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THE RELIABILITY OF POLYGRAPH CHART EVALUATIONS

by
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One of the major sources of controversy within the polygraph field has been the question of whether a polygraph examiner can accurately interpret the charts obtained by another examiner. We all know how much additional information the person who conducts the examination has available to him when he makes his decision about the Subject's truthfulness. There are the police investigative reports, the opinions of the investigators, the Subject's appearance and behavior (Horvath, 1972; Reid & Arther, 1953; Reid & Inbau, 1966), and that elusive quality which every examiner acquires with experience: Intuition, gut feeling, call it what you will. Psychologists are aware of how easily such outside sources of information may subtly influence the examiner's interpretation of the chart (Hathaway & Hanscom, 1958). To what extent would an examiner, one who has never seen the Subject, come to the same conclusion as the examiner who conducted the test? And let's take that question one step further. To what extent would several examiners, all evaluating the charts completely independently of each other, agree among themselves about the Subject's truthfulness to the relevant questions. These are very serious questions, and have always been so. But as judicial acceptance of polygraph examinations draws closer, these questions acquire a new importance. If the prosecution puts an examiner on the stand, the defense would certainly like to call in another examiner who would testify in favor of the defendant after looking at the prosecution's own polygraph charts. To what extent is this disagreement among examiners about the interpretation of a set of charts possible?

Before turning our attention to the study, lets briefly review the 5 or 6 previous reliability studies. The earliest study which looked at reliability was one by Rouke in 1941. Rouke used only two examiners. He found that their decisions agreed 88% and 91% of the time, respectively, with two groups of experimental Subjects from whom only the GSR had been recorded. More recently,

Moroney (1969), also using experimental Subjects, found that the more confident evaluators were in their decisions, the more likely they were to be correct. That is, the more ambiguous the charts were, the greater the possibility for error. Using charts obtained from criminal suspects, Horvath and Reid (1971) demonstrated that there was a high degree of reliability in blind examiner evaluations. They also showed that accuracy improved with experience. Hunter (1971) also demonstrated that polygraph charts can be reliably evaluated by independent examiners, and by the same examiners at a later point in time. In the most thorough study to date which has examined reliability, Kubis (1962) concluded that of the three channels he used, the pneumograph, the plethysmograph, and the galvanometer, the latter was the most reliable component. Finally, in a fascinating study, Holmes (1958) had six examiners independently evaluate 32 sets of charts blind. They were then given additional bits of information concerning the Subject and had to reevaluate the charts after each new bit of information. Holmes concluded that about 75% of the examiner's decision is based strictly upon the polygraph charts, and the rest is based upon subjective information. Unfortunately, Holmes did not report his results in sufficient detail for conclusions to be drawn concerning the reliability of the examiner decisions, but only about the validity of them.

The distinction between reliability and validity is an important one. Validity refers to accuracy: the ability of a test to measure or predict accurately what it is supposed to measure or predict (Hill, 1970, pp. 394-399). In terms of the polygraph, validity is a measure of the extent to which a deceptive or nondeceptive person will be correctly identified as such as a result of the examination. Reliability, on the other hand, doesn't refer to accuracy at all. Rather, reliability refers to consistency: the ability for the same results--whether correct or not--to be obtained each time the test is given or each time the test is scored. It is a truism that in order for a test to have good validity, it must also have good reliability. However, the converse is not necessarily true; a test may be very consistent, but may not measure what it is supposed to measure.

This study was conducted at the University of Utah in 1971. Seventy-two students volunteered for an experiment in lie detection. Half of them were told to take $10 from a desk drawer; the other half were not. Those 36 students who took the money were informed that if they could convince the polygraph examiner that they had not taken it, it was theirs to keep. All students were then examined by me. Now, I know that hypothetical crime examinations are held in low esteem among field examiners, and that there are numerous and significant differences between experimental Subjects and criminal suspects (Barland, 1972; Barland & Raskin, in press). But this does not negate the fact that half of the Subjects in my study had in fact taken that money, and all of the Subjects were put through as realistic a polygraph examination as possible. I used the Backster Zone of Comparison technique which lasted about two hours with each Subject. A Keeler 6317 three-channel polygraph was used. In this experiment we were able to determine with precision who had been lying to the relevant questions, and who had not. While this is of no importance in determining reliability, it is of crucial importance to the question of validity.

There are two major differences between my study and most of the previous experiments. The previous studies merely had the evaluators decide whether the person was deceptive or not. I required that my evaluators assign a number on a 7-point scale ranging from -3 to +3 for each possible response. A score of -3 indicated a large response to the relevant question together with a total lack of response to the adjacent control question. A score of +3 indicated just the opposite: a large response to a control question together with a complete lack of response to the adjacent relevant question. The second major difference between my study and most previous ones is that I had the evaluators assign these numbers to each of the three components, on each of the three relevant questions, on each of the three charts, obtained from each Subject. Thus, a Subject's total score on the entire test ranged between a possible plus or minus 81 (3 points x 3 components x 3 questions pairs x 3 charts). In practice, however, a score rarely exceeded plus or minus 20. Because the SKY questions were not asked on my tests, I decided that a score of 5 or higher indicated truthfulness, a score

of -5 or lower indicated deception, and a score of plus to minus 4, inclusive, was "inconclusive".

After I had examined each of the 72 Subjects and scored the charts, I sent them in small batches to five other polygraph examiners for an independent, blind evaluation. These 5 examiners were all military-trained examiners who had graduated from the Ft. Gordon school and who had learned the Backster numerical scoring technique there. The only thing they knew about the charts they were evaluating was the wording of the questions. They did not know if the person took the $10 or not, what the person looked like, what he said, how he behaved, or anything else like that. I thus ended up with a set of polygraph charts for each Subject, plus six numerical evaluation sheets showing how each response was evaluated by myself and five evaluators working independently of each other.

The fact that the evaluations were expressed as numerical scores along a continum rather than dichotomous decisions of "truthful" or "deceptive" probably doesn't strike you as being very important. In fact, however, it is of extreme importance. At the Ft. Gordon school, when they teach this numerical scoring system, they stress that it is primarily a teaching device so that the students will be able to learn how to score each type of response. They claim, and I have seen it happen, that by the time the course is over, the students will all be assigning a total score for each Subject which is within about 2 points of everybody else in the class. This is fantastic device for teaching reliability. But the school teaches that this scoring technique should not become a crutch for the examiner. Thus, most graduates do not continue to use it after they have acquired field experience, except in difficult evaluations. That this is so is really too bad, and I hope that many of you will consider routinely making such evaluations on every case you run in which a control question test is used. For this reason, I have appended a score sheet for you to refer to. It was a real stroke of genius on Backster's part when he developed this numerical scoring system, because it is a means of converting a person's physiological responsivity to a numerical score. Anytime a psychologist can assign a number of some aspect of a

person's behavior, it gives him an excellent research tool for analyzing group and individual results.

I mentioned that when the students leave the Ft. Gordon school, they are all making evaluations which have a range of about 2 points. I found that when the six evaluations for each Subject were compared, the mean range was 10.4 points. It is thus apparent that once the examiners have been out from school for a while, they begin to modify the relatively rigid rules learned at the school with that elusive factor called experience. This 10-point spread in scores can be looked at from both the theoretical and the practical standpoints. Let's look at it first from the theoretical view. When six different people score the same set of polygraph charts, there are 15 possible combinations of pairs of scores (5 + 4 + 3 + 2 + 1 = 15). And once a pair of scores from any two evaluators has been obtained for all of the 72 Subjects in the study, it is possible to compute a correlation between the set of scores from one examiner and the set of scores from the other examiner. A correlation is a number which summarizes the amount of predictability between two sets of scores. A correlation of 0.00 means that there is no predictability between the two sets of scores: knowing how one person scored the charts is of absolutely no help in guessing how the other person scored the charts. On the other hand, a correlation of + or -1.00 means that there is perfect predictability between the two sets of scores; if you know how one examiner scored the charts, you know with absolute certainty how the other examiner scored the charts. For the 15 possible pairs of examiners the correlations for the three components evaluated as a whole ranged from .78 to .95. The mean or average correlation for all of the 15 combinations was a phenomenonally high .86. What this means is that if you know how one of the evaluators scored a set of charts, you have narrowed down your guess of the score given by the other examiner by 74%. This is obtained by squaring the correlation. In this case, .86 x .86 = .7396 = 74%.

It is interesting to observe that the fact that I had examined the Subject myself did not have any apparent effect on my scoring, relative to the other examiners,

for the correlations between my scores and those of the other examiners (I was Examiner A) were essentially the same as the intercorrelations among the other examiners. In fact, several of the other examiners arrived at the correct decision as to each Subject's guilt or innocence more often than I did.

Correlations are fine for scientists, but what does this 10-point spread in scores for each Subject mean for us as polygraph examiners? It is not really very important, provided that the examiners tended to agree that the person was truthful or deceptive. For example, if the two extreme scores given to a specific Subject were -10 and -20, then all of the examiners agreed that the Subject was deceptive. If the two extreme scores were -10 and 0, this still would not disturb me, for what this would show is that some examiners called the person deceptive and others made no decision; that is, that the examination was inconclusive. What would be bad would be for the extreme scores to be, say, -5 and +5. Here one examiner would be saying "deceptive" and another examiner saying "truthful". How often did that occur? That is a critical question. This happened in 11 Subjects out of 72, or about 15% of the Subjects. Keep in mind that each set of charts was evaluated by 6 people. Naturally, the more different people that evaluate the charts, the more opportunity there is for such disagreements. If 1,000 people had evaluated all of the charts independently, then it is conceivable that there might have been disagreements on all 72 of the Subjects. Let us therefore break the analysis down into 2-man pairs of scores.

Table I lists the number of times that each possible pair of examiners disagreed about whether a Subject was truthful or deceptive. It also shows how many times out of a possible 72 that <u>both</u> examiners made a definite decision about the truthfulness of the Subject. Finally, it lists the percentage of disagreements in those cases where both examiners made decisions. You will find that in no case was there more than 4 disputes out of a possible 72; in that case there had been 38 cases in which both of the examiners made a decision. Four disagreements out of 38 paired decisions is 10.5%. At the other extreme, there were 0 disagreements out of 42 paired decisions, or 0%.

The overall totals were 25 disagreements (limited to 11 Subjects) out of 559 paired decisions, or a disagreement rate of 4.5%. I find this an amazing result, supporting the objectivity and reliability of field evaluations of polygraph charts. Out of 559 cases where 2 examiners both reached a definite decision about a Subject's truthfulness, they agreed 534 times, or 95.5% of the time!

TABLE I

Percent Agreement of Paired Decisions of Guilt/Innocence (Excluding Inconclusives)

Examiner Pair	Number of Disagreements	Number of Paired Decisions	Percent Disagreements
A - B	1	37	2.7
A - C	1	36	2.8
A - D	1	36	2.8
A - E	0	36	0.0
A - F	2	35	5.7
B - C	0	42	0.0
B - D	2	38	5.3
B - E	3	40	7.5
B - F	2	36	5.6
C - D	1	40	2.5
C - E	3	40	7.5
C - F	2	36	5.6
D - E	4	38	10.5
D - F	2	33	6.1
E - F	1	36	2.8
Total	25	559	4.5

As you will recall, I mentioned that each of the examiners gave a numerical score for each of the three components for each of the questions. We can therefore look at the reliability of the scores for each of the components separately.

