systematically explored. The extent to which the examiner's beliefs about a suspect's guilt or innocence can actually serve to distort the physiological record obtained urgently needs clarification. The ease with which subtle changes in the manner in which questions are asked during a test may distort the obtained chart needs to be determined, and the extent to which simple psychological maneuvers may serve to increase the suspect's detectibility requires investigation. The feedback technique suggested by Golden (1971) is an example of a promising procedure which can and should receive careful research attention.

In a similar vein, all of the problems generally subsumed under the question of countermeasures may ultimately serve to clarify the nature of the mechanisms upon which the detection of deception depends. Thus, the extent to which specific drugs, hypnosis, training in self-hypnosis, the manipulation of cognitive expectancies, the changes and consequences attached to detection, specific feedback training, extensive experience with and knowledge about the polygraph and its use, and so on, affect detection remains to be established. Finally, the importance of cultural differences, both on the physiological responsivity of the individual and the significance associated with lying, is bound to play an important role in an individual's detectibility. Kugelmass and Lieblich (1968) have reported such differences in the modality of the electrodermal response but no information exists on whether individuals who fail to respond in that modality respond normally in others. Certainly the work of Lacey, Bateman and VanLehn (1953) on autonomic specificity would suggest that this might well be the case. Similarly, the effect of psychopathology on detectibility is almost totally unexplored beyond anecdotal reports that psychopaths and psychotic individuals tend to yield uninterpretable charts.

Hopefully future work will begin to fill in the broad gaps in our knowledge. As our scientific understanding of the mechanisms upon which the field use of the polygraph rests is increased, it is likely that the research scientist will become progressively more able to contribute meaningfully to the appropriate application of the technique. Of equal importance will be the added knowledge to the science of psychophysiology which can be developed by careful study of the practice of field examiners in their day-to-day work. As is often the case, the intuitive clinician develops and uses techniques, often without the full ability to explain or clarify their nature but nonetheless effectively, long before these procedures are fully understood and quantified by the research scientist. There is little doubt that future work will show some inaccuracies in some of the cherished beliefs of polygraph examiners; on the other hand, it is even more certain that many of the procedures developed from years of experience and careful observation will form the basis for significant contributions toward an understanding of the complex relationship between mental processes and physiological responses. One would hope that as field examiners and research scientists begin to fully appreciate each other's strengths and weaknesses, the likelihood of each contributing to the understanding of the other will progressively increase to the benefit of both.

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SURVEY OF ATTITUDES ON THE POLYGRAPH

Attitudes of Polygraph Examinees Toward The Polygraph ("Lie Detector") Examination, And Attitudes of Polygraph Examinees, And Behavioral Scientists Toward Appropriateness of Use of The Instrument

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The research to be reported here is concerned, not with the reliability or validity of the polygraph as a device for the detection of deception, but with the credibility of the procedure to four groups of people concerned with detection of deception: polygraph examinees, polygraph examiners, both defense and prosecuting attorneys, and behavioral scientists in the areas of psychology, sociology, and criminology. These surveys all clearly show that the polygraph does win respect in each of these four groups, but doubt about the validity of the device and the ethicality of its use, the feeling that it makes a witness testify against himself. Surprisingly, examinees themselves only infrequently raise this issue.

Polygraph Examinees

While allegations are frequently made that a polygraph examination is an undue invasion of privacy undergone under duress, no studies have reported what the actual attitudes of examinees are.

This survey was designed to identify the "real" attitudes of examinees. A total of 315 polygraph examinees were surveyed after they took a test to determine their attitudes toward the procedure.

The 315 examinees were distributed among three groups: job applicants (N=241) who were given a

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polygraph pre-employment screening; employees (N=7) who were given a routine repeat examination; and "special" cases (N=67), who were polygraphed as suspects in situations where a crime had been committed.

Each examinee, after the exam was over, was asked to answer a brief seven item questionnaire soliciting his or her opinion of the process. Each question, in addition to calling for a YES-NO response, provided space for open-ended comments. The questions asked were:

1. What do you think about this test now that you have completed it?

2. Do you think the test was unfair in any way?

3. Did the test or any part of it offend you?

4. Do you think it was an invasion of your privacy?

5. If the occasion arose would you take a test like this as an applicant for a job in a trusted position?

6. Would you take a routine test every six months or once a year, as a condition for continued employment even though no loss has occurred at your company?

7. If a loss occurred at your company and you were asked to cooperate by taking the test to help find the person who caused the loss, would you?

Examinee Characteristics. The age, sex, and race distribution of examinees, by type of examinee, showed that there was little variation among the different examinee types with respect to these characteristics. Males preponderated (71 percent to 29 percent), blacks were three times as numerous as whites (76 percent to 24 percent), and the average examinee was relatively young (median age 24 years 9 months).

Examination Results. In employment applicant interviews, a conclusion with respect to integrity or

honesty is made and communicated to the employer-client for whom the examinee is tested. A tabulation of the results of 241 applicant interviews tended to show that the experience of this sample was very similar to previous samples (Ash, 1970; Ash, 1971).* Just over 43 percent are NOT RECOMMENDED, about 52 percent are RECOMMENDED, for 3 percent a "QUALIFIED" recommendation (findings not decisive is given, and in about 2 percent of the cases the disposition of the case was not available.

All examinees taking routine repeat exams were RECOMMENDED. These data are summarized in Table 1. Results on the "Special" examinations were not available.

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* Ash, P. "The validation of an instrument to predict the likelihood of employee theft." Proceedings of the 78th Annual Convention of the American Psychological Association. Washington, D.C.: The Association, 1970, pp. 579-580.

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Table 1

Distribution of Results of 315 Polygraph Tests and Whether Examinee was Told Result

	Type of Examination*					
	Employment Applicant		Employment Routine		Special	
	No.	Percent	No.	Percent	No.	Percent
Recommendation						
Recommended	126	52.3	7	100.0		
Qualified Recommendation	8	3.3				
Not Recommended	103	42.7				
Not Available	4	1.7			67	100.0
Told Results						
Yes	68	28.2	4	57.1	42	62.7
No	72	29.9	2	28.6	17	25.3
Unknown	101	41.9	1	14.3	8	12.0

*"Recommend" status not applicable to Special Exams.

Attitudes of Examinees. Question 1 solicited open-end comments regarding reaction to the whole procedure. The remaining six questions were answerable by a YES-NO response, with provision for comment if the answer was negative to use of the polygraph. The distribution of responses to the latter six questions is given in Table 2. Overall, the polygraph examination is accepted and approved by the very large majority of all examinees. Those taking routine exams (N=7) were unanimous (on all but one question, on which one examinee differed) that the test was fair, they were not offended, it was not an invasion of privacy, and they were willing to take it routinely.

Employment applicants, while not unanimous, expressed preponderantly favorable attitudes: 86.3 percent thought the test fair, 91.3 percent were not offended, 83.0 percent did not feel that their privacy was invaded, 96.3 percent were willing to take the test to get a job, 87.6 percent were willing to take it routinely to keep a job, and 96.7 percent were willing to take it to find a thief at their company.

"Special" examinees, those caught up in an actual theft or other defalcation situation who were polygraphed to find the culprit, were, on the average, less favorably disposed to polygraph exams than were applicants. It should be remembered, however, that the "Special" exams typically include people who have in fact committed defalcations which they want to conceal. Even so, the overwhelming majority of these examinees, ranging from a minimum of 67.2 percent (the polygraph is not an invasion of privacy) to over 89 percent support the use of the polygraph as an investigatory tool to identify people who have committed crimes.

Table 2

Distribution by Type of Examination of Responses of 315 Polygraph Examinees to Questions Concerning Feelings About the Polygraph

Question	Type of Examination: Employment Applicant No.	Employment Applicant Percent	Employment Routine No.	Employment Routine Percent	Special No.	Special Percent	Total No.	Total Percent
2. Test Unfair?								
Yes	32	13.3			10	14.9	42	13.3
No	208	86.3	7	100.0	53	79.1	268	85.1
No Answer	1	.4			4	6.0	5	1.6
3. Were You Offended?								
Yes	21	8.7			11	16.4	32	10.2
No	220	91.3	7	100.0	51	76.1	278	88.3
No Answer					5	7.5	5	1.6
4. Was It An Invasion Of Privacy?								
Yes	40	16.6			16	23.9	56	17.8
No	200	83.0	7	100.0	45	67.2	252	80.0
No Answer	1	.4			6	9.0	7	2.2
5. Would You Take It To Get A Job?								
Yes	232	96.3	6	85.7	60	89.6	298	94.6
No	6	2.5	1	14.3	4	6.0	11	3.5
No Answer	3	1.2			3	4.5	6	1.9
6. Would You Take It As A Routine Test?								
Yes	211	87.6	7	100.0	51	76.1	269	85.4
No	28	11.6			14	20.9	42	13.3
No Answer	2	.8			2	3.0	4	1.3
7. Would You Take It To Find A Thief At Your Company?								
Yes	233	96.7	7	100.0	60	89.6	300	95.2
No	7	2.9			3	4.5	10	3.2
No Answer	1	.4			4	6.0	5	1.6

The effect of knowledge of results on examinee attitudes. The examinee protocols indicated that some examinees were informed of the results of their examination before they were asked to complete the questionnaire, and some were not so informed before completing the questionnaire. For a substantial number of examinees, however, the record did not clearly indicate when the examinee was told the results, if, in fact, he was ever informed about them. Careful review of these three types of cases, however, failed to reveal any systematic differences between cases where there was definite information in respect to examinee feedback and those where such information was lacking.

The relevant data are summarized in Table 3. Knowledge of results, considering only cases where definitive information as to its timing was available, did not affect examinee responses to any significant degree except on Question 3, "Were you offended . . .?" Examinees who were informed of the results of their exam prior to completing the attitude questionnaire were less frequently offended than those not so informed. For employment applicants only, there was also a marginally significant difference between the "informed" and the "uninformed" with respect to the question, "Was it an invasion of privacy?" "Informed" examinees were less likely to feel that their privacy was invaded than "uninformed" Examinees.

These data suggest that informing examinees might contribute overall to somewhat more positive attitudes toward the polygraph interview, but that, given the overwhelmingly favorable response without respect to knowledge of results, the gain in favorable attitudes can only be moderate in extent.

Table 3

Attitudes of Examinees in Relation to Their Knowledge of Results of Their Examinations

Question	Employment Applicants						Special Examinations					
	Told		Not Told		No Information		Told		Not Told		No Information	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
2. Test Unfair?												
Yes	11	16.2	11	15.3	10	9.9	7	16.7	2	11.8	1	12.5
No	57	83.8	60	83.3	91	90.1	35	83.3	14	82.3	4	50.0
No Answer	0	0	1	1.4	0	0	0	0	1	5.9	3	37.5
3. Were You Offended?												
Yes	10	14.7	2	2.8	9	8.9	4	9.5	5	29.4	1	12.5
No	58	85.3	70	97.2	92	91.1	37	88.1	10	58.8	5	62.5
No Answer	0	0	0	0	0	0	1	2.4	2	11.8	2	25.0
4. Was It An Invasion Of Privacy?												
Yes	7	10.3	17	23.6	16	15.9	9	21.4	5	29.4	4	50.0
No	61	89.7	54	75.0	85	84.1	31	73.8	12	70.6	3	37.5
No Answer	0	0	1	1.4	0	0	2	4.8	0	0	6	75.0
5. Would You Take It To Get A Job?												
Yes	66	97.1	70	97.2	96	95.0	39	92.9	15	88.2	1	12.5
No	1	1.5	1	1.4	4	4.0	2	4.8	1	5.9	1	12.5
No Answer	1	1.4	1	1.4	1	1.0	1	2.4	1	5.9	6	75.0
6. Would You Take It As A Routine Test?												
Yes	53	77.9	61	84.7	97	96.0	33	78.6	12	70.6	6	75.0
No	15	22.1	9	12.5	4	4.0	9	21.4	4	23.5	1	12.5
No Answer	0	0	2	2.8	0	0	0	0	1	5.9	1	12.5
7. Would You Take It To Find A Thief At Your Company?												
Yes	68	100.0	69	95.8	96	95.1	39	92.9	15	88.2	6	75.0
No	0	0	2	2.8	5	4.9	2	4.8	1	5.9	1	12.5
No Answer	0	0	1	1.4	0	0	1	2.4	1	5.9	1	12.5

Open-Ended Comments. For each question, provision was made for free comments explaining the respondent's answer if the answer was negative to polygraph screening. Question 1 ("What do you think about this test . . . ") was the only one that solicited positive and negative comments. In all, examinees made 452 comments. These comments were classified as to favorableness to the polygraph (favorable to polygraph, neutral, unfavorable to polygraph) and as to content.

It should be noted that respondents did not comment equally on all questions. Of the 315 examinees who filled out the survey questionnaire, 233 volunteered comments on Question 1,but the rate of commenting fell off rapidly thereafter from 67 comments for Question 2 to 17 comments for Question 5.

