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A FIELD VALIDATION STUDY

OF THE

QUADRI-ZONE COMPARISON TECHNIQUE

By

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ABSTRACT

This field study tested and demonstrated the validity and reliability of the Polygraph Quadri-Zone Comparison Technique designed for Specific-Issue tests, using one hundred and twenty-two confirmed real-life cases from a Metropolitan Police Department and a Private Polygraph firm. The Quadri-Zone's unique Fourth Zone accurately identifies and remedies the major cause (Fear/Hope of Error) of false Positive/Negatives and Inconclusives in Specific-Issue tests. The Quadri-Zone Comparison Technique correctly identified 91% of the Innocent as Truthful and 9% as Inconclusive, with no errors. It further correctly identified 97% of the Guilty as Deceptive and 3% as Inconclusive, with no errors. Inconclusives excluded, the Quadri-Zone Comparison Technique was 100% accurate in the identification of the Innocent and the Guilty. Inconclusives included, the utility rate was 94%. Blind Scoring of polygraph charts showed extremely high correlations for the individual and total chart scores with no errors.

Dr. Matte has a Ph.D. in Criminology and Polygraph Science, is President of Matte Polygraph Service, Inc., at Buffalo, N.Y., and is the author of a book and several technical articles on the polygraph including prior articles in Polygraph. He is a member of the APA. Dr. Reuss is a Professor of Biology and Instructor in Anatomy and Physiology at the State University College at Buffalo, N.Y., who holds an Ed.D. degree. The polygraphists in this field study were James Allan Matte, Detective Thomas E. Armitage, and Detective F. LaCorte. (Ed.)

This article is condensed from a Doctoral dissertation entitled "Validation Study on the Polygraph Quadri-Zone Comparison Technique" by James Allan Matte with Dr. Reuss as Mentor and Faculty Advisor. The dissertation is available at $18.00 per copy from Dr. Matte at Suite 321, Statler Towers, Buffalo, New York 14221.

Quadri-Zone Comparison Technique

BACKGROUND

This field study is the first published research on the Polygraph Quadri-Zone Comparison Technique. Its theory and methodology was published in Polygraph in December 1978 and in a textbook in 1980 (Matte). The Polygraph Quadri-Zone Comparison Technique is a modification of the Backster Tri-Zone Comparison Technique which was validated in the Utah Study in 1978 (Raskin). The Quadri-Zone Comparison Technique has been taught at some polygraph schools, and used locally but has not been in common use around the country. It is a technique that requires much technical knowledge including the memorization of a 23-reaction combination guide which must be applied after the conduct of each polygraph chart. The results of this study apply only to the Quadri-Zone Comparison Technique when used in its pure form without deviation. The Quadri-Zone Comparison Technique is a polygraph technique used exclusively for single-issue tests.

There are basic similarities between the Backster, U.S. Army, and the Quadri-Zone Techniques in that all three zone comparison techniques contain a neutral question, a weak relevant (preparatory) question, a symptomatic question, an exclusive control question, a strong relevant question, another exclusive control question, another relevant question (dealing with same issue), and another symptomatic question. However the Army added another exclusive control question followed by a medium strength relevant question. The Army further permits the addition of the three SKY questions (Backster SKY) to their Zone Comparison test. Unlike the Backster and Army Zone Comparison Tests, the Quadri-Zone Technique compares each strong relevant question only to the neighboring control question preceding it. But like Backster, each relevant question is switched in position after each chart, permitting each relevant question to be compared to each control question. All three Zone Comparison Techniques use the seven position scale and zero to three scoring system when comparing the control to the relevant question. However only the Quadri-Zone and the Backster Tri-Zone Techniques use an increasing threshold when tallying the scores obtained from each polygraph chart, whereas the Army Zone Comparison Technique uses a fixed threshold of ± 6 regardless of the number of charts conducted. The Quadri-Zone threshold increases more rapidly than the Backster threshold. All three systems use the same scoring procedure when evaluating the control versus the relevant questions. However the Quadri-Zone departs from the other two systems when evaluating a control versus a relevant question when both display strong but equal response either in the pneumograph tracing or the cardiograph tracing. While Backster and the Army would score this comparison with a zero, the Quadri-Zone would score it with a minus one, but would score it with a zero when the responses are equal in magnitude but weak. The major difference between the three techniques is that only the Quadri-zone contains a "Fear of Error" control question which is compared against a "Hope of Error" relevant question.