TABLE 2

Mean Correlation and Range of Correlation Among the Six Examiners

Component	Mean Correlation	Range
Respiration	.645	.49-.89
GSR	.903	.83-.95
Cardiovascular	.755	.64-.86
Combined Components	.862	.78-.95

Table 2 shows the correlations for respiration, GSR, and cardio, respectively. As you can see for respiration the average correlation was .645. The average GSR correlation was .903. The average Cardio correlation was .755. Thus, it is obvious that the examiners scored the GSR responses most consistantly and the respiration least consistently. This is not surprising, since the GSR waveform is simple and the rules for scoring it are correspondingly simple and straightforward. On the other hand, the respirat ion parameter has so many different possible patterns, some of which are interpretable as showing deception and others as showing relief, that it is not strange that there was a wide range of scores among the 6 examiners. Moreover, it should be remembered that all of the examiners who participated in this study were trained at the Ft. Gordon school. Possibly the graduates of the National Training Center for Lie Detection, trained by Richard O. Arther, would score the respiratory responses more consistently, because Arther puts more emphasis on respiration. To have graduates from other schools evaluate these charts would make a fascinating study.

How accurate were the decisions? I must repeat that these charts were obtained in an experimental situation in which psychology students volunteered to serve as Subjects in a lie detection study. We are all aware of the dangers involved in trying to compare such studies

to the situation in the field. For example, at the time that I examined these 72 Subjects, I made a decision as to their truthfulness. Using cut-off points of ± 4, inclusive, for the inconclusive region, I ended up with 53% correct decisions, 12% incorrent decisions, and 35% inconclusives. Excluding these arbitrary inconclusives, 81% of my decisions were correct. These figures are not at all like I believe them to be in field situations.

Although the statistics pertaining to the validity of experimental testing does not directly pertain to the field use of the polygraph, it does serve to compare the efficiency of each of the three components. Here, I think, there may be some information which is applicable to those in the field. Which of the three components was the most accurate? Were there any that were not accurate?

TABLE 3

Percent Correct Decisions[a] (Excluding Inconclusives)

Examiner	A	B	C	D	E	F	Mean
Component:							
Respiration	67	74	64	77	76	79	72.8
GSR	72	76	77	80	79	86	78.3
Cardio	67	68	69	77	69	71	70.2
Combined	81	79	81	83	80	86	81.7

[a]The boundaries of the "inconclusive" region were ± 1, inclusive, for each of the individual components, and ± 4, inclusive, for the score for all components combined.

Looking at each component separately, and calling any score "inconclusive" if the total score for that component for any individual was 0, -1, or +1, we can see from Table 3 that in those cases where the results were not inconclusive, where a decision was made, the GSR was the most accurate of the 3 components, with 78.3% of the decisions being correct. Respiration was

the second most accurate at 72.8% and Cardio was last at 70.2% correct. But all 3 components, separately, were statistically significant in discriminating between the guilty and innocent Subjects. Even with the least effective component, the Cardio, you could have gotten that many correct purely by guessing only 34 times out of 10,000. All three components were effective, and the GSR was the most effective.

When the scores for all three components were lumped together, as is usually the case in scoring charts, the results were even more accurate than they were for any single component by itself. When the boundaries of the inconclusive region were $\pm$ 4 inclusive, 81.7% of all decisions were correct, as compared with 78.3% for the GSR. Table 3 also shows us that with every one of the 6 examiners, the GSR was the best single indicator, and that, with 5 of the examiners the total score was a better indicator of guilt or innocence than any single component by itself. With the 6th examiner, the GSR was tied with the total score.

TABLE 4

Percent Correct Decisions[a] (Excluding Inconclusives)

Examiner	A	B	C	D	E	F	Mean
Component:							
Respiration	60	67	63	73	66	78	67.8
GSR	72	74	70	74	72	79	73.5
Cardio	64	65	65	73	73	66	67.7
Combined	74	70	72	74	75	81	74.3

[a]The boundaries of the "inconclusive" region were limited to scores of 0 for each component individually and also for the score for all components combined.

If we reduce the inconclusives to only those scores which were 0. You can see from Table 4 that about the same thing happened as before: the GSR was the best, and the combined scores of the 3 components were even better. With only one of the 6 judges was the total

score worse than the GSR. The respiration and Cardio components were about equally effective.

In this study, there were 72 Subjects whose charts were evaluated by 6 different examiners. Some of the examiners were more accurate than others: Excluding inconclusives, the percentage of accurate decisions ranged from 79% to 86%; the average of the examiners was 81.7%. We have just seen that if you combine the scores of all of the components, the accuracy of the polygraph is greater than it was for any individual component by itself. Suppose we do much the same thing for the evaluator's decisions. Instead of looking at how any one evaluator did on each Subject, consider the average all of the 6 evaluations of each Subject's charts and see how accurate this composite score is for each Subject.

Team Review More Effective

We found a most remarkable thing: the "average score" for each Subject was more often correct than the score of any individual examiner. Whereas the average examiner was correct on 81.7% of his decisions, the combined scores were correct 86% of the time. Thus, by combining the scores for all of the examiners before deciding whether a given Subject was telling the truth or not, there was a noticeable increase in accuracy of the decisions.

It is my understanding that an unpublished reliability study conducted by the Department of Defense, in which some 30 examiners each evaluated 50 sets of charts obtained from criminal suspects, arrived at the same conclusion. This finding of increased accuracy by pooling the individual decisions appears to be a reliable finding, which clearly supports the concept of the military's Quality Control offices.

Conclusions

This study clearly demonstrates that examiner decisions are highly reliable, and that it is possible to increase the accuracy of decisions by having additional examiners evaluate a set of charts. The American Polygraph Association might consider establishing a board of examiners whose function would be to independently

evaluate polygraph charts obtained from important cases going before a court. I think we would be negligent in our duties as polygraph examiners if we were not to take all practical steps to increase the already high accuracy of the polygraph.

The central conclusion of my study is that independent evaluations of charts by other examiners yield highly reliable results, with agreement in about 95% of those paired cases where both examiners reached a definite conclusion. Associated with this, I concluded that the combined evaluations of any particular set of charts was more likely to be accurate than any of the individual evaluations by itself. I think that these findings can safely be applied to any situation where a properly constructed and administered control question test is being scored by competent and experienced examiners who are familiar with the control question technique.

I suspect that one would be on increasingly dangerous ground in attempting to apply these results to other types of tests such as the Peak of Tension, the Relevant-Irrelevant with added control questions, or the pure Relevant-Irrelevant.

Concerning the consistency of the evaluations of the various individual components, I think that the finding that the GSR was the most reliable is applicable to field situations, assuming the GSR component of the polygraph is functioning properly. As for the reliability of the other two components, relative to each other, I would suspect that the particular training of the examiners involved in this study may have influenced the results, and that examiners trained in other schools might yield different results. Because my study involved a laboratory experiment, I think that the accuracy most definitely cannot be generalized to field situations. The findings concerning the relative accuracy of the individual components must be treated cautiously for the same reason. But the finding that the combined effect of the components was more accurate than any single component by itself probably applies to field situations. I see no reason why it would not, and there is some evidence from other studies which suggest that this may be so.

I hope this study also stimulates other examiners to use the numerical scoring system, and to gather data concerning the relative effectiveness of the various components. Everybody seems to have an opinion about which is the single most accurate component, but field examiners do not offer facts to support their opinions.

At the University of Utah, we have embarked on a program to shed some light on this question by applying a numerical scoring system to all control question examinations administered to criminal suspects in our laboratory. Although this program is still very young, the initial indications support the finding of this study, that the GSR is the single most effective component of the three. The usefulness of the GSR with criminal suspects has also been supported by some excellent recent research in Israel (Kugelmass et al., 1968). But more data are needed before the question can be adequately answered. Practicing examiners are in a position to provide some of that data. I urge them to do so.

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ZONE OF COMPARISON
NUMERICAL ANALYSIS DATA SHEET

CHART I	Q4-5-6	Q6-7	Q9-10	Component Total	
PNEUMO					
GALVO					
CARDIO					TOTAL
SUB-TOTAL					

CHART II	Q4-5-6	Q6-7	Q9-10	Component Total	
PNEUMO					
GALVO					
CARDIO					TOTAL
SUB-TOTAL					

CHART III	Q4-5-6	Q6-7	Q9-10	SKY	Component Total	
PNEUMO						
GALVO						
CARDIO						TOTAL
SUB-TOTAL						

SHOT TOTALS				

SUBJECT _____

DATE _____

ROOM _____

EXAMINER _____

GRAND TOTAL	

REVIEWER _____

DATE REVIEWED _____

PNEUMO _____

GSR _____

CARDIO _____

IMPROVING POLICE SELECTION WITH THE POLYGRAPH TECHNIQUE

by

Clarence H. A. Romig

> Then it will be our duty to select, if we can, natures which are fitted for the task of guarding the city?
>
> It will.
>
> And the selection will be no easy matter, I said; but we must be brave and do our best?
>
> We must.
>
> Plato, The Republic

The Selection Process

Since the beginning of history man has been occupied with finding suitable approaches to the equitable division of labor. The obvious fact that some men can perform some tasks better than other men and that no man can do everything well has prompted rulers and teachers of every age and culture to seek a quick, convenient and accurate method of predicting human ability without undergoing the wasteful process of trial and error.

As long ago as 350 B.C., in The Republic, Plato described a number of tests that could be administered to young men to screen out the "smiths" and to select the guardians of the city.[1] About the same time the Chinese had already devised a system of examinations to judge candidates for various magisterial positions. Heredity has also long been and still is considered to be a logical method of designating men for such occupational roles as king, lawyer, or even policeman.

Sometimes the choice presents no problem because the job to be filled is easy, or the labor supply is adequate. But in a democratic society that frowns on nepotism, divination, or chance as instruments of job appointment, and when the positions to be filled are complex and the supply of competent

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labor rather tight, it becomes a matter of paramount importance to avoid the prohibitive cost of continually hiring inadequate employees.

While utilizing the most modern selection standards in the country in 1960, New York City Police Commissioner Stephen P. Kennedy complained about the selection process and cited an exceedingly high rate of police candidate failures within the first year of employment. Kennedy reported that each candidate lost within the first year cost the city no less than $6,000.00; more than one hundred candidates were lost annually the previous several years at an estimated annual cost of over $600,000.00. These personnel losses were attributed to physical and mental incapacities, personality defects and false personal history statements that came to light after the candidates were employed. Higher standards and more effective personnel screening devices were urged.[2]

Shortly after Kennedy's plea for an improved selection procedure his replacement as New York City Police Commissioner, Michael J. Murphy, in a speech in November 1961 to the Chelsea Lion's Club in Manhattan, stated that "what kind of a police department we will have ten and twenty years from now depends on what kind of men we attract and accept today."[3] In citing the long and difficult selection process, Murphy indicated that no more than ten to fifteen per cent of the police applicants were finally accepted for the police academy. Yet the rejection rates in the police field were not uncommonly high. Just before the start of World War II, the R. H. Macy Company in New York City conducted interviews of over one hundred seventy six thousand applicants to hire thirteen thousand.[4] Both the commercial and police hiring functions were long and difficult processes.

The Personnel Selection Process

Then, as is the current practice generally, the personnel selection process included the following steps: (1) Complete an application blank for a background investigation; (2) Undergo personal psychological-aptitude tests; (3) Take a physical examination by a doctor; (4) Attend a selection-review board. Even with the rejection of 85 to 90 per cent of the applicants Kennedy complained about the inefficiency of this system. He complained about the high loss rate after personnel had been thoroughly processed and hired. Kennedy clearly saw the need for improvement of the system for predicting successful police applicants.