The results of this analysis are presented in Table 4. It should be emphasized that for Question 2 through 7 only negative comments were solicited. For Question 1, 54.9 percent of the comments were favorable, 3.0 percent were neutral, and 42.1 percent were negative.

Even for the remaining six questions, although only negative comments were solicited, some positive or neutral comments were made.

Table 4

Distribution of Comments by Question and by Attitude

(Favorable, Neutral, Unfavorable)

Question	Favorable		Neutral		Unfavorable		Total	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent
1	128	54.9	7	3.0	98	42.1	233	100.0
2	4	7.2	8	10.7	55	82.1	67	100.0
3					38	100.0	38	100.0
4	2	8.0			23	92.0	25	100.0
5					17	100.0	17	100.0
6	2	4.1	5	10.2	42	85.7	49	100.0
7	2	8.7	9	39.1	12	52.2	23	100.0

The 452 comments were also classified as to content. The results of this analysis are given in Table 5.

Overall, favorable responses preponderated (54.9 percent of all Question 1 comments). The most frequently offered favorable comment (Question 1) indicated that the test was good, fair, accurate, should be used more often (33.5 percent of respondents). The second most frequent favorable reaction (8.2 percent of respondents) found the test new, interesting, enjoyable. No other favorable comment was given, on the general question, by more than 3+ percent of the respondents.

Neutral responses accounted for only a small proportion of all comments.

The most frequently cited negative comments expressed doubts as to the test's accuracy (13.3 percent on general question), anxiety about taking the test itself (13.7 percent), and complaints about the questions asked (8.6 percent). In the general comments (Question 1), only 3.0 percent offered the comment that the test invaded an individual's privacy, and on Question 4, dealing specifically with invasion of privacy, 36.0 percent complained of invasion of privacy while 44.0 percent expressed scepticism as to the accuracy of the test.

Summary and Conclusions. These data show fairly clearly that it is easy to overestimate the degree of resistance to polygraph examinations by the individuals who are asked to take them. Among relatively naive job applicants, only 16.6 percent felt their privacy was invaded. Over 96 percent are willing to take it to get a job. Effective use of the polygraph may be hampered, however, by the existence of doubts about its accuracy and general test anxiety in the procedure. Wider dissemination of research on the device's reliability and validity would probably help improve the public's perception of what can be achieved by way of a polygraph examination. The survey itself indicated this possibility: a few respondents reported increased confidence in the technique after they took the test, and, for some subgroups of examinees, knowledge of (usually favorable) results led to more favorable attitudes toward the procedure.

Table 5

Thematic Analysis of Comments

Theme Category	1 General No.	1 General Percent	2 Unfair No.	2 Unfair Percent
Positive				
New, Different, Interesting Learning Experience, Enjoyed It	19	8.2		
Good, Fair, Accurate Test, Should Be Used More	78	33.5	4	6.0
Vindication That "I Was Truthful"	9	3.9		
Confidence In Test Increased After Taking It	7	3.0		
Necessary For Job, Good & Useful	7	3.0		
Thorough, Involved	8	3.4		
Did Not Invade Privacy				
TOTAL POSITIVE	128	55.0	4	6.0
Neutral				
No Comment, Don't Know, Neutral	4	1.7		
Need More Data To Answer			5	7.5
Answer Would Depend On Outcome Of Test	3	1.3	3	4.5
Up To Company To Find Offenders				
Take Only If Job Is Worthwhile				
TOTAL NEUTRAL	7	3.0	8	12.0
Negative				
Doubt Test's Accuracy and Tester's Intentions	31	13.3	13	19.4
Fearful, Strange Experience, Fear Of Wrong Accusations, Made Me Nervous	32	13.7	7	10.4
Complaints About Types of Questions, Pain From Straps	20	8.6	30	44.8
Invades Privacy, Too Personal, Humiliating	7	3.0	5	7.5
Inappropriate	5	2.1		
General Dislike	3	1.3		
Realization of Own Dishonesty				
Parents May Find Out				
TOTAL NEGATIVE	98	42.0	55	82.0
GRAND TOTALS	233	100.0	67	100.0

Question									
3 Offensive		4 Invade Privacy		5 Take For Job		6 Routinely		7 Find Thief	
No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
						2	4.1	2	8.7
—	—	2	8.0	—	—	—	—	—	—
		2	8.0			2	4.1	2	8.7
						1	2.0		
								1	4.3
—	—	—	—	5	29.4	4	8.2	8	34.8
				5	29.4	5	10.2	9	39.1
2	5.3	11	44.0	6	35.3	5	10.2	4	17.4
16	42.1			4	23.5				
4	10.5	3	12.0						
13	34.2	9	36.0	2	11.8	22	44.9	8	34.8
						11	22.4		
						4	8.2		
2	5.3								
1	2.6	—	—	—	—	—	—	—	—
38	100.0	23	92.0	12	70.6	42	85.7	12	52.2
38	100.0	25	100.0	17	100.0	49	100.0	23	100.0

Attorneys and Behavioral Scientists. Defense and prosecuting attorneys may use the polygraph in their work. Behavioral scientists, especially psychologists and sociological criminologists, have long had an interest in the field of detection of deception. The polygraph is, in fact, a psychological measuring instrument, and the rationale behind its use is founded upon well-established principles of physiological psychology relating vascular and autonomic changes in the body, and to emotional experiences. Attorneys as principal users of the polygraph in the court system, and behavioral scientists who have done much of the basic research are, therefore, two groups whose opinions about the polygraph are critical to its acceptance.

A nation-wide sample of almost 5700 individuals, representing the four main subgroups indicated above, were sent survey questionnaires. Both questionnaires included items about use of the polygraph in the legal process. Only the questionnaire sent to psychologists and sociologists included items about use of the polygraph for employment purposes. In all, 1686 individuals, just under 30 percent of the sample surveyed responded.

Table 6

Distribution of Sample Surveyed and Responding

Group	Surveyed		Responded		Response Rate
	No.	Pct.	No.	Pct.	
Defense Attorneys[1]	2210	38.9	703	41.7	31.8
Prosecuting Attorneys[2]	1502	26.5	317	18.8	21.1
Other Attorneys[3]	-	-	70	4.2	-
Psychologists[4]	1486	26.2	429	25.4	31.5
Sociologists[5]	481	8.4	104	6.2	26.4
Other Behavioral Scientists[6]	-	-	63	3.7	-
TOTAL	5679	100.0	1686	100.0	29.7

[1]National Association of Defense Lawyers

[2]National District Attorneys Association

[3]Seventy attorneys, members of either NADL or NDAA, were not in either defense or prosecuting practice

[4]American Psychological Association, Divisions of Industrial (14) and Military (19) Psychology

[5]American Sociological Association, Criminology Division

[6]Sixty-three behavioral scientists, members of APA or ASA, now practicing in other fields

To provide a basis for estimating the degree to which a respondent's answers were anchored in experience, all respondents were asked what use they had made of the polygraph. The data are summarized in Table 7. About 40 percent of prosecuting attorneys and 48 percent of defense attorneys, have had experience with the polygraph. Many fewer behavioral scientists (23 percent of the psychologists and 12 percent of the sociologists) had used the polygraph, and just over 14 percent are now doing or have done research on the polygraph.

Table 7

Use of Polygraph by Attorneys Classified

By Present Practice,

And by Behavioral Scientists

A. Attorneys

Experience with polygraph?	Present Practice					
	Prosecutor		Defense		Other	
	No.	Pct.	No.	Pct.	No.	Pct.
Yes	284	40.4	153	48.3	33	47.1
No	419	59.6	164	51.7	37	52.9
TOTAL	703	100.0	317	100.0	70	100.0

B. Behavioral Scientists

Use Polygraph?	Psychology		Sociology		Other		Total	
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
No	328	76.5	92	88.5	45	71.4	465	78.0
Use Now	5	1.2	0	0	2	3.2	7	1.2
Have Used	96	22.3	12	11.5	16	25.4	124	20.8
TOTAL	429	100.0	104	100.0	63	100.0	596	100.0
Do Studies?								
No	367	85.5	90	86.5	54	85.7	511	85.7
Am Doing	2	.5	0	0	1	1.6	3	.5
Have Done	60	14.0	14	13.5	8	12.7	82	13.8
TOTAL	429	100.0	104	100.0	63	100.0	596	100.0

Attitudes of Behavioral Scientists and Attorneys Toward Use of the Polygraph in Criminal Cases. Respondents to the survey were asked to react to statements of five issues on a scale from "Strongly Agree" to "Strongly Disagree." The "Agree" end of the scale was always favorable to the polygraph.

The six statements were:

1. Polygraph results should be admissible as evidence in criminal cases where there is a prior stipulation agreed to by both sides.

2. Polygraph results should be generally admissible as evidence in certain exceptional cases, even over the objection of opposing counsel.

3. Polygraph test results should be generally admissible as evidence even over the objection of opposing counsel.

4. The polygraph technique should be used as an investigative aid in criminal cases.

5. I favor state licensing of polygraph examiners.

Both defense and prosecuting attorneys (and particularly the latter) are somewhat more approving of the polygraph than are either psychologists or sociologists. The general trend is about the same for all four groups, however: a strong concensus favoring the admissibility of the instrument on prior stipulation, approval of the instrument as an investigative aid, and strong support for licensing examiners.

Only a minority (but as high as 42 percent in the case of prosecuting attorneys) agree that the polygraph should be admitted in evidence over objection, even in exceptional cases.

Table 8

Summary of Attitudes of Behavioral Scientists and Attorneys Toward Five Issues Relating to the Use of the Polygraph in Criminal Proceedings: Precent Who "Strongly Agree" or "Agree"

	Behavioral Scientists			Attorneys		
	Psychologists	Sociologists	Other	Prosecutors	Defense	Other
Polygraph Should Be Admissible On Prior Stipulation	69.3	59.6	68.3	82.1	71.9	77.1
Polygraph Should Be Admissible In Exceptional Cases, Even Over Objection	38.2	23.1	35.0	42.2	29.8	25.7
Polygraph Should Be Generally Admissible, Even Over Objection	27.9	13.4	25.3	31.6	10.7	13.7
Polygraph Should Be Used As Investigative Aid In Criminal Cases	76.4	58.7	84.2	95.6	75.1	88.5
Favor State Licensing Of Polygraph Examiners	82.7	75.9	81.0	90.8	88.0	85.7

In spite of these indications of the acceptability of the polygraph, its reputation as an investigative aid is high only among prosecuting attorneys, 60 percent of whom say it is almost always or usually of great value. Only 39 percent of defense attorneys, 20 percent of psychologists, and 16 percent of sociologists think it has "great value."

Attorneys were asked for their estimates of the batting average of polygraph examinations: "Out of a series of 100 cases, in how many do you believe the examiner would correctly determine guilt or innocence?" The median estimate (half were higher, half lower) was 81 cases for prosecutors and 79 cases for defense attorneys. The range was large, however, from a low estimate of less than 10 right out of 100, to a high estimate of 100 right out of 100 (2.5 percent of all responding attorneys shared this estimate. It should be noted that the 80 out of 100 hit rate is below that actually observed in the studies of the validity of the polygraph when well-trained examiners are used.*

Attitudes of Behavioral Scientists Toward Use of the Polygraph for Employment Screening. The polygraph has become widely used by employers to screen out potentially-dishonest workers. Both psychologists and sociologists (87 percent of each) oppose use of the polygraph routinely, 57 percent of the psychologists and 69 percent of the sociologists disapprove its use "for jobs requiring trust." Even for clearance for security jobs, only 39 percent of the psychologists, 27 percent of the sociologists give a positive endorsement. Furthermore, there is strong disapproval among behavioral scientists of the practice of requiring employees to take a polygraph test or face dismissal, if a theft or loss is discovered. Only between 6 and 8 percent of behavioral scientists approve the practice. About 80 percent disapprove, and the balance are undecided. This attitude is probably grounded in the strongly-held belief that no one should be required to testify against himself.

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*See Accuracy and Consistency of Examiner's Opinion in Polygraph (Lie Detector) Test - F. L. Hunter and P. Ash. (In Press.)

Table 9

Attitudes of Attorneys and Behavioral Scientists to the Question:
"Overall How Would You Rate the Polygraph as an Investigative Aid?"