This "Fear/Hope of Error" question pair form an additional zone of comparison which is located after the two traditional control versus relevant questions. The "Fear of Error" question is a control question which is designed to determine the degree of fear that an examinee may have that an error will be made on the test regarding the target issue that only an innocent examinee should experience. Conversely, the "Hope of Error"

question is a relevant question which is designed to determine whether or not the examinee is hoping that an error will be made on the test regarding the target issue which only a guilty examinee should experience.

TABLE 1 - COMPARISON OF SCORING GUIDES FOR ZONE TESTS

1. Matte Quadri-zone Scoring Guide: (minimum is 2 charts)

Minimum scores required:	TRUTH	DECEPTION
For 1 chart	+ 4	- 5
For 2 charts	+ 8	- 10
For 3 charts	+ 12	- 15
For 4 charts	+ 16	- 20

2. Backster System Scoring Guide: (minimum is 2 charts)

Minimum scores required:	TRUTH	DECEPTION
For 1 chart	+ 3	- 5
For 2 charts	+ 5	- 9
For 3 charts	+ 7	- 13
For 4 charts	+ 9	- 17

3. Federal School Scoring Guide (Barland study): (minimum is 2 charts)

Minimum scores required to confirm:	TRUTH	DECEPTION
For 2 charts	+ 6	- 6
For 3 or 4 charts	+ 6	- 6

4. Canadian System Scoring Guide: (minimum is 3 charts)

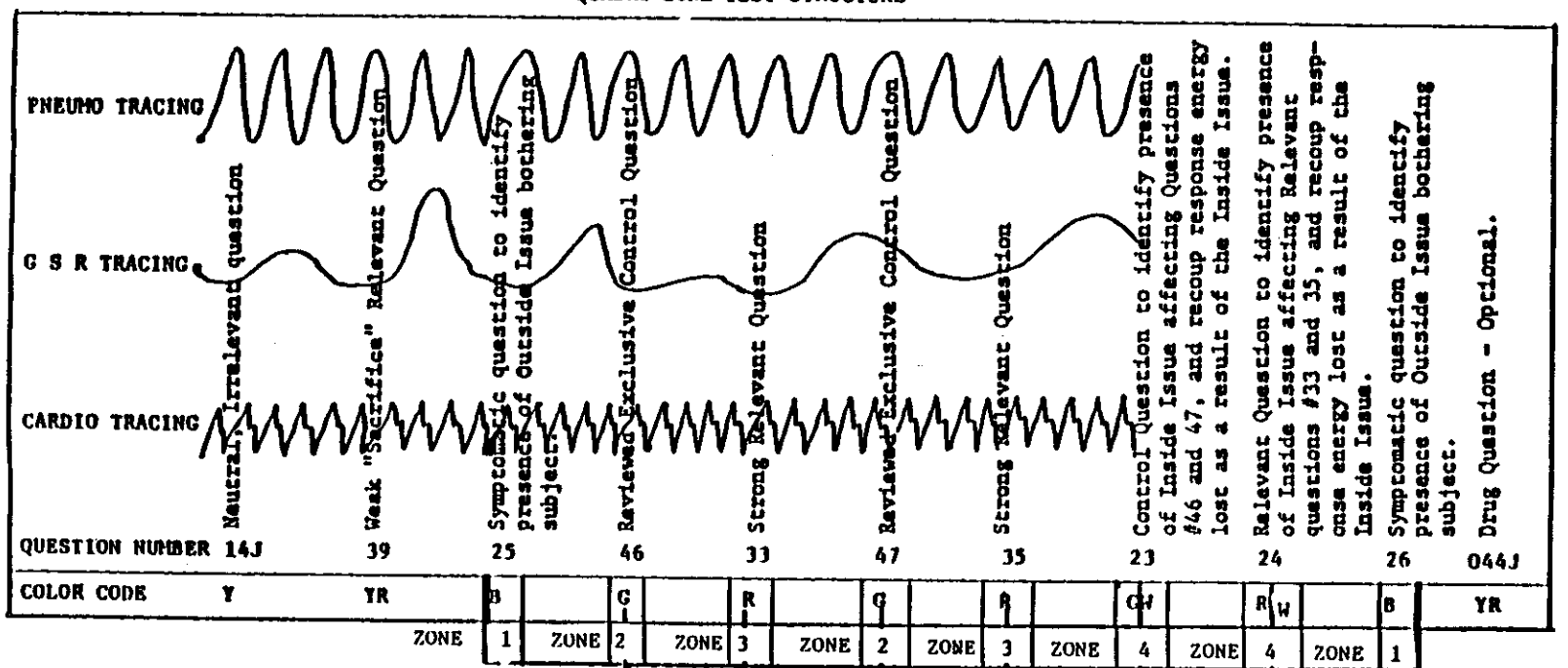
	TRUTH	DECEPTION
For 3 or more charts	+ 6	- 6