The Application Form

The police, industry, and the military have long used application forms as a technique for predicting future success. Although the application forms serve as a culling-out vehicle, those applicants who claim past job success, high educational and training qualifications and a settled family life are selected for further evaluation. Sometimes the personal history statements of the applicants are used in lieu of the application form. Both serve equally well as sources of information for reference checks and background investigation, although adequate background investigations are a rarity. Eli Ginzberg opined that "the best test of future performance can be found in past behavior" upon the culmination of his research as reported in three volumes entitled The Ineffective Soldier.[5] Conversely, Ruth J. Levy reported that one "cannot predict from an absence of unwanted qualities before employment. . . because individuals change and adapt to their new position and are influenced by new associates, physical locations and opportunities."[6] The problem of selection and predicting future success in the use of application forms or personal history statements suffer also from false information on the form, ascertainable only by a comprehensive and relatively expensive background investigation and astute personnel interview techniques.

The Interview

Another of the selection steps is the interview process by either interviewers or the employment board. Many personnel administration texts extoll the omnipotence of the trained personnel interviewer in the ferreting out of false information on the application forms. Other such texts have high praise for the interviewer's ability to predict future success of applicants. However, such claims are not supported by research. As long ago as 1922, the value of the interview was seriously questioned by an investigator, who noted that when fifty-seven applicants for sales positions were interviewed and appraised separately by twelve sales managers, the results showed very little agreement and some astonishing discrepancies in evaluation. One applicant, for example, was ranked first by one sales manager and fifty-seventh by another.[7]

Twenty-seven years later in 1949, another comprehensive review of the literature on interviewing revealed that very little evidence had been obtained testifying to the effectiveness of the employment interview. Out of 106 articles on

interviewing only 25 had reported actual results and these were inconclusive.[8]

After another ten years had passed, England and Patterson, upon surveying the state of the interview during the 1950's, suggested that a moratorium on books on interviewing be called until more empirical support for its use was developed, a recommendation concurred with by Dunnette in 1962, and repeated in 1963 by Dunnette and Bass.[9, 10, 11]

Like the application form and personal history statement, the interview by a trained interviewer or by a panel of officials is shown as a relatively ineffective selection tool, which is extremely susceptible to the manipulation of the applicant.

The Physical and Psychological Examinations

As reported by Kennedy earlier, physical and mental incapacities and personality defects accounted for many of the police losses within the first year on the force. The physical examinations by doctors and personality and psychological tests by professional psychometrists were standard tests designed to discover such disorders, yet they missed enough of the afflictions to cost the city $600,000.00 annually. In The Inefficient Soldier Ginzberg reported that the Army was oversold by the psychiatrists as to the value of psychological and psychiatric screening as means to weed out emotionally unstable soldiers. He stated that such screening can be efficient only if directed toward the most likely potential failures and the marginal cases. Physical and mental problems are usually known to exist by the applicants when they apply for the police positions, yet they are not officially identified early enough to preclude their being erroneously employed. Could this be because the applicants have taken the advice of Martin Gross, who wrote in his The Brainwatchers: "When taking a psychological test, the testee should protect himself by answering the questions to conform to the image he thinks the company is looking for."

As could be observed from the foregoing description of the classical selection process, no foolproof method has been universally accepted to ensure the hiring of the best

qualified men for the police department. Is there any other means available to the police or any other prospective employer to verify information provided by the applicant for a job? Allen Dulles thought so in his The Craft of Intelligence.

> The best one can do is to have the most thorough examination that can be given and I feel that one should not exclude, in the examination, technical aids, such as the polygraph, more popularly known as the lie detector. In my experience, I found the "lie detector" an important investigative aid in sizing up employees and most valuable in clearing people of suspicious and false charges as it was in providing clues to weaknesses or derelictions.[12]

How has the polygraph been used for police selection? Does the use of the polygraph more effectively screen applicants for sensitive jobs? Will polygraph examinations save time, effort and departmental funds through the pre-employment testing techniques?

The Polygraph and Police Selection

The use of the polygraph for police recruit selection is not a very recent innovation. There is evidence that no less than eight state police and twenty-three municipal police departments had at one time employed the polygraph in the selection process.[13] The earliest record of such employment of the polygraph was at the Burbank, California police department in the early 1950's. Rather than redundantly list each complete report of polygraph use in recruit selection, several of the most dramatic reports are summarized for convenient review.

Examinations in California

The first report of police candidate pre-employment polygraph testing was prepared by Chris Gugas concerning tests in the early 1950's in Burbank, California.[14] After examination of twenty-four applicants, fourteen were rejected for employment for one or more of the following concealed reasons, which were ascertained by polygraph examinations: excessive alcoholism, excessive gambling, poor credit standing, arrest records, homosexuality, serious emotional problems, other than honorable discharge from the military and serious health

defects. Gugas later conducted pre-employment examinations on five hundred and ten applicants for six California police departments. Of the five hundred and ten men, who were screened by the polygraph, two hundred and thirty-three were rejected. The gross rejections amounted to approximately forty-five per cent of all those examined. Causes of rejections were listed by the examiner as: Health problems not listed on application: bad back, epilepsy, migraine headaches, ulcers, emotional disturbances, bladder trouble, severe allergies, respiratory problems, venereal diseases, and skin diseases. Arrests not listed on application: Juvenile offenses; rape, arson, burglary, theft, and vandalism. Adult offenses; rape, embezzlement, extortion, arson, theft, bigamy, murder, desertion from service, mayhem, wife beating, intoxication, fraud, child molestation, and sex perversion. Military service record: other than honorable release and unreported courts martials. Previous work record: discharge for serious cause, dishonesty on the job, lack of application of effort on job, personality defects as related to job, intoxication on the job or as related to absenteeism, and carelessness in executive duties required by job. Abnormal sex behavior: active homosexual condition, bestiality, and serious sex behavior indiscretions. Credit: poor credit risk rating, and failure to meet financial obligations.

Examinations in Florida

Effective April 1961 the Orlando, Florida Police Department incorporated the polygraph as a pre-employment screening device in addition to the usual personnel procedure: (a) a lengthy personal history and application is notarized and submitted; (b) a background investigation is conducted; (c) a fingerprint and police records check is made; (d) a credit bureau check is employed; (e) a physical examination is performed; (f) a written intelligence examination is undergone; (g) the Civil Service Board interviews the applicant. The polygraph examination was incorporated as the last step in this process.[15]

During 1961 and 1962 approximately eight hundred and ninety-four applications were received from prospective police candidates. The employment process prior to polygraph examination resulted in selection of forty-five candidates and the rejection of eight hundred forty-nine applicants. Polygraph examination of the remaining forty-five candidates resulted

in deceptive answers and admissions thereto of the following questions at the cited frequency:

75% committed serious undetected crimes.
66% stole from previous employers.
32% had personal problems which could cause embarrassment to the department.
30% engaged in recent, frequent homosexual acts.
18% uttered bad checks.
16% had been fired from jobs.

No indication was given of the number of the applicants that were finally employed after the results of the polygraph examination were ascertained.

Examinations in Michigan

In 1962 the city of Kalamazoo, Michigan initiated the use of the polygraph as a screening device in the selection of police candidates. In June 1964, Mr. Barber reported to the Keeler Polygraph Institute Alumni Association his findings during the early phases of the use of the polygraph for this purpose.[16]

> Prior to the use of polygraphic screening, the Kalamazoo Police Department, as most other departments, employed the initial entrance examination with the traditional background investigation. Upon recommendations, the applicants (sic) were forwarded to the oral board for acceptance and/or rejection. ... The first group of applicants contained thirty-three subjects. These thirty-three subjects had successfully passed the entrance examination. They were then administered the usual "hit and miss" background investigation by the detective force and of the original thirty-three, twenty-six were recommended and seven not recommended. The twenty-six recommended subjects were then administered pre-employment polygraphic screening examinations of which nineteen subjects were not recommended and seven were recommended. This indicated that 73% of all subjects processed

> through the traditional "hit and miss" background investigation by the detective force were rejected. ... In terms of supervisory, investigatory, secretarial and oral board time *involved, it was determined that well over* $3,000.00 was expended needlessly on the nineteen subjects who subsequently were rejected by polygraphic screening.

As an economic measure the selection process was altered so that the next group of police candidates was given the initial entrance examination first and the successful candidates then polygraphed prior to further employment processing. Only those candidates who were recommended by the polygraph examiner were subjected to the background investigation. Obviously, certain specific areas of investigation were developed by the polygraph examination which allowed targeting by the background investigators.

> There were twenty-two subjects in this group who had successfully passed the entrance examination. . . . the examiner recommended six and rejected sixteen. Thus 72% of those subjects who passed the initial entrance examination were subsequently not recommended as a result of polygraphic screening. The sixteen rejected subjects would have gone through the traditional "hit and miss" background investigation and again in terms of supervisory, investigative, secretarial and oral board costs, an evaluation indicates a cost savings to the department of well over $2,000.

Eventually an evaluation was made of the admissions elicited from the first one hundred twenty-seven police candidate applicants of which the above cited groups were included. The one hundred twenty-seven candidates admitted to a total of five hundred eighty-one offenses for which they had been tried in court, might have been tried in court had the offenses come to the attention of the police, or until the moment of the polygraph examination had eluded being identified as perpetrators. Some of the candidates admitted to falsification of their applications in efforts to conceal garnished wages, excessive debts, drinking or drug problems and other non-criminal yet deviant and highly questionable behavior history.

In July 1967, Mr. Barber prepared a second analysis of the pre-employment polygraph program of the police department of Kalamazoo, Michigan. This new report encompassed the police applicant screening of two hundred and nine individuals.[17]

Evaluations of admissions made by the applicants were used as an indication of their past performances and were utilized as a basis for rejection. Although judgments for rejection were primarily based on self-admission of involvement in questionable or criminal conduct, revelation of such information by the traditional background investigation would also have been grounds for automatic rejection. This polygraph process undoubtedly elicited more such information than would have been uncovered by investigation, because the majority of the incidents were unreported when they occurred. The second analysis of uncovered unfavorable information resulted in one hundred nineteen recommendations of employment and ninety applicants not recommended. From the ninety applicants who were not recommended, two thousand eight hundred thirty-nine admissions of felonies, misdemeanors, active concealment of disabilities or offenses and application falsifications were obtained.

Fox later reported additional results of the continued police applicant testing in Kalamazoo. He reported that of the three hundred twenty-four applicants that were examined from 1968 through 1971, about three thousand eight hundred fourteen disqualifying offenses or actions were elicited. No mention was made in that report as to the number of candidates who successfully completed the entrance requirements and were hired between 1968 and 1971.[18]

Examinations in California

In 1967, Blum published some initial findings of a study of a California Sheriff's Department to determine whether the polygraph had any real merit as a police selection tool. Blum incorporated the polygraph technique into the selection process. All the job applicants were advised that the polygraph test was required, but none were told that the results of the polygraph examination would be inapplicable in the selection. The purpose of the polygraph examination and the none-use of the results was to establish: (a) what would have happened had the polygraph examiner's findings been considered, in

contrast to what actually happened when his recommendations were not known by the other personnel in the selection process; and (b) to develop an eligible list which would include both applicants who were recommended and those rejected by the polygraph examiner. It was the purpose of the study to observe the performance of these two groups of men and establish the adequacy of the polygraph technique as a predictor of future suitability of police candidates.

After the first year of the study it was found that there was no significant associations between the polygraph recommendations and the oral review board actions. Applicants were failed by the polygraph and accepted by the other tests; conversely, applicants were recommended by the polygraph examiner and then were rejected during the routine selection process. The area of greatest disagreement between the polygraph and the routine selection measures involved serious criminality. Most of the men certified as eligible for hiring after the routine selection process, but who were rejected by the polygraph, had admitted to serious crimes that were undiscovered by the routine selection system.