	Behavioral Scientists						Attorneys					
	Psychologists		Sociologists		Other		Prosecutors		Defense		Other	
Rating	No.	Pct.	No.	Pcts.	No.	Pcts.	No.	Pct.	No.	Pct.	No.	Pct.
Almost Always of Great Value	8	1.9	1	1.0	1	1.6	122	17.4	26	8.2	5	7.1
Usually of Great Value	77	17.9	16	15.4	12	19.0	297	42.2	94	29.7	28	40.0
Sometimes of Value	301	70.2	68	65.4	45	71.4	266	37.8	157	49.5	32	45.7
Usually of Little Value	38	8.9	12	11.5	5	7.9	17	2.4	31	9.8	3	4.3
Never of Any Value	5	1.2	7	6.7	0	0	1	0.1	9	2.8	2	2.9
TOTAL	429	100.0	104	100.0	63	100.0	703	100.0	317	100.0	70	100.0

Table 10

Attitudes of Behavioral Scientists Toward the Use of Polygraph in Preemployment Screening, by Profession

	% of Psychologists (N=256)			% of Sociologists (N=103)			%of Others (N=118)		
Attitude	Use Routine	Use For Jobs Requiring Trust	Use For Security Jobs	Use Routine	Use For Jobs Requiring Trust	Use For Security Jobs	Use Routine	Use For Jobs Requiring Trust	Use For Security Jobs
Strongly Agree	0.5	2.6	9.6	1.0	1.0	7.7	3.2	4.8	11.1
Agree	3.5	21.2	29.1	3.8	18.3	19.2	4.8	19.0	30.2
Undecided	9.3	19.1	20.7	8.7	11.5	14.4	9.5	19.0	17.5
Disagree	26.1	25.9	17.0	26.0	28.8	21.2	27.0	25.4	12.7
Strongly Disagree	60.6	31.2	24.2	60.6	40.4	37.5	55.6	31.7	28.6

Table 11

Attitudes of Behavioral Scientists Toward The Issue:
"If a Theft or Loss is Discovered
All Employees Should be Polygraphed or Face Dismissal"

Attitudes	Psychologists (N=256) Percent	Sociologists (N=103) Percent	Other (N=118) Percent
Strongly Agree	2.3	0	1.6
Agree	6.8	6.7	4.8
Undecided	13.3	6.7	14.3
Disagree	21.7	29.8	34.9
Strongly Disagree	55.9	56.7	44.4

In summary, attorneys believe that the polygraph is a useful investigative aid, but that its use in court proceedings should be limited to those cases where there is prior stipulation. They have a fairly high opinion of the validity of the procedure, but it falls short of actually measured validity.

Behavioral scientists have somewhat less positive attitudes than attorneys, but seem to be in agreement with respect to the use of the polygraph in investigations and in court. They strongly disapprove of most employment uses of the polygraph.

Polygraph Examiners. A national sample of 193 polygraph examiners were queried as to their attitudes toward polygraph use. A summary of their responses (Table 12) shows that their attitudes are not too different from those of attorneys: admit the polygraph to court proceedings only upon prior stipulation, use is as an investigative aid. Examiners do differ markedly from behavioral scientists, however, in their overwhelming endorsement of the polygraph for routine employee screening.

The attitude surveys reported here offer the polygraph profession an opportunity and a challenge. The opportunity exists because of the wide-spread acceptance of the instrument - surprisingly high especially among examinees themselves. The challenge is to conduct and disseminate the results of research to reduce misunderstanding of the procedures validity, reliability, and social usefulness.

Table 12

Attitudes of 193 Polygraph Examiners

to Polygraph Use

	Yes	No	Qualified	No Answer
Is Routine Employee Testing Useful?	168 87.0%	26 13.5%	- -	9 4.7%
Should The Polygraph Be Admitted Into Evidence Without Reservation?	32 16.6%	160 82.9%	- -	1 0.5%
Should The Polygraph Be Admitted By Stipulation?	178 92.2%	0 4.7%	- -	6 3.1%
Should The Polygraph Be Used Only As An Investigative Aid?	8 4.1%	90 46.6%	92 47.7%	3 1.6%

POLYGRAPH EVALUATION SURVEY

UICC DEPARTMENT OF PSYCHOLOGY
LABORATORY FOR ORGANIZATIONAL AND OCCUPATIONAL RESEARCH

AMERICAN POLYGRAPH ASSOCIATION

Legal research is essential if we are to advance the science of criminal justice. To this end, we are undertaking a study of attitudes of members of the legal profession towards use of the polygraph ("lie detector"). Your cooperation is earnestly requested to help us evaluate the polygraph for its contribution to the criminal justice process, and limitations which should apply to its use. We would appreciate it if you would respond to the few short statements set forth below, and return this self-mailing questionnaire. Thank you very much.

Philip Ash, Ph.D., Director
Laboratory for Occupational and
Organizational Research

1. Polygraph results should be admissible as evidence in criminal cases where there is a prior stipulation agreed to by both sides.
   ( ) Strongly agree ( ) Agree ( ) Undecided ( ) Disagree ( ) Strongly disagree
2. Polygraph test results should be generally admissible as evidence in certain exceptional cases, even over the objection of opposing counsel.
   ( ) Strongly agree ( ) Agree ( ) Undecided ( ) Disagree ( ) Strongly disagree
3. Polygraph test results should be generally admissible as evidence even over the objection of opposing counsel.
   ( ) Strongly agree ( ) Agree ( ) Undecided ( ) Disagree ( ) Strongly disagree
4. The polygraph technique should be used as an investigative aid in criminal cases.
   ( ) Strongly agree ( ) Agree ( ) Undecided ( ) Disagree ( ) Strongly disagree
5. I favor state licensing of Polygraph Examiners.
   ( ) Strongly agree ( ) Agree ( ) Undecided ( ) Disagree ( ) Strongly disagree
6. Overall, how would you rate the Polygraph as an investigative aid?
   ( ) Almost always of great value ( ) Usually of great value ( ) Sometimes of value ( ) Usually of little value ( ) Never of any value
7. How accurate do you believe polygraph test results are? Out of a series of 100 cases, in how many (from 0 to 100) do you believe the examiner would correctly determine the guilt or innocence of the examinee, or, the truth or falsity of his statements?
   Enter your estimate; a number from 0 to 100:_____
8. My present legal practice is; ( ) Prosecutor ( ) Defense ( ) Other_____
9. Approximately how long have you engaged in this practice?; For_____years.
10. If you have practiced in an area different from your present practice, what was your previous practice?; ( ) No change ( ) Prosecutor ( ) Defense ( ) Other_____
11. Approximately how long did you engage in this practice?; For_____years.
12. In what year were you admitted to practice? (Enter last two digits of year.) 19_____
13. In defense practice, if you engage(d) in it, have you ever had a client Polygraphed?
    ( ) No ( ) Yes; 14. If Yes, about how many such clients? (Enter number of cases):_____
15. In prosecutor practice, have you ever suggested that a suspect or defendant be Polygraphed?
    ( ) No ( ) Yes; 16. If Yes, about how many such cases? (Enter number of cases):_____
17. Have you ever had any professional experience with the Polygraph?; ( ) Yes ( ) No.

FORM L

POLYGRAPH EVALUATION SURVEY

UICC DEPARTMENT OF PSYCHOLOGY
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AMERICAN POLYGRAPH ASSOCIATION

Legal research is essential if we are to advance the science of criminal justice. To this end, we are undertaking a study of attitudes of Behavioral Scientest towards use of the polygraph ("lie detector"). Your cooperation is earnestly requested to help us evaluate the polygraph for its contribution to the criminal justice process, and limitations which should apply to its use. We would appreciate it if you would respond to the few short statements set forth below, and return this self-mailing questionnaire. Thank you very much.

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   ( ) Strongly agree ( ) Agree ( ) Undecided ( ) Disagree ( ) Strongly disagree
4. The polygraph technique should be used as an investigative aid in criminal cases.
   ( ) Strongly agree ( ) Agree ( ) Undecided ( ) Disagree ( ) Strongly disagree
5. I favor state licensing of Polygraph Examiners.
   ( ) Strongly agree ( ) Agree ( ) Undecided ( ) Disagree ( ) Strongly disagree
6. Overall, how would you rate the Polygraph as an investigative aid?
   ( ) Almost always of great value ( ) Usually of great value ( ) Sometimes of value ( ) Usually of little value ( ) Never of any value
7. In my opinion the polygraph should be used in pre-employment screening to evaluate applicant honesty.
   a. Routinely for all applicants
   ( ) Strongly agree ( ) Agree ( ) Undecided ( ) Disagree ( ) Strongly disagree
   b. For applicants for positions involving some measure of trust and risk of loss (e.g., guards, bank tellers, cashiers, route salesmen)
   ( ) Strongly agree ( ) Agree ( ) Undecided ( ) Disagree ( ) Strongly disagree
   c. For applicants for positions involving a high degree of trust and security (e.g., armored truck drivers, police, jobs involving the national security)
   ( ) Strongly agree ( ) Agree ( ) Undecided ( ) Disagree ( ) Strongly disagree
8. If a theft or loss is discovered all employees should be polygraphed, or face dismissal.
   ( ) Strongly agree ( ) Agree ( ) Undecided ( ) Disagree ( ) Strongly disagree
9. What is the major field within which you work primarily?
   ( ) Psychology ( ) Sociology ( ) Other_____
10. Where are you principally employed? ( ) Educational instituiton ( ) Government other than education
    ( ) Business or industry ( ) Consulting or self-employed ( ) Other_____
11. Do you now use, or have you ever used, the polygraph ("lie detector") in your own work in any way? ( ) No ( ) Use now ( ) Have used
12. Are you now doing, or have you done, any studies of the polygraph ("lie detector")?
    ( ) No ( ) Am doing ( ) Have done
13. On the basis of your studies, reading, and your own research, if any, how well informed would you say your are about the polygraph?
    ( ) I am an expert ( ) Well informed professionally ( ) Better informed than most laymen ( ) About as well informed as most laymen ( ) Don't know much about it
14. To which of the following organizations do you belong? ( ) American Psychological Assn ( ) American Sociological Assn ( ) American Polygraph Assn ( ) American Psychology-Law Society ( ) International Academy of Forensic Psychology

CALIBRATION OF POLYGRAPH INSTRUMENTS

By

W. A. Van De Werken

The polygraph historically has been a scientific instrument used as an aid in many fields of psychological and physiological research; some instrumentation containing as many as 12 recording channels has been used by the scientific community. We find that in the polygraph field many of these physiological recording sections are completely compatible with the polygraph technique and therefore are being utilized today. Standard instrumentation for a polygraph examination used for truth verification or lie detection may contain as many as 6 recording channels. This instrumentation usually provides for the recordation of single or dual respiration patterns, blood pressure recordings, galvanic skin responses, muscle tension and movement and variations or combinations of the above mentioned areas.

Even with today's degree of sophistication of instrumentation it is necessary to place attachments or detachable accessories upon the body of the person to be tested in order to record the physiological changes in which we are interested. These attachments act as receivers to detect the changes then conduct the impulses either electronically or pneumatically to the instrument which then converts the incoming signal to a usable output and ultimately to a permanent recording on a paper chart. Instruments are presently being manufactured so that a given input results in a given output of signal on the chart, and it is this information which makes it possible for the polygraph examiner to periodically check his instrument for conformance to the manufacturers specifications of sensitivity. This article has a dual purpose. The first being to explain sensitivity standards with the procedures to be followed in verifying conformance to the standards, and secondly, to discuss troubleshooting the instrument to locate any possible malfunctioning which may exist in the recording sections. Since in many cases the preparatory action to be taken is identical in either case we shall attempt to discuss the dual role concurrently.

The Chart Drive or Kymograph

This section is the chart transporting mechanism which is responsible for transporting the recording chart at a constant and uniform rate of speed under the pens. The majority of polygraph instruments in use today employ a chart drive mechanism working at a constant 6 inches per minute. Some, however, use metric speeds. Most are using a synchronous driven motor on a direct drive basis or with a step up gear arrangement which causes the chart to be propelled at the specified rate of speed. Checking the speed of the chart drive is important since the frequency of signals in some sections may be indicative of deception if the rate is considered as extremely excessive or extremely slow.

To check the speed of the chart drive it is recommended first of all the chart be in a stopped position. The examiner should at this time place a mark using a fixed reference point on the chart drive assembly (the cutter bar area is a convenient area to use). After placing the mark on the chart the examiner should while observing the second hand of a watch or stop watch, turn on the switch of the chart drive mechanism, which will cause the synchronous motor to be activated. In observing the second hand for a period of 60 seconds of time, the examiner should also see whether the chart is moving properly without binding. After 1 minute of time, the examiner should turn off the switch of the chart drive, and place another mark on the chart using the same reference point that he first used in marking the chart. The distance between the two marks on the chart should be 6 inches. If a 60 cycle synchronous motor is used with a 50 cycle current, the speed of the chart drive will then be 5 inches per minute rather than the 6 inches per minute. No physical damage is caused by 50 cycle current, but this is not true if the instrument is used on a 220 volt power source rather than a 110 power source. Of course, some motors are designed and manufactured for 220 volts.

Pneumographic Section (Respiration)

The pneumographic section which records changes in the respiration frequency and depth, operates on a slight vacuum or slight pressure depending upon the degree of extension or compression of the pneumographic test tube

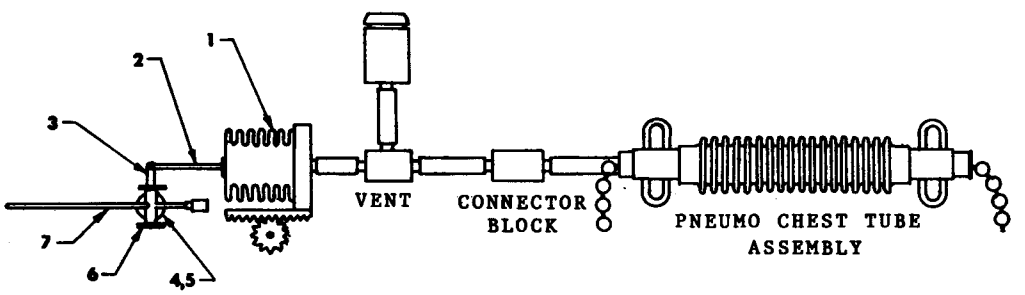
assembly. Note that inhalation by the person being tested will cause the pen to rise (from the creation of a vacuum) and that exhalation of the person being tested causes the pen to descend (from low pressure increase in the system).