The "Fear of Error" question purportedly compensates for the ineffectiveness of the control questions in competing with threatening relevant questions which were caused by the "Fear of Error."

The author (Matte) theorized that an innocent examinee's fear that an error will be made on his polygraph test will make the relevant questions inordinately threatening, causing a physiological response that will complete with the control questions causing inconclusive or false positive results. Those false positive minus scores are offset by the plus scores produced by the "Fear of Error" question. The author further theorized that a guilty examinee's "Fear of Detection" may be rechanneled into "Hope of

TABLE 2

QUADRI-ZONE TEST STRUCTURE



COLOR LEGEND:

- R Relevant Question (Strong)
- G Exclusive Control Question (Reviewed)
- GW Inside Issue Control Question (Variable strength)
- RW Inside Issue Relevant Question (Variable strength)
- B Symptomatic Question (Outside Issue)
- RY Relevant Question (Medium Strength)
- YR Relevant Question (Weak)
- Y Neutral Question (Irrelevant)

ZONES

1. Black (Symptomatic)
2. Green (P.Lie Control)
3. Red (Strong Relevant)
4. White (Inside-Issue)

NOTE: White Zone is Reflective of the Green or Red Zone, Hence Green/White vs Red/White

Error" or hope of beating the test, which will be manifested by his response to the "Hope of Error" question which will then be used to adjust scores.

Additionally, the Fourth Zone's "Fear/Hope of Error" questions provide the Polygraphist with the means of determining whether a control question should be strengthened or weakened when there is equal response to both control and neighboring relevant question. This choice is not available to other zone comparison tests.

Interestingly, the Office of Technology Assessment's Report entitled "Scientific Validity of Polygraph Testing" published in 1983, evaluated both analog and field studies conducted on polygraph tests pertaining to specific-incident criminal investigations and found that in analog studies, false positives averaged 14.1 percent and false negatives averaged 10.4 percent. In field studies false positives averaged 19.1 percent and false negatives averaged 10.2 percent. However it must be noted that in the review of these studies, OTA recomputed the data to include inconclusive results as errors. Exclusion of inconclusives would reduce aforementioned error rates. The OTA stated that the preponderance of research evidence does indicate that, when the control question technique is used in specific-incident criminal investigations, the polygraph detects deception at a rate better than chance, but with error rates that could be considered significant.

The Polygraph Quadri-Zone Comparison Technique's Fourth Zone (Fear/Hope of Error) was designed to address and remedy aforementioned weaknesses in the Zone Comparison Test.

PROCEDURE

A study of existing literature (Ansley 1983) on polygraph validity revealed that twice as many studies were conducted on the validity and reliability of the polygraph in a laboratory setting than those using real-life cases. Research conducted in a laboratory setting using mock paradigms lack two very important elements that are present in real-life situations, namely "Fear of Detection" by the guilty examinee, and "Fear of Error" by the innocent examinee. Since the Polygraph Quadri-Zone Comparison Technique specifically addresses the innocent examinee's "Fear of Error" and the guilty examinee's "Hope of Error" it was essential that this study use data obtained from polygraph charts acquired in real-life cases.