In Blum's words, "This study does not report on the validity of the polygraph examination as a means for predicting behavior on the job in law enforcement. Some validity. . . await follow-up observations on men actually hired. The study does find that the polygraph examination yields information not revealed by other selection methods."[19]

Examinations in Colorado

In June 1964, a report of pre-employment polygraph screening of police candidates was submitted from the Police Department of Denver, Colorado to the Denver Civil Service Commission.[20] Within the employee selection procedure the polygraph examination was given after the written (intelligence level and aptitude) and physical agility examinations and prior to the oral board, medical examination and background investigation.

Of the four hundred eighty-four applicants examined within 30 months the following results were reported:

375 or 77% admitted stealing from employers.
148 or 30.5% had been arrested by police.
110 or 22.7% participated in homosexual acts after age 17.
169 or 34.9% participated in homosexual acts before age 17.
260 or 53.7% told substantially the truth.
224 or 46% did not tell the complete truth.
134 or 27.6% were accepted as police officers.

Conclusions

A cursory review of the literature related to the polygraph and instrumental detection of deception has revealed voluminous writings in the police selection field. Most of the authors have agreed that the polygraph has value in the personnel selection processing of police recruits. Mainly due to the lact of definitive research and evaluation of the suggested techniques, a recommendation for the continued research of the employment of the polygraph in police selection is heartily endorsed.

In addition to the continuous replication of the cited studies, the following recommendations are suggested as specific considerations to be incorporated in the program of the polygraph examination of police applicants. Note that the order of these recommendations does not represent any attempt at priority listing.

1. Polygraph examinations should be conducted by competent, qualified and licensed examiners employed by a reliable and reputable firm that is experienced in personnel type examinations. Preferebly these examiners should conduct the examinations in a team approach thereby affording each examination with two opinions of the chart tracings. Additionally, in order to provide consistent results and techniques, the examiner(s) selected should be contracted for the entire project period.

2. A permanent polygraph facility should be provided to ensure a secure, private, quiet and uninfluenced physical setting to the examinee. Motel rooms and conference rooms should be avoided.

3. The recruiting brochures and application forms should state in no uncertain terms the fact that the polygraph is one of the many steps normally used in the selection process. Any application form or personal history statement should specify that any and all information will be verified by background investigation as well as by the polygraph test.

4. That all facets of the pre-test, testing, post test and other personal contacts in the polygraph phase be tape recorded for verification of proper conduct of the examiner and the statements elicited, and for review by the appropriate employing authorities.

5. That all facets of the polygraph examination, instrumentation, and test construction be discussed with the examinee prior to testing. Tape recording and two-way mirror use should be explained appropriately.

6. Even with two examiners employed in the team approach, no more than two applicants should be examined by each examiner daily to preclude haste and possible errors.

7. Police selection examinations should not require an interrogation of those suspected of deception.

8. Because the polygraph is merely one phase of the selection process, uncorroborated polygraph opinions should not be the final determinant for or against rejection of an applicant.

9. Complete and accurate data concerning each hired or rejected applicant should be retained for future use and evaluation.

FOOTNOTES

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EFFECTS OF CERTAIN IMMUNIZATIONS ON POLYGRAPH EXAMINATIONS

by

William J. Scheve, Jr.*

ABSTRACT

Experiment to determine the effect of tetnus diptheria and typhoid booster immunizations on Ss of polygraph examinations. 33 Ss divided equally into control, tetnus diptheria, and typhoid groups. Peak of tension polygraph examinations given all Ss before immunizations, 24 hours after immunizations, and 72 hours after immunizations.

Tetnus diptheria booster group showed no appreciable difference from control group. The typhoid group had faster heart rate, greater pulse amplitude, and more erratic cardio tracings than the control group.

Typhoid booster immunization appears to have adverse effect on cardio tracings in excess of 72 hours. Recommends question on immunizations during pre-test of all Ss., and test charts to determine effect of immunologic response when typhoid shot reported.(Ed.)

Objective

The purpose of this study was to determine whether or not recent immunizations, specifically tetanus diptheria toxin and typhoid, have any significant effects on the

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The findings in this report are those of the author and are not to be construed as reflecting an official statement by the U.S. Department of Defense or the Department of the Army.

results of polygraph examinations.

Discussion

From time to time polygraph examiners have reported testing individuals whose polygraph responses were erratic and irregular. Subsequent interviews of these individuals revealed that in some instances they had recently received immunizations of some type. Re-examination of these subjects several days later reportedly resulted in more readily analyzed reactions.

Individuals are made immune to certain diseases by injections of small amounts of a vaccine, which is normally a solution containing killed or weakened bacteria or viruses of a specific disease. Such vaccines cause the individual to produce specific antibodies(immunologic response) against the foreign organisms and may cause mild sickness for a period of several days. It is possible that an individual's immunologic response may result in the production of erratic and irregular polygraph responses.

During pretest interviews of subjects who are to be examined by polygraph, the question, "Have you taken any drugs or other medication during the past 24 hours?", is normally asked by the examiner. Persons who have received an immunization of some kind during that period usually answer in the negative, not necessarily because they intend to deceive, but because this aspect of preventive medicine is so commonplace in our society that they seldom think of an immunization as a drug or medication.

Tetanus diptheria toxin and typhoid immunizations are routinely given in the military services, and tetanus diptheria toxin in both the military and civilian communities as part of the treatment frequently given injured patients. This increases the probability that polygraph examiners may encounter on a relatively frequent basis persons who have been recently immunized.

It is important to determine if tetanus diptheria toxin or typhoid immunizations have an effect on the various polygraph recordings and, if so, what the specific effects might be.

Procedures

Volunteer subjects. This study involved a total of 33 volunteers divided into three groups of 11 each. Group I, the control group, received no immunizations during the period of this experiment. Group II received tetanus diptheria toxin immunizations and Group III received typhoid immunizations. With the exception of three volunteers who were civilians, all participants in this experiment were either students or members of the staff and faculty at the U.S. Army Military Police School (USAMPS), Fort Gordon, Georgia. The volunteers in Groups II and III were selected from the immunization control card file maintained by the USAMPS Personnel Office. Only subjects due for routine tetanus diptheria toxin or typhoid immunizations within the following 90 days were asked to volunteer. All subjects tested during the experiment were required to complete personal data sheets and to sign voluntary statements of consent.

Location and time. The experiment was conducted at the Polygraph Branch, Criminal Investigations Division, USAMPS, Fort Gordon, Georgia, during April 1971.

Equipment. The polygraph instrument used for the experiment was a Stoelting Deceptograph (civilian Model 22500, Army Model AN/USS-2D) with single pneumograph, galvanograph, and cardiosphygmograph components.

Pretest procedures. A mass pretest concerning the purpose of the experiment, an explanation of the polygraph instrument, and procedures to be followed was given to the volunteers. The mass pretest technique was used in an effort to save time during the conduct of the actual examinations, and to give each volunteer exactly the same instructions. It quickly became apparent, however, that individual pretesting time of at least ten minutes was essential to reduce the high level of general nervous tension experienced by the first few subjects tested.

Testing method. Three separate polygraph examinations consisting of three charts each were given to each volunteer. The first polygraph examination was administered to each of the 33 volunteers prior to any immunizations, to establish a base line study or "norm" for each person.

After the first examination series, Group II was given their tetanus diptheria toxin immunizations and Group III was given their typhoid immunizations. The second polygraph examination was administered to Groups II and III 24 hours after their immunizations and the third examination 72 hours later. The control group, Group I, was examined as closely as possible in conformance with the same schedule as the immunized groups.

Test questions. Because the volunteers were promised that no questions of a personal nature would be asked during any part of the examinations, only peak of tension questioning techniques were employed. During the first examination series, a seven to nine number card test was used. During the second examination series, the volunteers were asked to take from a cup a piece of paper on which a number was written. During the third examination series an attempt was made to determine the middle name of each volunteer from his middle initial. Because coming up with seven names beginning with the same first letter proved too difficult, the "pick a number from the cup" test was frequently substituted. A control question - "Have you lied to me during this examination?" was used as the last question for each chart.

For the first two charts of each examination series, the questions were asked in numerical sequence and a paper with the numbers or names on it was hung on the wall in front of the subject. In every case the subject responded to the examiner's questions with the number or name and then his negative response, e.g., "Was that number a six?" Response: "Six? No."

During the third chart of each examination series, the question sequence was varied so that the subject could not know when the relevant question was going to be asked. Frequently, this chart proved to be the most reliable in determining the subject's deceptive response as the reaction was usually more pronounced than in the first two charts in which he was able to anticipate the relevant question. To stimulate and maintain interest a reward of five dollars was promised if the examiner selected the wrong deceptive response.

Immunization data. All volunteers in this experiment had previously received tetanus diptheria toxin and typhoid immunizations at least once. Consequently, the immunizations given to them during this experiment were boosters. Each subject in Groups II and III was immunized intramuscularly in the right arm.

The dosage administered to the tetanus diptheria toxin group was 0.5cc TDT (Tetanus Diptheria Toxin), alum precipitated, with Thimerosal preservative at 1:10,000, lot no. 6550D9, manufactured by the National Drug Company, Division of Richardson-Merrell, Incorporated.

The typhoid group was immunized with 0.5cc typhoid vaccine, acetone inactivated and dried. The diluent for the typhoid vaccine was sterile 0.02M phosphate buffered isotonic saline containing 0.5% phenol as a preservative, lot no. 94604, manufactured by Wyeth Laboratories.

Chart Analysis Procedures

Because additional personnel for administrative and technical assistance were not available at the time of this experiment, it was necessary for the experimenter to make all arrangements for locating, interviewing, pretesting, assigning to appropriate groups, witnessing immunizations, and scheduling polygraph examinations of the volunteers, as well as conducting the examinations. Therefore, to eliminate as much personal bias as possible on the part of the examiner, the 297 polygraph charts from this study were not evaluated for data tabulation until several months after the conclusion of the testing phase. At that time, the names on the charts were blocked out and numbers assigned.

The responses to the irrelevant questions were matched against the response to the relevant (key) question on each chart. The irrelevant question response used for evaluation was arbitrarily selected as the response to the second question that preceded or followed the response to the relevant question, depending on the location of the relevant question on the chart. The response to the first question on a chart was not used for evaluation in any case, i.e., if the relevant question on a chart was question number 3, then the response to question number 1 was disregarded. In such a case, question number 5 was used

for measurement or comparison purposes. Measurements were made by components in terms of amplitude, frequency and duration of the response within the 15 second interval following the question stimulus mark on the chart. Component measurements were made as follows:

Pneumograph. The number of breaths taken in the 15 second interval following the selected relevant and irrelevant questions was counted and averaged for each chart, individual, and group. (The amplitude of the pneumograph tracings was not measured for tabulation purposes because only a single pneumograph tube was used and it could have been altered too easily by shifts in breathing between the chest and diaphragm, by attempts of the subject to control his breathing, and by the manner and tightness in which the pneomograph tube was affixed to each subject by the examiner.)

Galvanograph. The galvanograph tracings were measured only in terms of whether or not there were significant galvanograph responses on the chart.

Cardiosphygmograph. The cardiosphygmograph readings were recorded at the beginning and end of each chart, averaged for each examination series, and then averaged by group. The recorded pulse rate at the irrelevant and the relevant group questions were averaged by individual and by group for the 15 second intervals following the stimulus marks. The amplitude of the cardiosphygmograph tracings was also measured and averaged to determine variations for each subject during each examination series.