The general specifications of the manufacturers indicate that the sensitivity of the pneumographic section is such that a ¼ inch extension (creation of a vacuum) should cause the Pneumographic Pen, when properly balanced, to cause an inked arc on the chart in an upward direction for a measured distance of 3/4 of one inch. Instruction manuals give more lattitude, suggesting the excursion should be between 3/4 and 1 inch. This is explained by the manufacturers as being a compromise since it is virtually impossible for an examiner to accurately determine ¼ inch consistantly, since the graduations on the standard ruler have width which can cause a slight misreading of the ¼ inch. Manufacturers used cam acuated bellows which move the ¼ inch precisely. The same cam acuation is used in checking the cardio which will be explained later.

A review of the pneumograph diagram will indicate that the pneumograph system is completely closed and can be considered to be operating with a flexible bellows on either end of the system. The pneumographic chart tube assembly is a bellows on one end, and the tambour bellows is on the other, actuating a mechanical connecting link art which in turn causes a clockwise or counterclockwise position movement of the pen, causing the inked arc to be placed on the chart.

PNEUMOGRAPHIC COMPONENTS

(A TYPICAL TRAIN OF ENERGY)



TAMBOUR ASSEMBLY CONSISTING OF;

1. BELLOWS
2. CONNECTING LINK ARM
3. CONNECTING PIN
4. PIVOT SHAFT
5. JEWELLED BEARINGS
6. PEN FORKS
7. PEN

Calibration Procedure

The following procedure will allow the examiner to calibrate the pneumographic section. Connect the chest tube assembly to the instrument. Place the pneumograph chest assembly connecting hose on the connector of the instrument, close the vent, and center the pen (it is recommended that the pen be balanced to accurately determine the sensitivity). Place the pneumograph chest tube on a ruler and while holding one end of the tube in a fixed position extend the other end of the tube ½ of 1 inch. This should cause a 3/4 inch upward excursion of the Pneumo pen.

Next check to ascertain whether or not a leak exists in the system. With a closed system and with the pen centered as previously described (with proper pen balance) hold one end of the pneumograph chest tube assembly in a fixed position and then extend the free end approximately ½ inch so that there is an upward excursion of the pen. Once the Pneumo Tube has been stretched, hold down the previously free end and observe the action of the pen. If the system is intact the pen will stabilize and hold a fixed position. If a leak exists in the system the pen will descend toward the bottom pen stop or the bottom margin of the pneumograph excursion area.

Cardio-Sphygmograph Section (Blood Pressure)

The Cardiographic component records relative blood pressure changes, as well as pulse rate and pulse pressure by means of a cuff wrapped around the arm or wrist and connected pneumatically to a recording bellows in the cardiographic component.

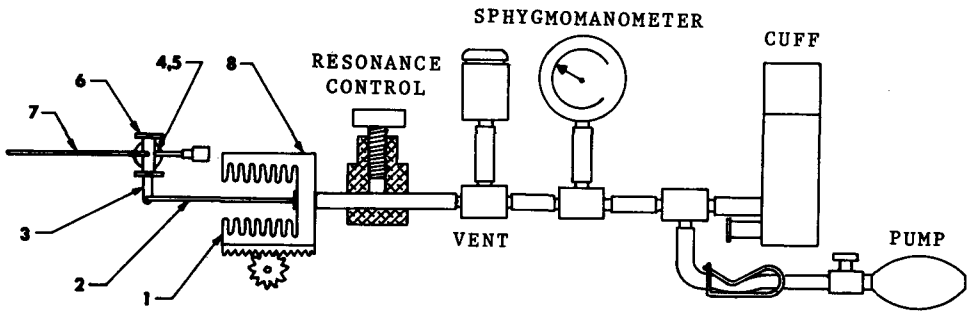
The cuff, when inflated to a suitable air pressure, will detect impulses and transmit them through connecting tubes, past the pressure indicating gauge (Aneroid Sphygmomanometer), to a very sensitive bellows and its connected lever system, which moves the pen. The pen records changes in blood pressure, pulse rate and pulse pressure on the chart.

The sensitivity of the cardiosphygmograph section is such that with a pressurized system of 90 millimeters, a 2 millimeter pressure change will cause the pen to scribe

an inked arc on the chart for a measured distance of 3/4 of 1 inch. As previously stated the manufacturers allow a sensitivity variation in a field test of between 3/4 and 1 inch since it is difficult for an examiner to accurately determine a 2 millameter change from the graduations on the sphygmomanometer. In a factory check the manufacturers use a cam actuated bellows which will consistantly cause a precise 2 millimeter change.

A review of the cardio diagram will disclose that the cardiographic component is a completely closed system containing a pump bulb assembly and occluding arm cuff at one end of the system, and then through connecting tubing terminates at a closed bellows identified as the tambour assembly. The intermediate system includes a sphygmomanometer, a vent valve and a resonance control. With a pressurized system, any pressure changes at the arm cuff is directly reflected by a corresponding action in the tambour assembly, and in the movement of the pen.

CARDIOGRAPHIC COMPONENTS
(A TYPICAL TRAIN OF ENERGY)



TAMBOUR ASSEMBLY CONSISTING OF;

1. BELLOWS
2. CONNECTING LINK ARM
3. CONNECTING PIN
4. PIVOT SHAFT
5. JEWELLED BEARINGS
6. PEN FORKS
7. PEN
8. AIRTIGHT CANNISTER

In order to calibrate the cardiosphygmograph section it is recommended that the following procedure be followed. The examiner should wrap the cuff around an inflexible object such as the leg of a table or a cylindrical object (such as a coffee can), close the vent, pressurize the system to 100 millameters of pressure and then massage the cuff to remove any trapped air bubbles in the wrapping. If there has been a significant drop in the sphygmomanometer pressure then the examiner should again pressurize the instrument to 90 millameters. At this moment the examiner should center the pen, making sure that the resonance control is open (if one is present in the instrument). Now the examiner should observe the inked tracing and note whether or not there appears to be any loss of pressure in the system, indicated by a tracing which drops towards the bottom of the chart. Be certain that this drop cannot be attributed to the fact that the cuff has not yet properly settled.

After determining that the system is fully activated and that no leak exists in the system, all that is necessary to establish the conformance to factory sensitivity standards is simply to press on the arm cuff so that there is an indicated pressure change on the sphygmomenometer dial of 2 millimeters of pressure. This should cause an upward movement of the pen of 3/4 of 1 inch. Since it is extremely difficult to accurately determine 2 millimeters, the preceeding test should be done three times, and an average of the tracings obtained. Pen balance is critical and can adversely affect the quality and amplitude of the tracing. Therefore it is strongly recommended that the pen be balanced properly for testing and field use.

Air Tightness of the Cardio System

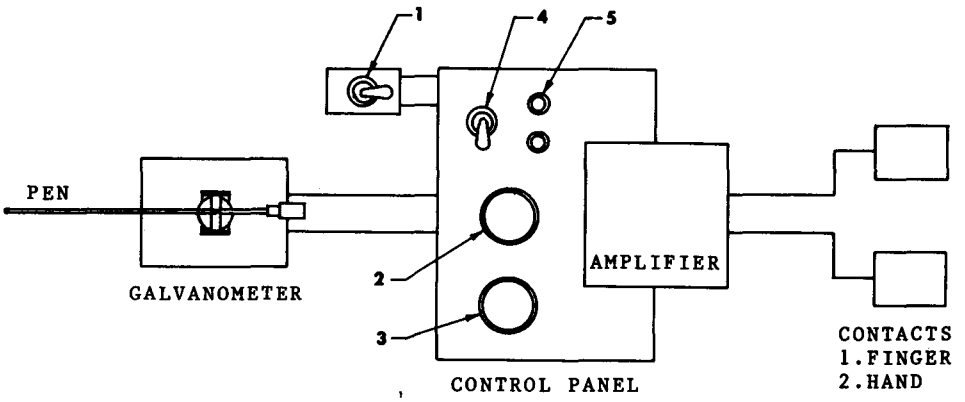
Checking for the air tightness of the cardio system can be performed at this time since the instrument has been properly pressurized with the cuff wrapped around the inflexible object, and the pen centered. If the ink tracing moves towards the bottom of the chart this is indicative of a pressure loss within the system. Manufacturers specify that a leak is too great if, when pressurized to 90 millimeters, the pen falls more than ¼ inch inl0 minutes. To locate the leak, start the

elimination at the readily accessible attachments and then work into the inner portion of the instrument. It is recommended that first the arm cuff tubing (which is attached to the connector) be pinched off at the connector itself. Observe the tracing and if the pen stops falling it indicates that the leak is in the cuff or in the connecting tubing. If this step did not correct the problem it is recommended that the hose leading to the pump bulb (and connecting to the connecting block) be pinched off at the connector block. Again observe the tracing and if the pen stops falling it is an indication that the trouble spot is in the pump bulb assembly. If this does not correct the leak it is recommended that the component section itself be exposed and the connecting tubing within the system be pinched off in a progressive manner, starting with the tambour assembly to ascertain that the tambour is alright, then moving back through the various components and pinching off the rubber tubing leading to the sphygmomanometer dial, the vent valve, and the resonance control The examiner should be able to locate the trouble spot, remove the rubber tubing and replace it. In some instances it is necessary to replace the vent or the vent seats. If the trouble was in the rubber tubing leading from the connector to the pump bulb or arm cuff we have found that merely cutting off the first 1 inch of rubber tubing at each end is often adequate, since most rot starts at the connections.

Galvanograph Section (Skin Resistance)

The function of the galvanograph section is to detect changes in electrical skin resistance. The first component is the finger or hand contacts, which pick up the changes in the signal received from the person. The next component is the amplifier which takes the weak signal from the hand electrode and boosts the power so that it can actuate the galvanometer pen into motion on the chart. After the signal is properly conditioned and processed it is transmitted to the pen where it is converted from an electrical signal to a mechanical movement. A review of the galvanograph diagram will illustrate the transmission of the signal from finger electrode to pen motor.

GALVANOGRAPH SECTION
(BLOCK DIAGRAM)



CONTROL PANEL ASSEMBLY CONSISTING OF;

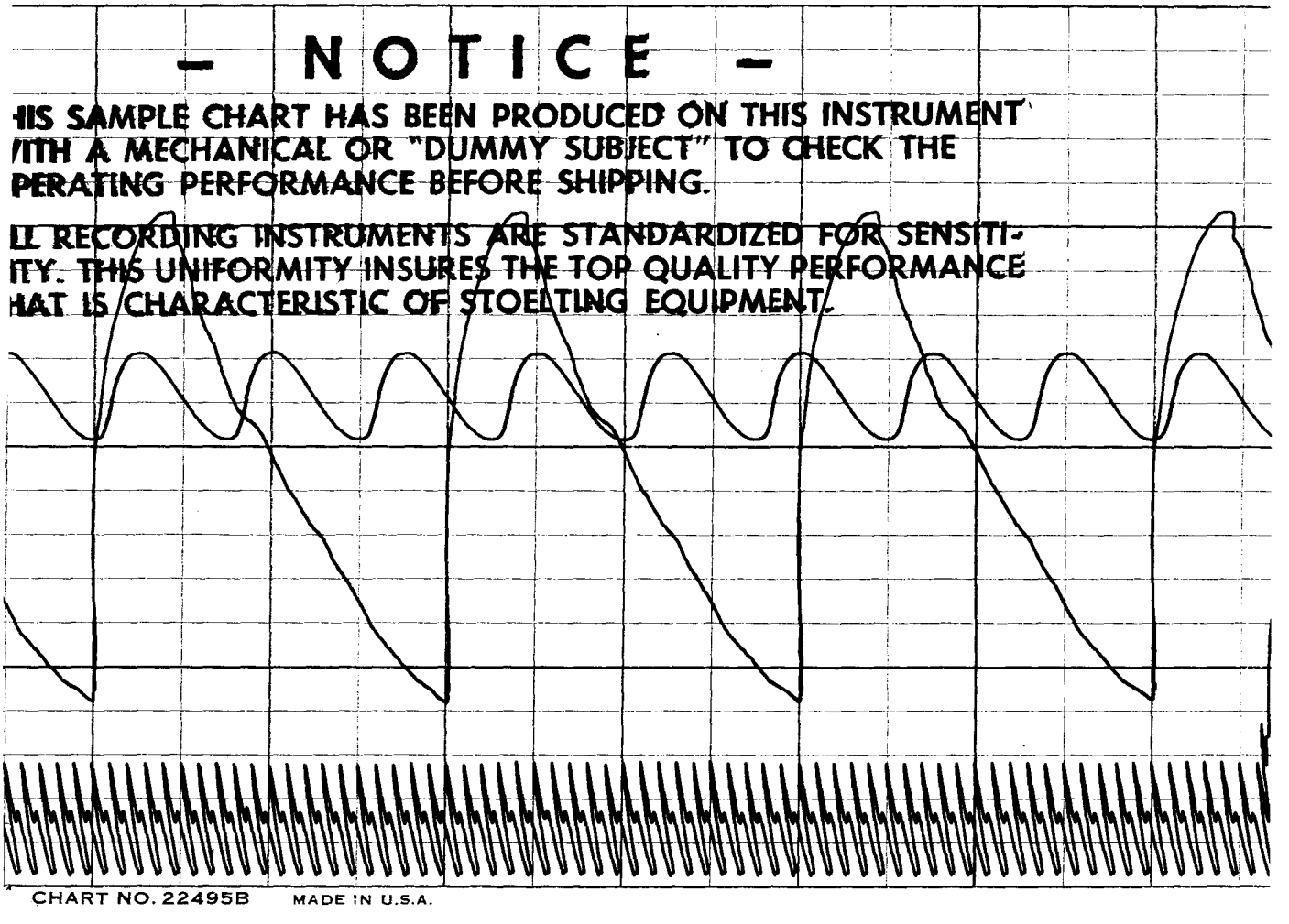
1. ON/OFF SWITCH
2. CENTERING CONTROL
3. SENSITIVITY
4. MANUAL / SELF CENTER
5. 1K,5K CALIBRATION PIP SWITCH