All polygraph specific-issue tests conducted with the Quadri-Zone Comparison technique at the Buffalo Police Department from January 1985 through December 1987 were reviewed. There were 113 cases of which 32 were later solved by confessions, investigations, convictions, and combinations of these methods. In addition, all of the specific-issue tests conducted with the Quadri-Zone Comparison Technique at Matte Polygraph Service, Inc., from January 1986 through April 1987 were reviewed. There were 145 cases of which 90 were subsequently solved by one or more of the previously mentioned methods. Thus, 122 of the total of 258 available cases (47%) were subsequently solved, providing a base of confirmed cases for study.

The Polygraphists' decisions at the end of these 122 cases were: 62 deception indicated (DI), 53 no deception indicated (NDI), and 7

inconclusive (Inc). Of the 7 inconclusive cases, 5 were solved as innocent and 2 as guilty.

In the order of preference for establishing ground truth, confessions are considered the best, convictions the next, and investigative results the least reliable. While there is often overlap, confession and conviction, investigation and conviction, we have separated them by the most to the least reliable method. Of the 122 cases, 85 (70%) were solved by confessions, 11 (9%) by convictions, and 26 (21%) by investigative results.

TABLE 3

FIELD SOLUTION OF 122 CASES

Guilty Persons (64 cases). Confirmed by:

Confessions	Convictions	Investigative Results
57 (89%)	6 (9%)	1 (2%)

Innocent Persons (58 cases). Confirmed by:

Confessions (of others)	Convictions (of others)	Investigative Results
28 (48%)	5 (9%)	25 (43%)

Total Persons (122 cases). Confirmed by:

Confessions	Convictions	Investigative Results
85 (70%)	11 (9%)	26 (21%)

The subject population of the 122 cases included 64 men and 58 women. There were 84 white persons, 37 black persons, and one American Indian. The age range was 16 to 60 and averaged 32. The educational level ranged from 8 years to 16 years and averaged 13 years. The average education level for the guilty was 13 years and the innocent 12 years. There were 85 crimes against property, 37 against persons.

The three Polygraphists who participated in this research were James Allan Matte, Ph.D., Certified graduate of the Backster School of Lie Detection (1972) who developed and has been using the Quadri-Zone Comparison Technique since 1977; Detective Thomas E. Armitage, Polygraphist, Buffalo Police Department, Certified graduate of the New York School of Lie Detection (1979) has been using the Quadri-Zone Comparison Technique since 1980; Detective Ciro F. LaCorte, Polygraphist, Amherst Police Department, Certified graduate of the Backster School of Lie Detection (1977) has been using the Quadri-Zone Comparison Technique since 1979.

Of the 32 confirmed cases conducted at the Buffalo Police Department, Detective Armitage conducted 29 of those polygraph tests, and Detective LaCorte assisted Detective Armitage and conducted 3 of them. Dr Matte conducted all of the 90 confirmed cases at Matte Polygraph Service, Inc. For the purpose of this study all confirmed tests conducted at the Buffalo Police Department used in this study will be referred to as Armitage cases.

The polygraph instrument used at Matte Polygraph Service in the year 1986-1987 was a Stoelting fully electronic four-pen, double pneumograph, Ultra-Scribe, and the polygraph instrument used at the Buffalo Police Department in the year 1985-1987 was a Stoelting fully electronic four-pen, double pneumograph Polyscribe.

In this research we compared the Polygraphist's original decision with the results of following activities which solved the cases, to determine how many false positives occurred, how many false negatives occurred, and the inconclusive rate. the latter as a measure of utility, not accuracy.

We also collected the scores from each polygraph chart on each spot where a comparison was made between a control and a relevant question to determine the effect that Zone Four (Fear/Hope of Error) had on the results of each polygraph test.

In addition, the polygraph charts for the 122 cases totalling 311 were read and numerically scored blind by the two Polygraphists who did not conduct the examination. The blind reviewers did not have any case information. They worked separately and at different times.