Findings

In general, there were few differences of any consequence between Group I, the control group, and Group II, the tetanus diptheria toxin group. Group III, the typhoid group, however, demonstrated marked increases in mean blood pressure and pulse rates and a relatively high incidence of distorted cardiosphygmograph tracings. Specific differences by component were as follows:

Pneumograph. The control group demonstrated a faster breathing rate than either the tetanus diptheria toxin or the typhoid groups in all three examination series, varying from an average of 4.038 breaths per 15 seconds

in the first examination series to an average of 3.87 in the third examination. It is speculative, but the average age of the subjects in the control group was 22 (significantly reduced because three of the control subjects were young teenagers), while for the tetanus diptheria toxin and typhoid groups it was 34 and 33, respectively. More apprehension on the part of the less experienced younger people in the control group may explain their higher breathing rate. The tetanus diptheria toxin group remained relatively constant with a low of 3.76 to a high of 3.82 breaths per 15 seconds during the three examinations. The typhoid group decreased gradually from an average of 3.72 breaths per 15 seconds during the first examination series to 3.53 during the second series and 3.31 during the third series. See Table I for variations in the rate of breathing of the individuals tested.

Galvanograph. Self-centering of the galvanograph component was used in all charts. No important differences were found in the galvanic skin response (GSR) activity among any of the groups. Little or no GSR, or a plunging GSR was found in almost a third of the charts, and these were divided relatively evenly among the three groups. This may be partially accounted for by the fact that many of the volunteers had to be tested late in the day after they had finished school or work and were somewhat fatigued. Also, as might be expected, the largest percentage of erratic GSR tracings was found in the third examination series, by which time the volunteers were tiring of the experiment and losing interest.

Cardiosphygmograph. The most significant differences among the groups were found in the cardiosphygmograph tracings. There were small insignificant differences between the control and the tetanus diptheria toxin groups. In tracings of the typhoid group, however, an increasing mean blood pressure (the amount of pressure required to center the dicrotic notch) was noted during the second and third examination series, as well as a marked increase in pulse rate during the examination conducted 24 hours after the immunizations. Further, 9 of the 11 subjects in the typhoid group showed increases in the amplitude of the cardiosphymograph tracings, varying from one-quarter to one-half inch, during the examination series conducted 72 hours following immunization. In more than half of the charts provided by these nine subjects during the third

examination series, the tracings traveled to the upper limit of the cardiosphygmograph pen stop. The results of two of the examinations were inconclusive, and several more might have been inconclusive were it not for pronounced reactions in the pneumograph and galvanograph tracings.

The following chart shows the average beginning and ending mean blood pressures for each examination series by Group. For individual mean blood pressure variations see Table II.

AVERAGE BLOOD PRESSURES (mm Hg)

	First Series	Second Series	Third Series
Group I, Control	84/85	82.5/85.5	82.5/85
Group II, TDT	85.4/87	84.4/86.4	85/87
Group III, Typhoid	83.5/84.5	87.4/88.5	89.1/90.4

The following chart shows the average pulse rates per 15 seconds by group and by examination series. For individual variations in pulse rates see Table III.

AVERAGE PULSE RATES

	First Series	Second Series	Third Series
Group I, Control	21.8	22.3	20.2
Group II, TDT	21.4	20.6	20.1
Group III, Typhoid	21.9	24.0	19.8

Conclusions

In general, it appears that anyone who has recently received a tetanus diptheria toxin immunization may be

given a polygraph examination with little fear of unusual or erratic chart tracings as a result of the immunization. On the other hand, consideration should be given to postponing for three to five days the polygraph examination of a subject recently immunized against typhoid. The risk of distorted and possibly inconclusive charts when examining a subject recently immunized with a typhoid booster is comparatively high, largely because of the distortions caused by the fluctuations in mean blood pressure.

In addition to this experimental evidence, that typhoid vaccine causes a more significant immunologic response in an individual than does tetanus diptheria toxin vaccine, many of the typhoid volunteers complained of mild discomfort because of their "shots." None of the tetanus diptheria toxin immunized group voiced such complaints. The mechanics of the immunologic response to specific vaccines is beyond the scope of this paper, but it is fairly common knowledge that some vaccines cause more discomfort than others. Based on the experience of this author, immunizations most disliked by many members of the military services because of the lingering discomfort factors associated with them include plague, typhoid, yellow fever, flu, and cholera.

Based on the findings from this study, it would seem prudent during the pretest interview of a subject for polygraph examination to include recent immunizations in the questions concerning the use of drugs or other medications during at least the previous 72-hour period. Since the mean blood pressure of many of the typhoid immunized volunteers was still increasing at the end of the third day, it may be necessary to postpone the examination for several more days. Postponement of an examination because of a recent immunization may not be necessary, but it certainly could eliminate a potential distortion in the results.

In cases in which a subject is suffering obvious discomfort, the examination should be postponed. In those cases in which the subject feels no discomfort, however, a test chart should be completed to determine if there are any significant distortions that may have been caused by the immunization. If distortions occur, the subject should be re-examined after the immunologic response subsides.

Obviously, the facts and circumstances surrounding the necessity for any particular polygraph examination must be determined by the examiner.

Recommendations

Inasmuch as this experiment involved only a small group of volunteers, a more conclusive study should be conducted using more stringent controls and a larger sampling of subjects to evaluate the evidence resulting from the present study.

Another study should be made to determine the approximate length of the period of immunologic response to typhoid vaccine. Since the mean blood pressure of the volunteers immunized with typhoid boosters in this study continued to rise over a 72-hour period, is it possible that it would continue to rise for another 24 to 48 hours longer before returning to normal?

Additional studies should also be conducted to determine the effects of other vaccines, i.e., yellow fever, plague, cholera, flu, etc., as well as antibiotics such as penicillin and tetracycline, on the results of polygraph examinations.

TABLE I

Pneumograph Respiration Rates Per 15 Seconds

Subject Number	First Series	Second Series	Third Series
Group I, Controls			
1.	5.0	5.16	4.0
2.	2.58	2.83	2.75
3.	4.9	4.9	4.9
4.	3.58	2.9	2.9
5.	4.83	4.3	4.5
6.	4.0	4.58	3.9
7.	3.58	3.75	4.16
8.	5.25	3.9	4.4
9.	4.6	4.6	4.08
10.	3.3	4.08	4.0
11.	2.8	2.5	3.0
AVERAGE:	4.038	3.95	3.87
Group II, TDT			
1.	2.3	3.0	2.9
2.	6.8	6.6	6.5
3.	2.58	2.9	3.0
4.	3.6	3.25	3.16
5.	4.16	3.75	4.0
6.	4.0	4.0	4.0
7.	4.0	4.6	4.16
8.	4.08	3.6	3.5
9.	2.08	2.58	2.3
10.	4.75	5.08	5.16
11.	3.08	2.58	3.3
AVERAGE:	3.76	3.81	3.82
Group III, Typhoid			
1.	3.9	3.83	3.75
2.	1.58	1.58	1.9
3.	3.25	3.0	3.0
4.	4.0	4.0	3.1
5.	4.83	4.3	3.9
6.	4.6	5.6	4.5
7.	4.16	3.3	3.6
8.	2.9	2.3	2.0
9.	4.08	3.5	3.8
10.	4.6	4.25	3.75
11.	3.0	3.16	3.08
AVERAGE:	3.72	3.53	3.31

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TABLE II

Average Beginning and Ending Mean Blood Pressures

Subject Number	First Series	Second Series	Third Series
Group I, Controls			
1.	87/90	85/88	83/87
2.	85/90	84/92	84/88
3.	90/91	82/86	82/86
4.	87/86	84/87	81/84
5.	83/87	82/82	79/82
6.	91/91	84/84	82/82
7.	80/82	82/86	82/86
8.	80/79	83/86	82/84
9.	70/70	84/85	86/87
10.	90/88	78/81	85/84
11.	81/82	80/84	82/86
AVERAGE:	84/85	82.5/88.5	82.5/85
Group II, TDT			
1.	89/84	86/86	96/97
2.	83/87	82/82	84/86
3.	87/89	83/85	88/90
4.	77/73	87/87	83/85
5.	81/84	84/88	80/84
6.	93/93	91/93	92/91
7.	82/85	85/86	84/87
8.	90/92	82/84	83/84
9.	81/89	80/85	82/84
10.	90/92	84/84	82/82
11.	87/89	85/91	83/90
AVERAGE:	85.4/87	84.4/86.4	85/87
Group III, Typhoid			
1.	93/90	101/99	104/105
2.	80/87	84/86	88/89
3.	75/75	87/89	80/84
4.	84/86	81/83	88/87
5.	85/89	86/88	98/98
6.	90/89	90/90	91/93
7.	81/80	85/88	84/86
8.	80/80	85/87	83/85
9.	74/75	83/81	83/84
10.	86/87	86/87	89/90
11.	90/92	92/94	92/93
AVERAGE:	83.5/84.5	87.4/88.5	89.1/90.4

TABLE III

Average Pulse Rates of Subjects Per 15 Second Intervals

Subject Number	First Series	Second Series	Third Series
Group I, Controls			
1.	25.5	29.7	18.8
2.	23.5	23.2	20.5
3.	23.6	21.5	19.5
4.	20.5	22.5	19.8
5.	19.2	17.3	18.8
6.	30.2	28.8	24.5
7.	21.5	20.3	18.0
8.	24.3	27.0	30.6
9.	19.5	19.3	17.0
10.	16.5	18.3	18.0
11.	15.5	17.5	16.3
AVERAGE:	21.8	22.3	20.2
Group II, TDT			
1.	30.0	27.8	26.0
2.	18.2	20.0	18.3
3.	17.6	19.0	24.0
4.	19.2	20.0	19.5
5.	19.3	18.5	17.5
6.	25.0	23.0	23.5
7.	18.2	17.5	16.5
8.	16.3	17.0	16.3
9.	25.5	19.3	17.2
10.	20.8	19.0	17.5
11.	25.5	25.3	25.0
AVERAGE:	21.4	20.6	20.1
Group III, Typhoid			
1.	23.3	25.0	22.0
2.	21.3	23.3	21.2
3.	23.5	25.8	20.6
4.	21.3	23.3	17.0
5.	21.8	19.5	15.3
6.	22.2	27.8	22.2
7.	25.0	29.5	22.5
8.	21.6	25.6	22.3
9.	19.2	22.5	18.5
10.	16.8	20.6	16.8
11.	24.6	21.5	20.0
AVERAGE:	21.9	24.0	19.8

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QUESTION SPACING

A Study of time lapse from the end of Stimulus to the end of Reaction in a Polygraph Examination

by

Kenneth L. Haney
San Diego County Sheriff's Department

Abstract

Study evaluates a school standard of 15 and 20 seconds between polygraph questions as to whether it is too long or too short. One hundred criminal cases analyzed as to reaction to opening statement. 95% of the reactions subside within 20 seconds, 66% within 15 seconds. Additional avenues of research recommended. (Ed. abstract)

The Keeler Polygraph Institute Training Guide instructs the polygraph examiner to allow a minimum of 15 seconds between stimuli, but not over 20 seconds during an R & I test. No explanation is given for this instruction. It is assumed this lapsed time is to allow dissipation of autonomic response following stimulus, plus recovery from to the previous state.

The purpose of this study is to determine:

1. Can the recommended 15 second minimum be shortened to allow either shorter tests with less subject discomfort or allow more questions per test with tests of present length?

2. Should the recommended 15 second minimum time be extended to some longer period?

3. Is the recommended 20 second maximum too long a period?

4. Should the recommended 20 second interval be extended?

A portable A.C. Model No. 22500 Deceptograph manufactured by the C. H. Stoelting Company with Associated Research Chart rolls was used throughout the study.

The first 100 cases examined in 1965 were taken in the order they appeared. Each was a criminal case. Stimulus used in each case was the announcement of test beginning. In each case it consisted of: "All right, the test is about to begin. Sit perfectly still, do not move, answer each of these questions, 'Yes' or 'No' or not at all." Only the classic autonomic responses described in the Keeler Polygraph Institute Training Guide for cardio sphygmograph, pneumograph, and GSR were tabulated. All polygrams were executed in the normal galvanometer mode, and the self-centering device was never employed. No attempt was made to record magnitude of any given autonomic response to the stimulus, but only its duration was considered.