The manufacturers recommended sensitivity for Stoelting instruments is that with the pen centered and the sensitivity control set at number 25 on the scale, use of the 1K (1000) ohms pipswitch should cause a rise on the chart of ½ inch. When the sensitivity control is adjusted to full sensitivity, or number 100 on the scale, and the 1K pipswitch is depressed, the pen should rise 1 inch on the chart.

In order to verify sensitivity in a Stoelting instrument, using the figures stated, it is necessary to remove the finger electrode cord completely from the finger electrode receptacle on the instrument. At this time the plug will be shorted out and allow for the pen centering using an internal resistance within the system. Once the pen is centered, after the sensitivity control has been set to number 25, the examiner should depress the 1K pipswitch, and the pen should cause an inked tracing of ½ inch deflection. The sensitivity should then be advanced to #100 and the 1K pipswitch again depressed, and at this time there should be a 1 inch tracing deflection. Based on experience the Galvo section is usually a "go or no-go" situation. If the sensitivity does not conform to manufacturers specifications it is recommended that the section be returned to the manufacturer for re-adjustment and re-allignment.

To determine a specific failure in the GSR system, start with the fuse located next to the connector on the instrument. If the fuse is open, the galvanometer will not work. If the fuse is open or defective the chart drive mechanism will not work either. It is a good procedure that in all cases of GSR malfunction to check the fuse before involving yourself in a total exploratory breakdown of the instrument. A failure of the finger electrodes can be determined by a continuity check with an ohm meter or similar device, while applying stress along the cord, especially in the area of the fingertips and connector. The finger electrodes naturally are checked independent of the instrument. Next check the amplifier, control panel, and galvanometer with the power switch in the ON position, the finger electrodes disconnected from the instrument, with the sensitivity set at approximately #25, attempt to center the pen using the centering control knob on the control panel of the instrument. If the pen moves, this is an indication of a "working system" in the Galvanometer. It indicates that if there has been a lack of response noted on the chart the trouble spot is probably the finger electrode. If movement occurs, we should then follow the procedure in checking sensitivity previously outlined. If the deflection of the Galvo pen is less than previously stated, the amplifier should then be returned to the manufacturer for re-alignment. If there is no movement in the pen we are confronted with the situation of a fault in either the amplifier control panel or in the galvanometer. To isolate the problem we should now remove the galvanometer from the instrument and use an ohm meter to decide whether there is an "open" or "shorted" condition existing in the coil. In the newer Stoelting instruments there is in addition to the galvanometer itself, a printed circuit board containing two capacitors, having 5 leads terminating on the board. A continuity check should be made between the first and second lead or termination and the fourth and fifth. This will disclose whether or not a shorted or open condition exists. In the event that an ohm meter is not available a check for operation of the Galvo pen motor can be done using a 9-volt transistor radio battery. Placing one lead from each of the contacts points on the battery to the first and second termination, and then on the fourth and fifth termination on the printed circuit board will cause a deflection of the pen in one direction or another. If this occurs then the galvanometer is satisfactory and any failure that may exist in the system is in the control

panel and amplifier. If the trouble is in the amplifier it can be repaired locally by a knowledgeable radio technician, or it can be returned to the factory.



PROBLEMS IN INTERPRETING POLYGRAPH EXAMINATIONS OF MALINGERERS

By

Stanley Abrams, Ph.D.

Abstract

The examination of suspected malingerers by the polygraph poses several problems. True malingerers should be readily identified by the deceptive responses in the chart tracings. Subjects who suffer from conversion reactions to traumatic experiences do not consciously know that their injuries do not have an organic basis. Polygraph tracings of these subjects should be carefully examined for evidence of deception because unconscious awareness of psychosomatic disorders can tend to override the subjects' conscious oral responses in the chart tracings.

When physical trauma occurs, there is not only the obvious organic injury, but also there is the possibility of emotional complications by the shock of the trauma itself, or it may be a response to the injuries sustained. In addition, there may be the development and persistence of apparent physical symptoms because of certain secondary or tangential factors. That is, the symptomatology may grow out of the gratification of certain psychic needs, such as sympathy, attention, control of others or through some external gain, such as financial compensation. When symptoms occur or persist because of psychological factors, the individual is diagnosed as having a conversion reaction. In this diagnostic category the emotions, such as fear or tension, are manifested in physical symptoms, such as pain, or somatic (bodily) complaints, such as paralysis or blindness without conscious awareness that there handicaps are not real. In other words, there is a conversion of this psychological state to a physical symptom. Although this symptom stems from the unconscious, it is just as real and factual to the subject as it would be, if he had a genuine organic problem.

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The legal viewpoint throughout the United States is that financial compensation is justifiable when an injury is sustained, regardless of whether or not the symptoms have an organic or functional (psychological) origin. When an injury occurs a physician can generally determine the extent of the physical injury and the degree of impairment. If, however, the symptoms that exist appear to stem from something other than an organic problem, the patient is frequently referred to a psychologist or psychiatrist. An attempt is then made to determine whether or not a conversion reaction exists, or if the individual is malingering.

A malingerer is one who consciously feigns an illness or an inability to function in a certain manner for some self-serving purpose. His symptoms are a conscious attempt to deceive, which is in contrast to the person with a conversion reaction whose symptoms grow out of unconscious factors. Differentiating between these two diagnostic categories is difficult and highly effective psychological approaches for accomplishing this are not available.

Because of this diagnostic problem and its importance to insurance carriers and the civil courts, it would be expected that the polygraph technique would have been used extensively in this area. This, however, appears not to be the case, for there is no report in the literature of the polygraph being employed in this manner.

Examining a subject with the polygraph to determine if he is a malingerer is not as simple and clear-cut as it might at first appear. The malingerer, who is consciously and deliberately trying to deceive, knows that he is being deceptive and would consequently manifest significant emotional responses within his own limits, as would any lying subject. This is not so with the conversion reaction subject. Even though his answers may not be truthful, he consciously believes them to be, and this would tend to cause his responses to indicate truth. However, since in his unconscious there is an awareness that deception is involved, this would tend to override the conscious tendency toward truthfulness with a resultant general trend toward an indication of deception in the subject's chart pattern. The ultimate results is that there may be evidence of deception, even though the

subject feels that he is being truthful.

This inevitably raises the old question: Can the polygraph measure unconscious as well as conscious processes? While the literature has generally favored the negative, there are studies reported which contradict this. Weinstein, et al (1) employed hypnosis to create an amnesia in subjects for having committed a mock crime and achieved partial success in distorting the polygraph results. Since this was only partly accomplished, it demonstrated that unconscious deception could in fact be detected. Germann (2) and Bitterman and Marcuse (3) demonstrated to an even greater degree that unconscious as well as conscious material was available to polygraph techniques. In a paper on the use of the polygraph with psychiatric patients, Abrams (4) reported that there were areas of stress of which subjects were consciously unaware but were blatantly obvious in their polygraph tracings.

From these reports it is clear that any attempt at differentiating the malingerer from the conversion reactions subject will present greater difficulties than those found in the usual test of deception. However, It is firmly believed by this writer that the polygraph approach can be a more valid indicator of malingering than either of the more traditional psychological or psychiatric procedures.

This writer has examined a number of subjects who were making claims for compensation for on-the-job injuries or automobile accidents. In all of those seen, no sufficient organic basis could be found for the symptoms that were being displayed. In each case the insurance carrier also suspected malingering.

In testing these subjects, a somewhat different set of principles for interpretation had to be developed. From these cases, norms were built up that varied somewhat from the more frequently seen criminal suspects. When the questions to be asked were related to a physical sensation, that is, pain, numbness, etc., the interpretation was carried out in the usual manner. This was because the subject with a conversion reaction does experience these sensations whether it be headaches or dizziness, even though there is no organic basis for the symptoms. If his responses in this realm appear deceptive,

then he is undoubtedly a malingerer.

On those questions relating to the individual's inability to perform an activity in the same manner as prior to the injury, the examiner must treat these questions differently. The malingerer consciously knows that he could continue to work in spite of his injury, while the conversion reaction subject consciously believes he cannot work, but at the unconscious level he knows otherwise. There is a gray area between the conscious and the unconscious that the individual himself cannot clarify. Often, he, too, is not quite certain as to the correct answer to the question. How much of the conscious or unconscious is involved in the idea of being able to work is difficult to ascertain. Most probably there is some of each. Therefore, questions of this nature might be better avoided. When this is impossible, the following principles appear to be valid.

Truthful responses to relevant questions appear in the tracings as what this writer prefers to call compromise reactions. Since they are essentially truthful at the conscious level but yet essentially deceptive at the unconscious level, their response tends to lie between the two. Their tracings on the relevant items are not quite as unaffected as a truthful reaction, nor do they show as great a change as a deceptive response. Thus, if their tracings on the relevant items are less than, equal to, or slightly greater than the control questions, the response is viewed as truthful. If, on the other hand, their reaction is considerably greater on the relevant than on the control items, they are interpreted as deceptive.

All too obviously, these judgments are more difficult to make than the usual means of interpreting responses. Inevitably there will be more inconclusive tracings reported, and the accuracy level may be somewhat less than the usual 98 per cent. As more cases accumulate, greater validity can be attained and a more precise approach can be developed.

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VERMONT STATE POLICE POLYGRAPH SERVICE

By

Norman Ansley

Founded in 1958 by Major Glenn E. Davis, the Vermont State Police polygraph service is a model of efficiency. This 240 man department maintains a staff of three full-time examiners to conduct polygraph examinations for their own force and all of the other law enforcement agencies in Vermont. Because of this complete service, no other state or local agency has a polygraph operation.

All candidates for the Vermont State Police are screened by polygraph, a service extended to other departments including Vermont's largest city, Burlington. Major Davis, who started the screening program in 1959, states: "I believe most state police departments who have polygraph screening for police applicants have a firm policy insuring that each person is exposed to all areas of screening, i.e., a review of the application, a written test, a physical, an agility test, eye test, the polygraph test, and an oral board. It is recommended that they progress in that sequence. It is at this point the determination should be made as to whether or not a background investigation is to be done, or the applicant is to be denied further consideration."

Major Davis notes that during the span from March 1971 through March 1973, there has been a gross savings of $28,000 because it was not necessary to conduct background investigations on 109 of the 210 applicants. Major Davis has observed that the most expensive part of recruiting is the investigation with its long hours, miles of travel, long distance calls, and lengthy report. Background investigations are conducted on all those candidates who remain in contention after the initial phase of screening. The polygraph, of course, does obtain information which is not available through the investigation. It also allows the department to clear up false accusations or statements made by those contacted during the investigation. For example, an employer may have fired a applicant because he suspected him of stealing, when in fact he was not.

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The opposite is more often the case. Disclosures were made that 25 of 210 police applicants had committed 39 breaking and enterings; 5 had committed embezzlement; 1 had committed arson; 59 had committed 360 larcenies at work and 46 had committed 210 larcenies at places other than work. The personal behavior of the police applicants included two who were heroin users, 62 involved in sex offenses, 17 who admitted to assault, one alcoholic, 26 heavy gamblers, 17 who had committed perjury and a number who had been involved in the buying, possession and selling of stolen property. Certainly none of these deserved further consideration as police applicants.

The Vermont State Police criminal cases involved nearly 600 cases in fiscal 1972 (Table 1) and more than 700 in fiscal 1973 (Table 2). Table 2 includes 343 State Police cases and 387 done for other police departments.

The Department takes pride in those cases in which the innocent have been protected. Because so many complaints in sex cases are false, it is a matter of policy to conduct a polygraph examination on the victim before proceeding with the investigation. Many police departments have adopted this rule; a reasonable precaution considering the terrible damage done to a person's reputation when merely accused of an offense such as rape. Indeed, the Uniform Crime Reports for 1972 indicate that 15 per cent of forcible rape cases reported to police were proven upon investigation to be false.

Sgt. M. W. Ramey, Supervisor of Polygraph Services, tells of a deaf, dumb and illiterate complainant who alleged that a man had forced him to stay with him in a hotel room for two days and while there had forced him to commit a variety of homosexual acts. The complainant named his assailant. Sgt. Ramey employed the services of the Principal of the Austine School for the Deaf in Brattleboro to act as interpreter during the polygraph test. The principal sat facing the subject, during the test, repeating Sgt. Ramey's questions with sign language. The principal also conducted the entire pretest interview in this manner, since the subject could not read or write. To avoid movement, the subject was instructed not to answer the questions through sign

language and that his answers were understood to be the same as those agreed to during their review. Following the second chart, the subject made some admissions of a minor nature that changed his story. Following the third chart, he confessed that the other man had not used any force and that his participation was entirely voluntary. As an 18 year old who lived with his mother, he made up the allegation of force in order to explain his two day absense.

In another case, Sgt. Ramey and Cpl. M. C. Vinton conducted polygraph examinations on two men who were incarcerated in the state prison awaiting trial on a charge of armed robbery. The prosecution's case was based upon the identification of one of the men, by name, by a woman who was present in the drug store during the robbery. The only other witness, the druggist, had been shot. Based on her positive identification of a fellow resident of this town, the local police arrested the suspect and his close friend who matched the description of the other. The defense counsel requested a polygraph examination by the State Police, following the usual procedure of stipulating to the use of the results in court. The trial judge agreed. The results of the polygraph examinations indicated that the men were not in any way involved in the robbery, and following investigation disclosed that reputable witnesses had seen the men at another location at the time of the robbery. The State Police then asked the witness to take a polygraph examination, but she declined and instead had herself committed to a mental institution. Whether or not her false accusation was malicious or in error, remains unknown.

In addition to Sgt. Ramey and Cpl. Vinton, the full-time staff includes Trooper Richard E. Boydon, a recent graduate of Lynn Marcy's polygraph course. Back up includes Lt. J. Ryan, a Keeler graduate who is now a Troop Commander, and Major Davis, who continues to keep his proficiency. The Vermont State Police is one of three agencies under the direction of Commissioner of Police Safety, Edward W. Corcoran, a retired Colonel of Military Police. Colonel Corcoran, with his knowledge of the respected Army CID polygraph program, provides constant support to the State Police polygraph service.

To provide good service throughout the state, the Vermont State Police has a completely equipped polygraph room in each of the five geographical commands. Instruments include Keeler 6308s and one Keeler 6338, with a photoelectric plethysmograph. In addition, the department has recently acquired two new Lafayette polygraph instruments which feature an electronic cardiosphygmograph, and the option to add a second pneumograph unit.

Although all but Trooper Boyden are graduates of the Keeler Institute, the department provides variety in advance instruction by regularly sending its examiners to the American Polygraph Association seminars and the Delta College annual workshops. The examiners also maintain a close working relationship and conduct regular conferences with the other New England state police examiners. They also confer occasionally with Vermont's only qualified commercial examiner, Ralph J. Brock III, a graduate of the National Training School of Lie Detection and a veteran with service in Army Military Intelligence. All of the Vermont State Police examiners and Mr. Brock are APA members.

Vermont does not yet have a polygraph licensing law, but the work of an untrained and unqualified examiner in Vermont has caused such concern that the legislation will be supported at the next session. In the past, the bill has been academic.

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TABLE 1
POLYGRAPH STATISTICS
1-July-71 - 30-June-72

	Number of Examinations Given	For Vermont State Police	For Local Police	Other agencies	Cleared of crime	Deceptive reactions without Confession	Confession on crime examined for	Inconclusive Results	Confessions to unrelated crimes
Arson	41	41	0	0	17	16	6	2	8
Assault	26	19	7	0	7	7	12	0	11
Aiding Prisoner to Escape	4	4	0	0	3	1	0	0	2
Breaking and Entering	77	29	46	2	22	29	24	2	38
Fish and Game Violations	0	0	0	6	3	3	0	0	0
Fraud	18	8	10	0	6	5	6	1	8
Homicide	14	9	5	0	11	2	1	0	6
Larceny	96	42	53	1	34	34	25	3	39
Lewd and Lascivious	26	17	9	0	8	10	8	0	10
Malicious Destruction	1	1	0	0	0	0	1	0	4
Motor Vehicle	23	4	19	0	8	8	7	0	12
Narcotics	38	15	23	0	12	19	7	0	10
Rape (Forced)	38	25	13	0	20	12	5	1	3
Rape (Statutory)	1	1	0	0	0	0	0	1	0
Robbery	13	11	2	0	8	4	1	0	3
Pre-Employment	171	100	71	0	0	0	0	0	0
TOTALS:	593	326	258	9	159	150	103	10	154

Criminal examinations encompass three subject categories.

1. **Victim**
2. **Accused**
3. **Witness**

TABLE 2

POLYGRAPH STATISTICS

FISCAL YEAR 73

	DEPARTMENTS				RESULTS				
	Number of Exams	State Police	Local Police	Other	Cleared of Crime	No Confessions Deceptive Reactions	Confessions	Inconclusive	Confession Unrelated Crimes
Arson	32	28	4	-	14	11	6	1	1
Assault	48	19	22	7	19	11	17	1	5
B & E (Breaking & Entering)	85	40	43	2	36	19	28	2	45
Fraud	44	15	9	20	14	8	15	7	7
Homicide	6	2	1	3	6	-	-	-	-
Larceny	215	79	118	18	128	42	27	18	82
Lewd and Lascivious	20	7	12	1	1	7	12	-	10
Motor Vehicle	47	16	23	8	11	11	19	6	18
Miscellaneous	23	11	10	2	6	6	9	2	18
Narcotics	24	9	12	3	4	10	7	3	16
Pre-Employments	127	91	36	-	-	-	-	-	-
Rape - Force	40	21	18	1	12	9	14	5	3
Rape - Statutory	4	2	2	-	1	-	-	3	-
Robbery	15	3	10	2	6	2	4	3	3
TOTALS:	730	343	320	67	258	136	158	51	208

Other Departments

Out of State Law Enforcement Agencies
Social Welfare Department
Fish and Game Department
Sheriffs Departments

SOME FURTHER OBSERVATIONS ON THE DEBETHAM CASE

By

Kenneth L. Haney

Abstract

DeBetham case facts and testimony reviewed by a prosecution witness, with emphasis on errors in testimony given to introduce the polygraphy results into evidence. Suggestions made on the role and selection of APA fly-away teams. (Ed.)

The Court Decision

In spite of rhetoric and euphemism Bruce Eugene DeBetham was found guilty by the Court. In reviewing the case the Court of Appeals included the following:

> Moreover, our analysis of the record convinces us that the trial judge did not believe appellant in those instances where his testimony conflicted with that of the government witnesses. In these circumstances the error, if any, in rejecting the evidence would be harmless under Rule 52 (a), FRCrim P. We do not hold that polygraphic evidence is never admissible. Here, even if it had been admitted, the result would have been the same.

It seems obvious this decision is a far cry from the old Frye decision. It would appear to allow admissibility of polygraph evidence in the future at the discretion of the

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This is the third and last article on the DeBetham case. The first was written by one of the defense examiners, Chris Gugas, entitled "Some Observations on the DeBetham Case," Polygraph, December 1972 pp 247-249. The second, "The Polygraph Examiner as a Witness in Court," Polygraph June 1973 pp 122-142, was written by the defense counsel, Charles M. Sevilla. K. L. Haney, author of this article, was a prosecution witness. Mr. Haney and Mr. Gugas are members of the APA.
Editor.

individual trial judge. It would also appear evident, if the Court of Appeals did not err in its analysis, that the trial judge in the DeBetham case tended to believe evidence presented by the prosecution more than that presented by the defense.

Since there was a rather strong effort by the defense to include polygraph evidence, further examination of this case may compare relative credibility of evidence presented, present information on what the prosecution learned in this case, place the role of polygraph in perspective, and may yield some suggestions for improvement of future attempts to introduce the polygraph as evidence.

Case Facts

There was disagreement regarding case facts. According to U. S. Customs Agency Service Reports DeBetham drove a car registered to Charles Anthony Bland from Mexico into the U.S. at the San Ysidro Port of Entry about 10:30 P.M., 12-4-71. Because of his extreme nervous ness during routine declaration, DeBetham was directed to the secondary area for a thorough investigation. Five grams of heroin were found hidden in Bland's car. DeBetham denied knowledge of the heroin. He told Customs Officers he entered Mexico with Bland in Bland's car to get an estimate on upholstery for Bland's car. Later, the defense was to present a story that DeBetham went to Mexico with friends, became separated from them, hitch-hiked towards the border and was picked up by Bland. He made no mention of this at the time of his arrest. In both stories DeBetham claimed that while in line to return to the U.S. Bland got out of the car, told DeBetham he would see him on the U.S. side and walked across the border. The Customs Agent observed what he believed to be needle marks on the inside of DeBetham's arm. Defendant claimed the marks on his arm were caused by a grass rash while playing high school football. He said his coach was aware of the rash and had recommended medication for it. With the aid of DeBetham's description Bland was arrested on the U.S. side near the border. Bland claimed he had not been in Mexico. He had marks on both arms and admitted he used heroin. Bland denied knowledge of the heroin found in his car.

DeBetham was to later claim he only knew Bland casually. According to Customs reports both Bland and DeBetham lived in Imperial Beach. Police there reported they believed

both might be users and possibly pushers of narcotics. At least both defendants associated with numerous persons believed to be involved in the use or sale of narcotics. Incidentally, DeBetham's high school coach could not remember the rash on his arms and said he had not recommended any medication for him.

Local APA Involvement

Many San Diego members of APA were not aware of the DeBetham case until after the fly-away team had been in town, testified, and departed.

Two polygraph examiners from the Sheriff's Department were asked to join a conference which included the Assistant U.S. Attorney handling the DeBetham case, an N.I.S. polygraph examiner, and the Naval District's supervising polygraph examiner. The announced purpose of the meeting was to discuss testimony presented by the defense to support admissibility of polygraph evidence in the DeBetham case. The prosecutor said she first became aware of defense plans to lay a foundation to admit the polygraph examiner's opinion of his charts one day before the fly-away team came to town. All the defense told her was there would be five examiners and an attorney to testify. Therefore, she was largely unprepared for what followed.

This conference brought to light that DeBetham had been tested by three different examiners. Upon review of copies of the charts, it was the consensus of the prosecution examiners that even though technique in the first examination appeared faulty there were still responses consistent with deception criteria which should have been exploited by interrogation. A Navy examiner reported he was told by the second examiner who tested DeBetham that deception was present in his charts which was verified by admissions from DeBetham indicating ke knew the package was in Bland's car. Again, it was the consensus of the prosecution examiners that there were responses consistent with deception criteria in the second examination.

It was the consensus of examiners present that charts said to be from the third examination of DeBetham did not appear to be from the same individual as the first two examinations. It also appeared that the same chart was submitted twice with different times entered on them as

if they were two separate polygrams. Finally the list of questions submitted for the third examination was numbered differently from those on the charts.

The prosecutor said the APA team testified the first two examiners of DeBetham were qualified and competent and their tests good ones. If this were really so, she was at a loss to understand the need for this third examination. This bolstered her suspicions regarding the third test. She said if these examinations were admitted into evidence she would try to prosecute those involved with fraud, perjury and criminal conspiracy.

Flyaway Team Testimony

The court record indicates contradictions and errors in flyaway team testimony. For example, there was testimony that a competent examiner can read another examiner's charts. Later, this same individual testified, "You can look at a chart and you may not be able to testify conclusively that it is a chart of an innocent or guilty person, but you can come close to it."

In another instance a defense witness testified, "You can give a polygraph exam to anybody that is physically fit to take a polygraph examination. They don't have to have fear." Later this same person testified that a subject of a polygraph examination has to have fear for the test to work. One team member claimed he had conducted over 20,000 examinations primarily in criminal work, but had "never encountered a psychopath." Another team member testified that a large percentage of criminal testing done in this country today is on what the psychologists call either psychopaths or sociopaths. One defense examiner related he took lengthy preparation for an exam and conducted an exhaustive pre-test interview, yet he claimed to give over 1,000 tests annually.