The average length of response was 12 seconds. More than ½ of the responses lasted 12 seconds. A 12 second response recurred more frequently than any other.

About 2/3 of the responses lie between 7½ seconds and 16½ seconds. Almost 95% of the responses fall between 3 and 21 seconds.

A total of 5 subjects failed to respond in any way to the stimulus. One individual had not completed his response in 30 seconds and in this case his response was interrupted by the first test question. Eighty-nine persons completed their responses after 15 seconds passed and 95 of the sample of 100 completed their response to the stimulus within 20 seconds.

Indications are that we can be confident at something less than the 1% level that this sample is a good estimate of the true measure. If this is so, the study tends to indicate that if Keeler Institute Training Guide instructions

are followed to allow a 15 to 20 second interval between stimuli this will include about 95% of the cases.

On the basis of this pilot study one might instruct examiners to remain flexible in regards to insertion of stimuli. While the 15 to 20 second interval will include most cases one should remain alert for the few exceptions. As in many aspects of human behavior it would appear that autonomic response may also exhibit large individual differences. However, before accepting or rejecting the hypothesis it is felt a further study should be made to include a larger sample.

It is interesting to note that visual examination of those few cases where responses exceeded the 20 second interval reveals that the galvanometric response in each case lasted longer than either cardio or pneumo response. This premise might be subject to further study. Related study might also include the following:

1. Are there age and sex differences in response?

2. Are there any consistant similarities or differences in response time for the various sections measured - cardio, pneumo, etc?

3. Are there any consistant changes in magnitude and duration of response with time? That is, during an examination lasting an hour or more are there differences in response from chart to chart as suggested by the Backster total chart minutes concept?

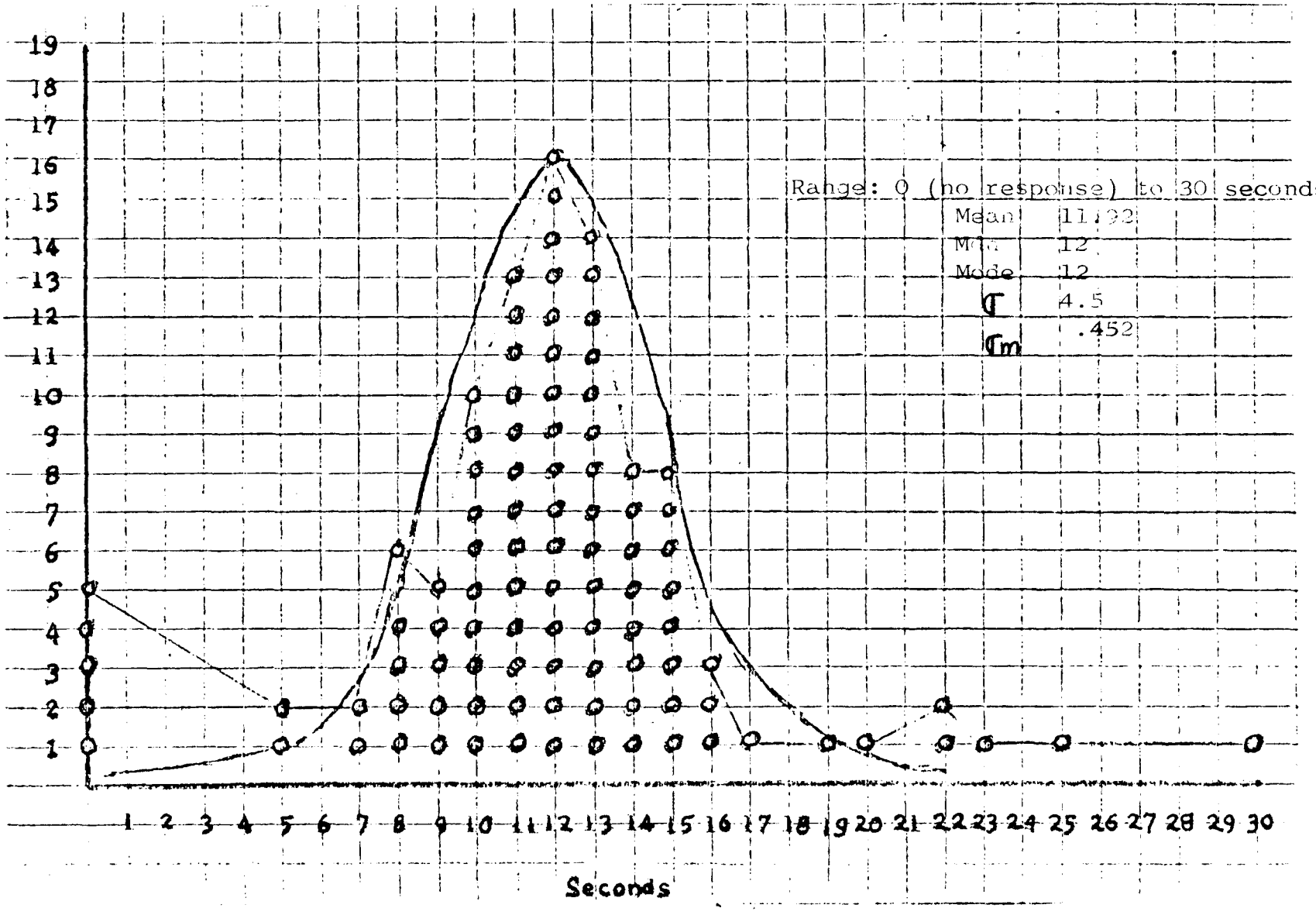
4. Are there differences in response time between relevant and irrelevant test questions?

5. Does length of a stimulus have anything to do with reaction time?

6. Are there differences in reaction time between those who tell the truth and those who attempt deception?

7. Can it be determined if there is a response more typical of deception than all others?

8. Is there any difference in response time when a subject answers 'Yes' or 'No?'



RESPONSE TIME, FROM THE STIMULUS OF THE ANNOUNCEMENT OF THE BEGINNING OF THE TEST

100 CASES

SENSITIVITY LEVEL TEST vs CARD TESTS

by

Norman A. Matzke

To a polygraph examiner, the phrase "Card Test" as it relates to polygraphy should be repugnant. Its synonymous with amateurism and trickery. I have observed excellent polygraphers conduct very competent pre-test interviews and then subsequently follow up with a Card Test. In my opinion any reference to playing cards while conducting a polygraph examination shows a definite lack of professionalism. Have you ever approached a subject with some cards in your hand and observed a smile come over his countenance when he firsts observes the cards? Does he suspect that possibly the cards are marked; that the examiner is a slight of hand expert; or that there is some other trickery involved? As professional examiners, using a diagnostic instrument, we can ill afford to be associated in any manner with anything that remotely resembles or suggests deceit. Even though you may feel you are successful in your endeavors with the Card Test, have you really accomplished your mission? Have you completely convinced the subject on the reliability of the instrument? In many cases you have not, and this is evidenced by the lack of amplitude in the responses noted in the polygrams later produced.

Sensitivity Level Test

In lieu of the "Card Test", I would suggest possibly using a method I refer to as the "Sensitivity Level Test". At the conclusion of the first polygram, in some techniques, it is the responsibility of the examiner to assure the subject of the validity of the examination, to restimulate the untruthful, and to reassure the truthful. Therefore, explain to the subject that the following procedure is to conduct a Sensitivity Level Test to ascertain his or her's specific response to a known lie, the better to enable the examiner to evaluate the polygrams. It is further explained that the majority of subjects respond in a somewhat predictable manner; however, one (1) in fifty (50) have an unusual response pattern

to a deceptive response. In the event that the examiner is unable to discern a deceptive response to a known lie during the Sensitivity Level Test, it would in no manner invalidate the examination, but rather, would show the examiner that the subject has an unusual response pattern which he can then evaluate when interpreting the subject's charts. The subject is then handed a sheet of paper and instructed to write a number on the paper, using a number between 13 and 20. The subject is further instructed not to write the number 13 nor the number 20, but rather, some number in between. It is then requested that after writing the number on the paper, it be folded several times and retained in the subject's possession during the sensitivity Level Test. The examiner then hands the subject a pen and turns his back, so that he cannot observe the number written on the paper. When the subject indicates that he has written the number and folded the paper, the examiner then turns to the subject and explains that the questions will be formulated in the following manner:

"Regarding the number you wrote on the paper, was it number 13?" (Instruct the subject to answer 'no'.)

"Regarding the number you wrote on the paper, was it number 14?" (Again instruct the subject to answer 'no'.)

"In other words, you will answer 'no' to each and every number I ask you, including the number you wrote on the paper. At no time during this portion of the examination will you answer 'yes' to any question. Therefore, when you answer 'no' to the number you wrote on the paper, you will be lying. From this I will be able to observe your emotional response to a known lie; however, as I previously stated, in the event that I cannot readily discern your lie to the number you wrote on the paper, it will in no way invalidate the examination."

Then proceed with the examination and go through the numbers 13 through 20 in that order. In 99% of the cases the G.S.R. is the most reliable of the components on which to base an opinion on this type of Peak of Tension Test. It is also advisable to run two tests consecutively, the second to be in a mixed series.

It has been my experience that in 65% of the Sensitivity Level Tests conducted, the subjects have selected the number

17; however, it has also been found that more often those appearing dull or less intelligent will select number 14.

Using this procedure you will find that you have stimulated the deceptive and reassured the truthful in a manner commensurate with your profession. It is advisable to follow this portion of the examination with the statement, "Now that I have demonstrated to you that the instrument can detect truth from deception, that should make you feel more at ease. You can be assured that I can tell when you are telling the truth."----long pause----and conversely, you know that I can tell when you are lying."

I do not advocate that all polygraphers use the Sensitivity Level Test. However, to those who are still utilizing the "Card Test" I would suggest that they re-evaluate their procedures. In my opinion the use of cards is antiquated, ineffectual and non-professional.[1]

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[1]Editors Note: Examiners are requested to submit comments on this Technique and examples of other stimulus Tests.

MURDERER CONFESSES AFTER POLYGRAPH EXAMINATION

A CASE IN MEXICO

by

Ing. Hernan Guajardo G.

The body of a 20 year old man was found on August 9th on the railways tracks to Paredon, on the outskirts of San Nicolas de los Garza, showing a number of bruises. In the beginning he was thought to be the victim of an accident; but upon a more careful study of the body traces were found indicating blows apparently caused by a blunt instrument. He was definitely not killed by a train accident, as it was thought at the beginning.

The body was taken to the Hospital Univarsitario, where the autopsy took place; the results showed as the cause of death what the investigators had already deduced. In charge was Police Deputy Lic. Federico Rodríguez Lucio.

Up to then the identity of the corpse was unknown; but after patient investigations, he was found to have been Juan Torres Ramos, 20 years old, from San Luis Potosi, single, who had been living at Rayones - 1557 on Topo Chico. When the aforesaid information was verified, the police officials began a series of interviews with the neighbors; talking with everyone who in one way or another had been related with the victim. Nevertheless, this added few facts to the information they had.

Meanwhile, a stranger had been to the hospital asking for information about the deceased, his address, whether he was ill in the hospital, and inquiring if the body was still in the morgue of that hospital. Investigation progressed slowly due to the mystery surrounding the case. However, the agents already had in their list of suspects the name of Jose Luis Garza Martinez; precisely the stranger who had been making inquiries at the hospital. Less than 36 hours later Jose Luis was arrested when found suspiciously begging for alms "to bury a relative".

What put him under suspicion was the fact that he had been asking for information at the hospital before the discovery of the body was published in the press. When the policemen found out that the beggar said he was a relative of the dead man, it increased their suspicions, and they decided to investigate him exhaustively.

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Jose Luis could not deny he knew the victim, since he was found begging for money to bury him; so he had to admit they had been friends; even though he denied having anything to do with the murder. But the questioning showed discrepancies that led the investigators to suspect him even more.

The agents that conducted the investigation were certain that they had the murderer; but they still lacked the evidence to support that certainty. That was when they asked Jose Luis to take the lie detector test, and he agreed. I conducted the examination with a Keeler model 6338. This was the first time in our state that polygraph evidence and examination was admitted into the judicial process.

Meanwhile, police headquarters had asked the Mexico City Police to send information on the suspect, since he said he had lived there. They sent back data that showed him as a thief, impersonator, and drug addict.

The results of the polygraph examination afforded evidence that denied all his statements of being innocent. When he realized he was lost, he confessed. After a complete confession, he and the police proceeded to reconstruction of the crime; and it was found that the day it took place Juan and Jose Luis had been drinking together. On getting drunk they began to remember times when they had fought and why; and they began to fight over again. Juan got the worst part of it as his friend managed to hit him on the head with a rock; and when Jose Luis saw him lying down he hit him again and again until he killed him. Then he took the body and put it on the tracks in order to disguise his crime as an accident when the train passed over the body.

CALIFORNIA COURT ADMITS POLYGRAPH EVIDENCE

Memorandum of Opinion on Motion under 1538.5 Penal Code and Introduction of Polygraphic Evidence

Superior Court of the State of California for the County of Los Angeles

People of the State of California, Plaintiff
vs.
Raymond Cutler, Defendant

The Defendant is charged in an information filed by the District Attorney with a violation of Section 11530 of the California Health and Safety Code (possession of marijuana), to which he entered a plea of not guilty and made a motion under P.C. 1538.5 to exclude the marijuana seized on grounds of an unlawful search and seizure. The issue of the illegality of the search was submitted on transcript of testimony taken at the preliminary hearing plus additional testimony in support of the offer by Defendant to introduce into evidence the result of a polygraph examination administered to him.

As revealed by testimony taken at the preliminary hearing, Defendant was arrested at the Los Angeles International Airport, by a U.S. Marshal after a search of his carry on luggage by the Marshal revealed a plastic baggie containing marijuana. There was a direct conflict between the testimony of the Marshal and that of the Defendent who testified at the preliminary hearing as to whether the luggage was opened by the Marshal or the Defendant and whether the Defendant, on request, gave consent to the opening of the bag.

Relevant to this conflict, the Defendant offered to introduce into evidence the result of a polygraph examination taken by the Defendant purporting to show no deception in his testimony that the Marshal opened his luggage without his permission. The alleged lack of consent and who opened the luggage is considered by the court to be a critical one on the legality of the search under the P.C. 1538.5 motion to suppress and the results of the polygraph examination is relevant to that issue if admissible.

It is the experience of this court during his ten years of presiding at criminal trials that the great majority of trials on issue of guilt or innocence turn on the credibility of witness; that perjury is prevalent and the oath taken by witnesses has little effect to deter false testimony. The principal role of a trier of fact is the search for truth and any reasonable procedure or method to assist the court in this search should be employed.

In view of the needs for procedures to aid trial courts and juries in judging credibility and deception, the decisions of the California Appellate Courts in respect to the admissibility of expert opinions of the results of polygraph examinations should be reviewed and re-evaluated in light of the current scientific knowledge on the subject. (Prior decision holding polygraph evidence not of sufficient scientific certainty to justify admission into evidence -- People v. King (1968) 266 ACA 466; People v. Carter (1957) 48 C.A.2d 737; People v. Porter (1955) 136 C.A.2d 461).

Extensive evidence was introduced in this case on the psychological, and psychological principals of polygraph; description and function of the measuring device used in the examination, the nature and purpose of pre-examination interview, the programming of the examination, the experience and training of examiners and expert opinions as to the both reliability and validity of the examination to detect falsity and deception.

From this extensive expert opinion and evidence, this court makes the following factual findings that it considers to be amply supported by the evidence and which may be of some assistance to Appellate Court reviewing this court's ruling:

Findings:

1. That the science of polygraphy, including the developing of more sophisticated polygraph machines; the development of standards of procedures in pre-examination interviews; the elimination of unsuitable subjects; the programming of relative and control questions; the training and development of qualifications for examiners has been

the subject of great and significant advancement in the last ten years.

2. That recent laboratory and in-the-field research has established a generally recognized reliability and validity of the polygraph in excess of 90 percent.

3. That the polygraph now enjoys general acceptance among authorities, including psychologists, physiologist and researchers in these fields as well as polygraph examiners and possesses a high degree of reliability and validity as an effective instrument and procedure for detecting deception.

4. That many defense and security agencies of the U.S. Government determine whether charges and court martials will be filed or prosecuted on the basis of polygraph examination.

5. That several law enforcement agencies in California uniformly refuse to file complaints or informations when no deception is shown in polygraph examinations of suspects.

6. That at least two Federal Trial Courts have admitted into evidence the results of polygraph examinations under court controlled procedures (U.S. of America v. Richard Ridling, Criminal Action No. 46732, United States District Court, Eastern District of Michigan, Southern Division, Memorandum Opinion rendered 10/6/72; and U.S. v. Errol Zeigler, Criminal Action No. 1831-70, U. S. District Court for the District of Columbia, Memorandum Opinion and Order filed 10/10/72).

7. That the courts have sufficient authority and under the Evidence Code to control, limit and condition the introduction of such evidence so that overemphasis will not be placed on such evidence. (See discussion of these considerations (Pages 11-13) in the opinion of Judge Parker in U.S. v. Zeigler, supra, and on Pages 11-13 in opinion of Judge Joiner in case of U.S. v. Ridling, supra).

8. That examiners Beardon and Charney, who examined the Defendant, both by reputation, experienced and training, are well qualified and competent polygraph examiners and

their examination conducted in this case was conducted in accordance with generally recognized and accepted procedures. That the admitted errors made by Beardon in marking wrong answers to certain questions on his charts are not so substantial as to affect his end interpretation. The record reveals that Mr. Beardon's conformity with standard procedures was more than sufficient, and his explanations of his markings as to answers on the charts did not severly impair his ultimate evaluation and conclusions as to lack of deception.

Conclusions and Order:

1. The opinions of examiners Beardon and Charney concerning evaluations and interpretations of the results of the polygraph examination given to the Defendant will be received into evidence.

2. Defendant's P.C. 1538.5 motion to exclude the marijuana seized is granted.

DATED: November 6, 1972.

Allen Miller (signed)
Judge of the Superior Court

SOME OBSERVATIONS ON THE DeBETHAM CASE

by
Chris Gugas, Sr.

When attorney Charles Sevilla of the Federal Defender's Office in San Diego, California called me to discuss polygraphing a narcotics suspect, I little realized the extent to which I would become involved in the case.

The case was that of a young man who had been accused of attempting to smuggle a few grams of heroin into the United States from Mexico. Attorney Sevilla informed me that his client had been polygraphed by two examiners and found to be telling the truth in claiming that he had no idea there was heroin in an automobile he was driving. The suspect, Bruce Eugene DeBetham, related the following story which led up to his arrest by Federal Agents: DeBetham said that he had been in Tijuana with friends and was separated from the group when they wanted to do some extensive visiting; he was to wait for them at a nearby store. When they failed to show up after several hours, he decided to go back to San Diego. As he was approaching the border area, he was beckoned by an old school chum who was alone in a car. The driver asked DeBetham to drive his car to the gate area while he made a fast trip to the restroom. He was told by the driver, that if he did not get back in time, to meet him across the border at a designated spot. As DeBetham neared the gate, he was routinely pulled over and the car was searched by the Customs men on duty. They found a small amount of heroin in the trunk of the car. Mr. DeBetham denied any knowledge of the narcotics and explained to the officers what had happened.

The driver of the car was subsequently arrested, but he told another story. He said that both he and DeBetham had specifically gone to Mexico to purchase heroin and that the idea had originated with DeBetham. The driver offered to testify against DeBetham in return for clemency. Suspect DeBetham refused to

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admit anything, claiming he was innocent and that the driver was lying. It was at this point that Mr. Sevilla submitted his client to polygraph examinations.

It is interesting to note that the driver had a heroin habit and had been arrested previously for narcotics offenses. DeBetham had never used heroin, but did admit to the examiners that he had smoked marijuana.

Mr. Sevilla told me that he was interested in having me give DeBetham a third examination in my offices as there was some suggestion by the U.S. Attorney's office that DeBetham may have used some type of drug before his prior examinations which could have affected the results. I set a date and told the subject not to take any type of medication prior to his test on the following morning. When he arrived, I sent him to a medical laboratory, in the same building where tests were made, to establish with certainty that he did not take any medication or narcotics within the past twenty-four hours. The laboratory report indicated that DeBetham was clear of any medication which might affect his examination.

The polygraph examination was then administered and it was my opinion that Mr. DeBetham had not attempted deception to any of the critical questions asked. I had two satisfactory control questions to which the subject admitted deception.

After submitting my report to the attorney, we then made preparations to introduce testimony in the Federal Court to establish the necessary foundation to allow the polygraph into court. Mr. Sevilla did excellent research and the staff of the Federal Defenders assisted in this significant work. All of us "burned the midnight oil" for several weeks in preparation for the court hearing. Mr. Sevilla also contacted F. Lee Bailey, Charles Zimmerman, Lynn Marcy and Robert Brisentine to testify on the validity of the polygraph technique.

I spent about two full days on the stand and demonstrated the polygraph on two persons. Both were good subjects, and the court and those present were impressed with the positive results. I testified on

the various techniques in use, psychological and physiological aspects, interrogation procedures, and on my background and experience as an examiner. The cross-examination by the U.S. Attorney was rigorous and detailed. She had the assistance of two military examiners to aid her in her questions. No attempt was made at that time to introduce the charts into court; we were only laying a foundation. Later, Bailey and the other examiners testified for almost a full day before the court adjourned.

Subsequently an examiner with the local Sheriff's office testified for the prosecution. This examiner testified that in his opinion, the polygraph should not be allowed into court, and that if it was, he would leave the polygraph field. He indicated that the polygraph had not yet gained enough scientific validity to be accepted into court as expert testimony. This testimony was countered by defense experts with statistical figures on the validity of the polygraph, which had been published in more than fifty journals.

After the experts had testified, the Judge Gordon Thompson handed down his decision which indicated that he was most favorably impressed with the testimony given by the proponents of the polygraph technique and that it should be considered for courtroom testimony. The Judge, however, concluded by stating that he was obligated to deny admission of the results of the polygraph examination because of two previous cases in which the U.S. Appelate Court had denied allowing the results into evidence. It is interesting to note that no other reason was given by Judge Thompson for the refusal. The case is now before the 9th Circuit Court of Appeals. Bruce Eugene DeBetham was fined $750 and "sentenced" to obtain a four year college education by Judge Thompson!

Observation on Preparation for Testimony

In conclusion, one observation for all practicing polygraph examiners: No matter how much experience you have as a polygraph examiner, you had better begin studying again and get ready to meet some very stiff cross-examination by either side when the polygraph results are finally admitted into court. The courtroom

is no place for amateurs or incompetents, or those who have never had to testify in a court of law.

The importance of attending seminars and other polygraph meetings should be a definite requirement for those who intend to stay in the polygraph field. The new techniques and rapid strides we have made in the past years require that every polygrapher keep up with current procedures if he is to survive in court presentations.

I also recommend that every examiner read and carefully digest the book by F. Lee Bailey and Henry B. Rothblatt: Investigation and Preparation of Criminal Cases, Federal and State. This book will give you an idea of what is expected of a polygraph examination. Bailey's book, The Defense Never Rests, is another must for American Polygraph Association members.