Defense counsel described a team member as one of the leading men in the field of polygraph. The leading man said the necessary ingredient for a good polygraph examination was the "competent, qualified, professional, experienced, examiner." While demonstrating the technique for the court he claimed, "We are not going to hook up all the attachments because it does take a considerable amount of time." When the prosecutor suggested use of all

attachments, it took him about one minute to fix attachments on his subject's body. In his explanation to the court on how the instrument worked, this leading man said, "I'm going to put some air in your arm," and "This is what normal GSR is or the electricity coming out of his fingertips." A team member testified that integrity is the by-word for the competent examiner; that "he must be above suspicion." Unfortunately, prosecution had admitted into evidence a prior opinion of this examiner's work which tended to impeach his testimony.

Validity is a Problem

One team member testified he had conducted polygraph examinations since 1956 and could not recall making any erronious conclusions in criminal cases. Another team member testified he was 98% accurate - another modestly said he was only 95% accurate. When prosecution asked how these percentages were computed the court was told this was based on confessions and admissions. "For instance, if I run 25 people in a given situation and I obtain confessions from one, then I have one hundred percent accuracy." They were unable to say, however, how accurate their technique was over all - that is when they included those they said were truthful (but never confirmed) and those whose charts indicated deception, but they were unable to verify by confession or other means.

An attorney who does not personally conduct polygraph examinations testifying for the defense claimed, "There will be no battle of the experts, because I find these men do not disagree like firearm identification people and fingerprint people. You do not find a competent man to give one opinion and a competent man with a clashing opinion." This, of course, has been the effective way over the years to cover a multitude of sins, and silence opposition. What this attorney is saying, in effect, is if you agree with with me then you are competent. If you do not, you are not.

The defense introduced a college professor and identified him as an expert in polygraph. This expert claimed to have established a high validity for polygraph in a study consisting of 40 persons. Even though members of his profession have repeatedly shown a validity study is dependent on size of the sample and randomness of the sample, this academician was willing to generalize to the total

population based on his 40 man study. He testified he was about to publish a book about the polygraph. A review of his manuscript turned up a line he had written regarding his thoughts on validity. "We will never know the validity of the polygraph." Asked about this by the prosecutor, he admitted he had written this, then said, "Well, I guess I'll just have to change that, won't I?" This expert witness admitted on the stand he had never personally conducted a polygraph examination.

One team member testified he was able to determine as well as any physician any human malfunction that might impede successful polygraph testing. There was intimation there was one-to-one correlation between a response on a chart and deception.

How DeBetham Aided Prosecutors

Prosecutors learned much from the DeBetham case. One local Assistant U.S. Attorney said prosecutors are now exchanging information on a national basis on how to successfully cope with admissibility. For this reason admissibility may be more difficult to attain then before. At least three attempts to lay a foundation for admission of polygraph evidence have failed locally since DeBetham.

Before this case, most local polygraph examiners enjoyed a good rapport and reputation with the courts, prosecutors, various governmental agencies, and defense attorneys. Since the DeBetham case, there have been fewer requests for polygraph service. Where before there was pre-trial bargaining, especially where a case was based primarily on circumstantial evidence, local prosecutors on state and federal levels are now refusing to deal or pay any attention to polygraph results.

Prosecutors are no longer content with a simple explanation of theory. They are not only asking examiners questions about physiology and psychology in relation to operation of the technique, but are asking how an examiner can predict psychological impact of any given question, control, etc. They are asking examiners to outline for them what occurs from time of stimulus to reaction, and how to explain the gap between the psychological experience and the physiological events which are recorded.

Prosecutors are pointing out that while a rather long list of deception criteria exists as a possibility in chart interpretation there is no single response which can indicate presence of deception as separate and distinct from all other emotions. Prosecutors are saying there is no accepted scientific standard to indicate that each individual component of the instrument can detect conscious lying. If an examiner claims there is, he is being asked why more then one channel is used.

Prosecutors are asking if one channel indicates a response consistant with deception criteria and two or more do not, shouldn't this be more indicative of truthfulness then deception?

Prosecutors are asking examiners if they subscribe to the theory that all the subjective signs should be read during the pre-test interview, and if the examiner claims this is important to the total context of an examination, he is being asked how another examiner not privy to this subjectivity can truly evaluate another examiner's work?

Prosecutors are asking what schooling consists of for polygraph examiners. It is being shown that some examiners have never attended formal polygraph training. Some of those examiners who have much to say about the ethical competent examiner are admitting they have personally trained another to be an examiner. It is being shown that existing schools last six, eight, or perhaps as long as fourteen to sixteen weeks. Examiners are testifying that during this period of time they have learned sufficient instrumentation, physiology, psychology, question formulation, chart interpretation and interrogation to make decisions important in the lives of others by their diagnoses of their charts alone.

Prosecutors are contrasting this background with some of the trades: For example, in California to become a plumber requires a 5 year apprenticeship working under supervision of a journeyman, and two nights per week, two hours per night, spent in formal schooling. In order to become a meat-cutter in this state two years of apprenticeship are required under the supervision of a journeyman and a minimum of 160 hours of formal schooling. To become a barber in California an aspirant is required to first attend 1,150 hours of continuous formal training, plus a

minimum of 15 months of apprenticeship under a journeyman, with two nights per week of two hours per night devoted during that period to more formal schooling.

Prosecutors are asking if the various aspects of conducting polygraph examinations are not at least as difficult as the curricula for these trades. Prosecutors are asking if human personality is not equal in value and importance to hair-styling, clogged sewers, and how to bone out a roast of beef?

A local Assistant U.S. Attorney said he understood that Senator Ervin is in the process of introducing a bill to outlaw use of polygraph. As an aftermath of the DeBetham case he is also being asked to include prohibition of use of polygraph as evidence except on prior stipulation in court in the new Federal Rules of Evidence.*

Testimony For the Prosecution

After reviewing Customs reports, charts, question lists, and transcripts in the DeBetham case, I was convinced this was the wrong defendant, the wrong case, and the wrong examiners with which to attempt to lay a foundation for admissibility.

It was my feeling that were polygraph to be admitted in this case and criminal charges filed, proven or not, this could easily be ruinous of the reputation and careers of the examiners involved, would be detrimental to examiners everywhere, and could do lasting and perhaps irreparable damage to polygraph. On the other hand, if admissibility were denied, all that would result would probably be one or two lines in the local newspaper.

I felt the flyaway team forced me into an untenable situation. On the one hand, I did not want to stand idly by when there was a possibility the name of polygraph could be blackened.

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*S2156 introduced by Senator Ervin would prohibit polygraph screening by any company involved in interstate commerce and prohibit polygraph screening in the Federal Government and the military services. It does not relate to the use of the polygraph in law enforcement. S1438 places limitations on the types of questions that may be asked in Federal polygraph screening. We are not aware of any current bill by Senator Ervin that relates to Federal Rules of Evidence. (Editor.)

On the other hand I did not want to be put into a position of being in opposition to what appears to be the main stream of thinking in APA and the polygraph field. I felt that truth was the best armament and best for polygraph and decided to testify for the prosecution.

In my testimony I said it was my opinion if certain conditions were met, my experience indicated the polygraph technique enjoyed a rather high degree of validity and reliability. I pointed out we have no known coefficient of validity or reliability in polygraph as do some of the psychometric devices. Of the studies made, there was certainly an indication of high validity and reliability. In my opinion the definitive study had not been done, but I had every expectation that it eventually would be done.

I testified that if a polygraph examiner's opinion as to chart interpretation were to be admitted wholesale now, other than on stipulation, I would quit this kind of testing unless certain standards were met - to include legislation control over acceptable instrumentation, environment of examination, standardization of techniques, and over selection, training, and control of examiners.

Role of Polygraph

In reviewing transcripts in this case it became obvious that there is a major difference in opinion in the polygraph field as to what role polygraph should play in society. One group seems to feel it has advanced sufficiently in technique to serve as a diagnostic service with opinion based on chart interpretation. These are the people who would have no hesitation in saying one examiner can draw a conclusion as to test results by examining another's charts. The other group seems to feel it is engaged primarily in instrumental interrogation in which responses on a chart should be resolved by interrogation and that validity of any given test indicating deception is established by a confession. Many of these examiners express caution in making conclusions by reading another's charts because of the subjective aspects of the technique. While members of the former group might feel comfortable in reporting that the person taking their test was truthful or attempting deception, members of the latter group would be more content to report there were or were not chart

responses consistant with deception criteria during the examination.

The fact that this dichotomy exists in the field of polygraph is a healthy sign for continued research and growth. In any true profession there is room for difference of opinion. If there were not, there would never have been advances in the various disciplines. Blood-letting and application of leeches would remain common remedies for just about any malady. It is felt that the field will advance more rapidly and benefit more if each persuasion maintains tolerance of the opposite view, and personal identification with one or other philosophy will no longer spill over into acrimony in public debate.

Regardless of what our hopes and aspirations may be for polygraph in relation to the courts, it is my opinion that before admissibility is to be achieved the polygraph must gain acceptance by reputable members of the scientific community. To do this, now as never before, we need to be honest and realistic with ourselves and others.

Those who make claim to infallibility or to such high accuracy as some do only serve to direct ridicule on themselves and their technique in the eyes of members of the scientific community. The burden of proof is shifting to those who make the claim. When we begin to be satisfied with being a little less than perfect, we begin to have a ring of truth.

A concerted effort to study our validity and realiability should be made. Aid of accepted scientific methods for determining these must be enlisted and accepted standards most rigorously applied. We must do something better then have an examiner claim 100% accuracy because in a given case he examined 25 people, found 24 to be non-deceptive and one deceptive, then generalize this isolated experience to his total work.

Rather then laugh at established scientists who try to point out the very complex nature of emotion, and dismiss them cavalierly as "anti-polygraph," we should make in-depth inquiry of them as to the nature of what we measure during a polygraph examination.

If, because of the nature of the technique, we are not able to develop a coefficient of validity and reliability

acceptible to reputable members of the scientific community, we must accept it for what it is and be honest about it. We will not have to hang our heads in shame if this is to be the case. Rorschach has been a useful clinical tool for years, is recognized as such by the scientific community, and yet because of the nature of the technique it has not been able to establish its validity. What they do have is a highly standardized method of administration and scoring.

Suggestions for Future Fly-Away Teams

1. Inquiry should be made of local APA members as to the case, the reputation of the defendant, and who conducted the examinations.

2. A check should be made of any original examination before testimony is offered, to make certain of its adequacy. If the original proves inadequate perhaps a small number of examiners of stature can be selected to examine future defendants so APA and local people will not be faced with another DeBetham case.

3. Make certain each member of a team of unblemished character and reputation, regardless of his abilities as an examiner. There should be no possibility of impeaching a team member's testimony because of his past performance.

4. For laying a foundation for admissibility hopefully an attorney with a modicum of humility will be found who not only has knowledge of the law, but has something more than a simplistic superficial understanding of the nature of psychology, physiology, and polygraph and who is capable of understanding implications and complexity of some of the questions he may ask a witness. His goal should be to bring truth to the court, not showmanship. Polygraph need not fear the truth.

5. Give a second look at the so-called polygraph experts from other fields who have never administered a polygraph examination, but who have somehow attached themselves to the polygraph. What is their motivation?

6. Give a second look at those individuals, and their performance, originally included in the APA organization by a grand-father clause, but who could not meet its present standards.

7. Perhaps APA should consider establishment of degrees of efficiency within its membership to be decided by competition in written and oral examination.

8. If judgments are to be made in court of an examiner's technique, should not APA publish a minimum set of standards acceptable for each technique? To do so would serve notice to examiners everywhere their work is subject to scrutiny. There would be less chance there could be difference in opinion between prosecution and defense witnesses in the future. Perhaps APA should follow the Military's lead in establishing some form of quality control, where each examiner in the field would be required to submit, at random, requested examples of his work.

TO: B.H.F.
P.O. Box 83
Auburndale, Mass. 02166

Gentlemen:

Please forward _____ copies of The Polygraph in Court at $3.65 each to me. I have included my check/money order for $_____.*

*Make checks or money order payable to B.H.F.

Name_____

Address_____

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Polygraph 1973, 02(3)

REFERENCE WORKS AND THE POLYGRAPH

A Look At What Encyclopedias and Dictionaries Say About The Polygraph

By

Ellen Y. Weir and Norman Ansley

Encyclopedias and dictionaries are believed by many to be absolute authorities on a tremendous variety of subjects. Children and adults look upon encyclopedias and dictionaries as sources of flawless information from omniscient and frequently unknown authors. Whether the reference is part of a prestigious set, such as Encyclopaedia Britannica, or a less expensive brand sold at a store not primarily known for its references, thousands of people, from the elementary levels of education and throughout adult life, unquestioningly quote them on all topics, including such things as polygraphs and lie detectors. Because of the belief in the accuracy of encyclopedias and dictionaries, reference works exercise a great deal of influence on public opinion. And because of the concern of those in the polygraph field with public acceptance of and confidence in the instrument, it is interesting to note how the polygraph fares in references.

Most of the encyclopedias surveyed contained information on the polygraph, usually entered under "Polygraph," "Lie Detector" and "Criminal Investigation." Generally, the polygraph is given a brief, but accurate description. Several references provide brief descriptions of the technique and some entries include photographs of instruments and charts. The description of the polygraph in Chamber's, an English encyclopedia, is the only one that could be considered critical. In an article on psychology, following a description of Jung's word association test used with the GSR, the author said, "The popular title of Lie Detector for the psychogalvanic apparatus is a mischievous misnomer." Although many agree with this statement, the impression this might make on a student could be misleading. There was one other brief reference to the instrument in Chamber's. In an article devoted to psychological testing, the polygraph was described as recording

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"breathing, pulse rate, and psychogalvanic reflex . . . as used in investigating emotional responses, as in so-called lie detector machines."

The American edition of Encyclopaedia Britannica is a little kinder. Listed under "Polygraph", it describes the instrument, noting that it is popularly called a lie detector, and comments on its extensive use in criminal investigation. They conclude, "Many authorities, however, maintain that its results are questionable, even when tests are conducted by skilled operators." A lengthier article, entered under "Investigation, Criminal", describes the instrument and technique in a more favorable manner, and includes a photograph of the polygraph and subject, courtesy of John E. Reid and Associates. Both articles on the polygraph are unsigned. However, the bibliography accompanying the article on criminal investigation cites one reference on the polygraph; Fred Inbau, Lie Detection and Criminal Investigation, 2nd ed., 1948.

An article in Encyclopedia Americana, under "Polygraph", contains information on research instruments and the standard polygraph, commonly called a lie detector." The attachments and technique are briefly described. Like Encyclopaedia Britannica and numerous other encyclopedias, Americana notes the inadmissability of polygraph results as legal evidence. In its article on "Criminal Investigation", Americana refers to the polygraph, providing a brief description. A third article, entered under "Lie Detector", provides a thorough description of the polygraph instrument. It describes the technique, again mentions the problem of admissability and contains a bibliography with five well-chosen articles. The last article is signed by Frank Dorn, The Associate Editor of Popular Science Monthly.

World Book Encyclopedia, the reference in wide use among school children, defines "Lie Detector" as "a device that measures physical reactions to questions." It goes on to describe technique and includes a photograph of the Reid polygraph, identifying John E. Reid and Richard O. Arthur as "models posed", and another photograph showing a portion of a chart. The article, written by noted polygraph authority, Fred E. Inbau, notes the contributions by John A. Larson, Leonard Keeler, and John Reid to the development of the instrument.

The American Peoples Encyclopedia gives the polygraph a favorable treatment. In its brief, unsigned article on Vittorio Benussi, an Italian experimental psychologist, it points out that the "psychological response theory underlies modern lie detection methods, and respiration measurement is an integral part of the technique used with the lie detector or polygraph." An article on "Crime, the Lie Detector, and Truth Serum", written by Fred E. Inbau, describes technique and adds that "polygraphs or lie detectors produce a chart by which a fairly reliable diagnosis can be made by a trained and competent examiner." Additional information is found under "Polygraph", where reference is made to the court's refusal to admis polygraph evidence despite proponents claim of 80 to 85 per cent accuracy. The article contains a photograph by Associated Research but does not include a bibliography.

According to Compton's Pictured Encyclopedia and Fact Index, the lie detector is in wide use. The entry contains a description of the polygraph, names Marston, Larson and Keeler as its principal developers, and erroneously states that the polygraph is used in the courts of many states.

The article on the lie detector or polygraph in Merit Students Encyclopedia is also favorable. It describes the machine, presents its history, beginning with Lombroso in 1895, and mentioning Jung, Munsterburg, Benussi, Marston, and Larson. The article is signed by Charles Area, Dean of the College of Law at the University of Arizona.

Brockhaus Enzyklopadie (Weisbaden, Germany, 1972) describes the polygraph and its use in medical, psychological and criminal fields. The article also describes the difference between the modern polygraph and older instruments.

Only a few encyclopedias contained no information on the polygraph: Van Nostrand's Scientific Encyclopedia, (1968 Ed.); Harper's Encyclopedia of Science, (1963 Ed.); The International Encyclopedia of Social Science, (1968); The Illustrated Encyclopedia of the Modern World, (1956 Ed.); Webster's Unified Dictionary and Encyclopedia, (1970 Ed.); and Columbia Encyclopedia, (1963 Ed.).

Dictionaries

Dictionaries are another source of valuable information, and most of the dictionaries surveyed provided information

on the polygraph. Black's Law Dictionary defines "Lie Detector" as "a machine which records by a needle on a graph varying emotional disturbances when answering questions truly or falsely, as indicated by fluctuations in blood pressure, respiration, or perspiration." It also cites the case of State v. Colle.

Several medical dictionaries provide descriptions of the instrument and the technique involved. An unsigned article in Psychiatric Dictionary elaborates on the principle which the polygraph is based. The tone of the article is optimistic about acceptance of the polygraph, stating, "Although results are not always accurate, the technique of interpretation is constantly being improved; it appears that accurate diagnosis on the basis of the test is possible in 75-80 per cent of cases, that in 15-20 per cent results may be too indefinite for confident diagnosis, and that the remaining 5 per cent constitute the margin of probable error. Such errors as do occur are usually on the side of failing to detect the guilty person rather on the side of mislabeling an innocent person guilty." Both Black's Medical Dictionary and Dorland's Illustrated Medical Dictionary have brief definitions of the polygraph.

Webster's Collegiate Dictionary, a reference in widespread use, contains no information on the polygraph. However, The American Heritage Dictionary of the English Language, another popular volume, defines polygraph as "an instrument that records changes in such physiological processes as heartbeat, blood pressure, respiration, and is sometimes used in lie detection.

In conclusion, the polygraph receives fair, although somewhat brief, treatment by the leading popular and professionally-oriented references. Encyclopedias and dictionaries containing no information on the polygraph are clearly in the minority, as are the volumes that are negative in their articles on the polygraph. Thus, as the public relies more and more on reference works in forming their perception of their surroundings, the groundless fears and ignorance surrounding the public's opinion of the polygraph will vanish.

What Encyclopedias and Dictionaries Say About the Polygraph

ENCYCLOPEDIA	ENTRY	FAVORABLE	ILLUS.	BIBLIO.
Americana (1969)	Polygraph	yes	no	no
	Criminal Investigation	yes	no	no
	Lie Detector	yes	yes	yes
American Peoples' (1965)	Benussi, Vittorio	yes	no	no
	Lie Detector	yes	no	no
	Polygraph	yes	yes	no
Britannica (1967)	Polygraph	yes	yes	no
	Detectional Deception	yes	yes	no
Brochaus(1972)	Polygraph	yes	yes	no
Chamber's (1967)	Psychological Testing	no	no	no
	Psychology	no	no	no
Collier's	Crime Detection	yes	no	no
	GSR Application	no	no	no
	Physiology	yes	no	no
Compton's Picture (1963)	Lie Detector	yes	yes	no
Funk and Wagnalls Standard Reference (1970)	Lie Detector	yes	no	no
Illustrated World (1971)	Lie Detector	yes	no	no
Larousse Illustrated International (1972)	Lie Detector	yes	no	no
McGraw Hill E. of Sci. & Tech.	Lie Detector	yes	no	yes
Merit Student's (1967)	Lie Detector	yes	yes	no
New Standard (1962)	Lie Detector	yes	no	no
World Book (1970)	Lie Detector	yes	no	no

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DICTIONARY	ENTRY	FAVORABLE	ILLUS.
Black's Law Dictionary (1957)	Lie Detector	yes	no
Black's Medical Dictionary (1971)	Polygraph	yes	no
Dorland's Illustrated Medical Dictionary (1965)	polygraph	yes	no
Dictionary of Philosophy and Psychology	lab equipment	yes	no
Psychiatric Dictionary (1960)	lie detector	yes	no
	Keeler polygraph	cross reference to above	
	polygraph	cross reference to above	
Taber's Cyclopedic Medical Dictionary (1963)	lie detector	yes	no
	polygraph	yes	no
Webster's Third New International Dictionary (Merriam Co. 1961 - the large version)	lie detector	yes	no
	Keeler polygraph	yes	no
	polygraph	yes	no
	pathometer[1]	yes	no
	polygraphic	yes	no
	polygraphist	yes	no

[1]Pathometer - trade name of Father Summer's galvanometer. Sometimes called a Fordham Pathometer, as he was at Fordham University while doing his research and criminal case work.

Note: Some dictionary and encyclopedia references only describe polygraph instruments, without mention of research or forensic application. In such cases they are marked favorable.

Lying and Its Detection; A Study of Deception and Deception Tests

By John A. Larson. In collaboration with George W. Haney and Leonarde Keeler. With an introduction by August Vollmer [1932] 1969. Patterson Smith Reprint Series, New Jersey.

BOOK REVIEW

By

George K. McKinney

Lying has been practiced by humans in various forms since the beginning of civilization. To make an untrue statement with intent to deceive; to create false or misleading impressions; to mislead or deceive; are all accurate descriptions of lying. Lying has been described by some as a method used by humans for self-protection in a hostile environment. Conversely, lying has been utilized by some to gain prestige in the eyes of peers, to impress, and to advance one's position. Since lying and deception are forces which are in operation on a daily basis in a variety of forms, it is frequently difficult to detect. As a result, many countermeasures have been developed by individuals and institutions to detect human deception. Threats, fear, physical abuse, psychological pressure and lies have been utilized by "authorities" to defeat deception techniques used by individuals under stress.

Lying and Its Detection is one of the first published works that addresses itself to problems and solutions regarding detection of deception and to the causative factors of lying in subjects. Although this document was initially published in 1932, much of the content is still applicable today. The value of this book is further enhanced because at the time of initial publication it was one of the few books in print that could "speak with authority" because of documented case history material, experiments, and investigations regarding lying and deception.

Before one becomes deeply engrossed in this book, the reader must realize this book is not written specifically for the professional polygraph examiner or about the polygraph. The contents are orientated toward the

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professional scholar pursuing studies in educational psychology, medicine, physiology or psychiatry. In spite of this, valuable information regarding deception and its detection is available to the reader.

Part one attempts to define and classify the different types of deception exercised by individuals under stress. Distinctions are made between the so-called casual liar and the pathological liar. Distinctions and comparisons are also made between deception patterns of males and females.

Part two presents detailed accounts of various methods used during ancient times (1096 A.D. through the 1800's) to detect deception. Specific cases and their results are cited. Police methods used to detect deception in the early 1900's are also cited. The use, results, and legality of police procedures are discussed. Brief comments are made regarding so-called "Third Degree" methods used by police authorities in obtaining confessions from accused persons.

Part three describes early and "modern" experiments conducted by practitioners and clinicians to determine deception in subjects under laboratory and actual stress conditions. Specific cases are detailed for the reader.

Part four cites experiments with early cardio-pneumo apparatus to include charts and graphs of experimental and actual test cases. Of particular interest to polygraph examiners are experiments conducted by Leonarde Keeler and Chester W. Darrow. The cases and experiments are well documented and include studies conducted in prisons and police departments. Studies are cited using male and female subjects. Attention is given to the environment in which confessions are given by an accused person and the methods used by authorities to obtain confessions. Although the graphs and tables are apparently accurate, they have minimal relevant application to present day polygraph procedures and techniques.

The professional polygraph examiner will find this book of interest for its technical acuity and a necessity because of its historical significance.

"Large Magnitude Voluntary Heart Rate Changes," by David T. Wells, Department of Psychiatry, Baltimore City Hospitals, and Johns Hopkins University School of Medicine. Psychophysiology Vol. 10, No. 3, pp. 260-269.

An experiment was performed to demonstrate methods for enabling subjects (Ss) to produce large magnitude heart rate (HR) changes under conditions which include adequate controls for basal HR changes and elicitation of the HR response by breathing changes. The methods used were an attempt to optimize motivational feedback, and practice variables. Of 9 Ss, 6 displayed mean HR increases ranging from 16.7 bpm to 35.2 bpm. The greatest mean HR decrease for any S was 3.1 bpm. Control procedures indicated that breathing changes accompanying large increases in HR were not sufficient to account for the magnitude of HR change.

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Warren H. Teichner, Jacquelyn Beals and Vincent Giambalvo, "Conditioned Vasomotor Response: Thermoregulator Effects" Psychophysiology 10:3 (May 73) 238-243.

Peripheral vasoconstriction has been demonstrated as a fear reaction, as a response to sudden novel stimuli, and as an easily developed conditioned response. (The recording of peripheral vasoconstriction may be accomplished with a photoelectric plethysmograph on a Stoelting, Lafayette or Keeler polygraph instrument. On all of these instruments, the vasoconstriction will deflect the pen up.) In this study the authors state that whether a conditioned vasomotor response will be a constriction or dilation appears to depend upon the thermal state when the response is elicited.

For rabbits equilibriated to 18-20°C. (65-68°F), the conditioned stress response tends to be a vasoconstriction. For equilibrium to air temperature either higher or lower than that approximate thermal non-regulatory range, the response tends to be vasodilation. Thus, when the temperature was below 15°C (59°F) or above 24°C (75°F) where mild thermoregulatory response might be expected, the conditioned response was vasodilation.