COURT OF APPEALS REVERSES TRIAL COURT ORDER ADMITTING POLYGRAPH

U.S. v. Zeiger

An order by the U.S. District Court for the District of Columbia permitting a Federal defendant to introduce expert testimony about the favorable results of his polygraph tests, 12 CrL 2057, is reversed without opinion by the U.S. Court of Appeals for the D. C. Circuit.

The district court had decided that the polygraph is now reliable enough as a tool for detecting deception to tender admissible expert opinion testimony as to the results of adequate testing. The U.S. District Court for Eastern Michigan had reached a similar result only days earlier, 12 CrL 2055, but this was in a perjury case and the court set up more stringent preconditions to the admission of the polygraph testimony.

Text of the order: "This cause came on for consideration of an appeal under 23 D. C. Code Section 104(d) from an order of the District Court dated November 7, 1972, which admitted proferred polygraph testimony, and the Court heard argument of counsel. On consideration of the foregoing, and of the record on appeal herein, it is ordered by the Court that the order of the District Court appealed from in this cause is hereby reversed and this case is remanded to the District Court for further proceedings." Per Curiam, U.S. v. Zeiger; Court of Appeals, D. C. November 9, 1972.

is no place for amateurs or incompetents, or those who have never had to testify in a court of law.

The importance of attending seminars and other polygraph meetings should be a definite requirement for those who intend to stay in the polygraph field. The new techniques and rapid strides we have made in the past years require that every polygrapher keep up with current procedures if he is to survive in court presentations.

I also recommend that every examiner read and carefully digest the book by F. Lee Bailey and Henry B. Rothblatt: Investigation and Preparation of Criminal Cases, Federal and State. This book will give you an idea of what is expected of a polygraph examination. Bailey's book, The Defense Never Rests, is another must for American Polygraph Association members.

COURT OF APPEALS REVERSES TRIAL COURT ORDER ADMITTING POLYGRAPH

U.S. v. Zeiger

An order by the U.S. District Court for the District of Columbia permitting a Federal defendant to introduce expert testimony about the favorable results of his polygraph tests, 12 CrL 2057, is reversed without opinion by the U.S. Court of Appeals for the D. C. Circuit.

The district court had decided that the polygraph is now reliable enough as a tool for detecting deception to tender admissible expert opinion testimony as to the results of adequate testing. The U.S. District Court for Eastern Michigan had reached a similar result only days earlier, 12 CrL 2055, but this was in a perjury case and the court set up more stringent preconditions to the admission of the polygraph testimony.

Text of the order: "This cause came on for consideration of an appeal under 23 D. C. Code Section 104(d) from an order of the District Court dated November 7, 1972, which admitted proferred polygraph testimony, and the Court heard argument of counsel. On consideration of the foregoing, and of the record on appeal herein, it is ordered by the Court that the order of the District Court appealed from in this cause is hereby reversed and this case is remanded to the District Court for further proceedings." Per Curiam, U.S. v. Zeiger; Court of Appeals, D. C. November 9, 1972.

REPAIRING THE STOELTING PNEUMOGRAPH ATTACHMENT

by

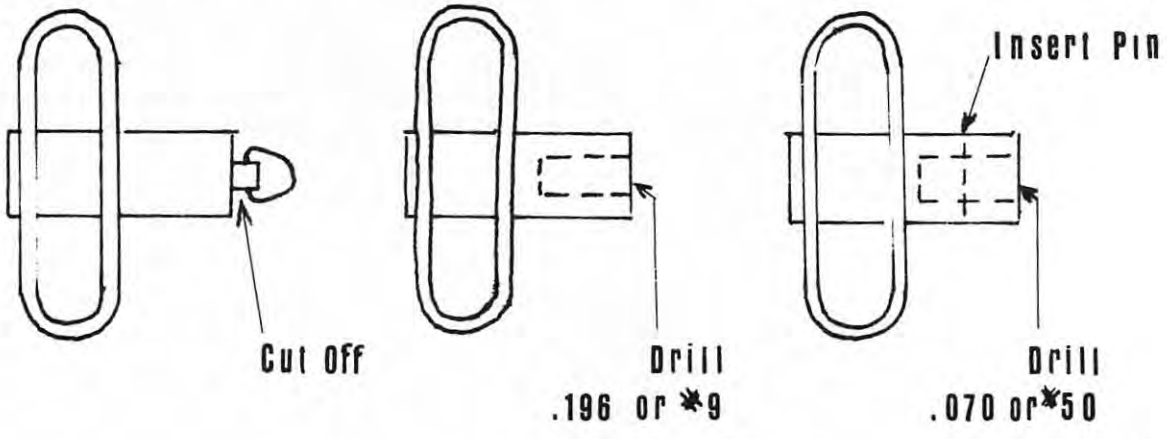
Ronald E. Decker

When the inner rubber band breaks in the small Stoelting pneumograph attachment, you begin the repair by removing the thread which holds the rubber to the metal end. Then break the glue joint and gently remove the convoluted tube from the metal. You will often find that the rubber band was cut by the thin wire of the retaining ring.

Cut new rubber bands to the same length as the broken ones. In an emergency, you can use the old ones but their age makes them more likely to break sooner. Use bands of about the same width. Loop each end over the retaining rings and glue with rubber glue. Then tie with string and replace the tube on the end pieces, using glue.

To prevent the thin wire rings from cutting the bands again, cut off the old ring and the projection that held it. Drill a hole where the projection was using a .196 or #9 drill. Drill this in far enough that you can cross it with another hole from the side that will hold a retaining pin. Drill that hole with a .070 or #50 drill and insert a retaining pin. The rubber bands are looped around the retaining pin.

Holes and breaks in the convoluted pneumograph tube may be temporarily repaired with liquid rubber, plastic rubber, or a flexible sealant. Such a repair is only temporary. Order a new tube from the factory.



Polygraph 1972, 01(4)

INTERNATIONAL REGISTRY OF COMPUTER USERS AMONG PSYCHOPHYSIOLOGISTS

Edited by S. David Kahn, M.D. and Emmett B. Swint, Jr.

Atlanta: Georgia Institute of Technology, 1972

Reviewed by N. Ansley

This work represents an extremely useful reference source for those who wish to exchange information regarding the application of computer technology to psychophysiology. Since the publication is soon to be updated, those who use computers are urged to include their laboratory work. Directories like this one prevent duplication of work and facilitate the informal exchange of concepts and results.

The present list resulted from information furnished by the respondents to a questionnaire sent to all subscribers to the journal Psychophysiology. A statistical summary of this data will be published in the March 1973 issue of Psychophysiology. The current edition lists 179 individuals with addresses. Although the majority are in the United States, individuals in ten foreign nations are also listed.

The book lists the types of computers, physiological variables under study, and programs under development or wanted by the physhophysiologists. All of the data is cross-indexed, allowing users to locate colleagues with similar computers or similar interests. The physiological variables are eye, cardiovascular, nervous system, muscle, respiration and skin. Each of these has subsections.

The directory may be ordered from Mr. Emmett B. Swint, Box 31194, Georgia Institute of Technology, Atlanta, Georgia 30332. The price is $3.00 and checks should be made out to Computer Registry. Those who wish to add their work and interests to the next issue should obtain forms from the same address and submit them before January 1, 1974.

Polygraph 1972, 01(4)

REVIEW: "MAGNITUDE OF GALVANIC AND VASOMOTOR RESPONSES AS A FUNCTION OF STIMULUS INTENSITY"

Hovland, C. I. & Riesen, A. H. Magnitude of galvanic and vasomotor responses as a function of stimulus intensity. Journal of General Psychology, 1940, 23, 103-121.

The study was undertaken in the belief that the role of the emotional tone of the stimulus has tended to obscure research on investigating the relationship between the intensity of the stimulus and the magnitude of response.

Method

For each subject simultaneous recordings were made of the skin resistance, vaso-motor response, and breathing movements. To insure peripheral circulation in S's extremities, room temperature was kept moderately warm. The E was screened from the S's view, but was able to observe S to detect any muscular activity in the limbs accounting for changes in the vasomotor recording system. Electric shock stimulus was applied to the volar surface of S's left forearm by means of two moist gel electrodes placed three cm apart. Current was supplied by a 110 volt, 60 cycle AC source. Three 100,000 ohm precision wound resistance, and a 100,000 ohm variable resistor were placed in series to permit continuous variation. A Weston microammeter measured the current passing through S. The length of the electric stimulus (one sec.) was controlled by a Bennett timer.

Blood volume changes were recorded from the right middle finger. A Pyrex glass tube was placed around the finger, sealed at the finger base, and connected to a pneumatic system, which converted finger volume changes into mechanical motion. A modified Franck capsule photographically recorded the beam of light reflected from the mirror of the apparatus onto the diaphragm.

Non-polarized silver-silver chloride electrodes for recording potential changes were used. These were placed on the palm and dorsum of the right hand. Using a Leeds & Northrup Type R moving coil galvonometer, deflections were recorded by focusing a beam of light reflected from the galvonometer mirror upon a slit camera with 100 ft. roll film. Ten thousand ohms resistance in this circuit made the

deflections dependent upon potential changes. A third response, breathing, was also photographically recorded from a Summer-type pneumagraph.

Subjects were eight Yale undergraduates who were paid by the hour.

Current magnitudes of 1,000, 2,300, 3,200, and 4,400 microamperes were administered in irregular balanced order every 60 seconds. Subjects had no difficulty in distinguishing the comparative strength of all degrees of electrical stimulation used. The correlational analysis that was later performed involved a smaller N than was used in the testing, since some records were eliminated for such variables as breathing irregularities, S fidgeting, and the galvonometric deflections beyond the camera range.

Results

Vasomotor activity (constriction) was found to be the only type of change which exhibited any constancy in its relation to the moment of the occurrence of shock stimulation. Latencies were longer for vasoconstriction than for skin resistance responses, by one-half to one second.

A relatively linear relationship was found between the intensity of shock and the magnitude of the vasomotor response:

Stim.	Vaso. Response
1 milliamp.	11 mm.
2.5 milliamp.	17 mm.
3.5 milliamp.	19 mm.
4.5 milliamp.	25 mm.

(All of these responses' volumes were different from each other, significant at the .01 level).

Relatively linear relationships were also found between the intensity of shock and the GSR:

Microamp.	GSR Response
1000	12.3 mm.
2300	20.9 mm.
3200	28.8 mm.
4400	41.3 mm.

Correlations between the vasomotor and GSR responses ran positively, .32 to .71, all but the lowest being significant (.05). This relationship was also relatively linear.

Breathing changes had, as many others report, the same results on both vasomotor and galvonometric responses. A drop was observed in the average response (28.6 to 21.8 mm) from the first half to the second part of the experiment.

Conclusion

In spite of the significant relationships uncovered in this experiment, the authors felt that no formulation could be made in such a way as to permit a comparison between this and other studies in which psychophysical methods for standardizing the stimulus were employed.

DRUG ATLAS

Mid-West Research Institute

Reviewed by Milton A. Berman

A complete and authoritative reference for street drugs, it contains reports on various drug samples obtained from law enforcement agencies, hospitals, physicians, counselors, and users. Each sample has its ingredients identified, description given, and an actual size photograph. The pages are loose-leaf, permitting addition of supplemental pages.

The symptoms for normal and excessive dosage are given, along with an antidote.

The book is strongly recommended for a polygraphists library. It may be ordered from Mid-West Research Institute, 425 Volker Blvd., Kansas City, Mo. The price is $35, plus $5 for supplemental reports.

A BIBLIOGRAPHY OF SCIENTIFIC STUDIES

PERTAINING TO THE VALIDITY OF CURRENT LIE DETECTION TECHNIQUES

By

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