RESULTS

The base rate of deception was 64 out of 122 (52%). Of the 64 confirmed deceptive subjects, the Polygraphists' decisions were DI in 62 (97%), NDI none, and Inconclusive in 2 (3%). Of the 58 confirmed nondeceptive subjects, the Polygraphists' decisions were DI none, NDI 53 (91%), and Inconclusive in 5 (9%). The Polygraphists were correct in 115 or 122 cases (94%), wrong in none of the cases, with inconclusive results in 7 cases (6%). When the inconclusives were excluded, the Polygraphists made 100% correct decisions. The seven inconclusives and no errors gave a utility rate of 94%. There were twice as many truthful inconclusives (n.5) as deceptive (n.2), but the number is too small to be significant.

Comparisons of the data for the Innocent and Guilty show that the mean Tri-zone chart score for the Innocent Armitage case was +5.7 and Matte +6.1. The mean Quadri-Zone case scores for the Innocent Armitage cases was +13.2 and Matte +13.1. The mean Tri-Zone chart score for the Guilty Armitage cases was -9.1 and Matte -9.6. The mean Quadri-zone case scores for the Guilty Armitage cases was -21.6 and Matte -26.6. In general, both the Innocent and Guilty mean chart scores and mean case scores for Matte were slightly higher than the Armitage scores but not statistically significant. This tends to show that the Quadri-Zone Comparison Technique yielded consistently similar scores from the two different samples.

TABLE 4

ACCURACY OF POLYGRAPH OUTCOME COMPARED TO GROUND TRUTH

Percent outcome for the Polygraph Decisions separately for Innocent Cases and Guilty Cases <u>including</u> Inconclusives compared to known confirmed cases. The Matte Quadri-Zone Comparison Technique was used to reach the decisions.

<u>Matte Scoring Guide</u>

		Polygraph Outcome: Truthful NDI	Deceptive DI	Inconclusives INC	TOTALS
Ground Truth: Innocent NDI	A	16 89%	0 0%	2 11%	18 100%
	M	37 93%	0 0%	3 7%	40 100%
	Total	53 91%	0 0%	5 9%	58 100%
Ground Truth: Guilty DI	A	0 0%	13 93%	1 7%	14 100%
	M	0 0%	49 98%	1 2%	50 100%
	Total	0 0%	62 97%	2 3%	64 100%

Summary Totals

Accuracy of Decisions:	
Total cases	122
Correct	115
% Correct	94%
Error	0
% Error	0%
Inconclusives	7
% Inconclusives	6%

TABLE 5

ACCURACY OF POLYGRAPH DECISIONS COMPARED TO GROUND TRUTH

Percent outcome for the Polygraph Decisions separately for Innocent Cases and Guilty Cases excluding Inconclusives compared to known confirmed cases. The Matte Quadri-Zone Comparison Technique was used to reach the decisions.

Matte Scoring Guide

Ground Truth		Polygraph Outcome: Truthful NDI	Deceptive DI	Inconclusives INC	TOTAL DECISIONS
Innocent NDI	A	16 100%	0 0%	2 11%	16 100%
	M	37 100%	0 0%	3 7%	37 100%
	Total	53 100%	0 0%	5 9%	53 100%
Guilty DI	A	0 0%	13 100%	1 7%	13 100%
	M	0 0%	49 100%	1 2%	49 100%
	Total	0 0%	62 100%	2 3%	62 100%

Summary Totals

Accuracy of Decisions:

Total cases	122
Total decisions	115
Correct Decisions	115
% Correct	100%
Error	0
% Error	0%
Inconclusives	7
% Inconclusives	6%

The Zone Four (Fear of Error) factor generated an adjustment to the 58 Innocent case scores by increasing the scores an average of +7.3 per case. The average total score per Innocent case without the Zone Four adjustment was +5.89 and with the Zone Four adjustment was +13.1. This shows that the "Fear of Error" factors is extremely significant and cannot be ignored in the scoring of Innocent cases.

The Zone Four (Hope of Error) factor generated an adjustment to the 64 Guilty case scores by decreasing the scores (increasing the value) an average of -5.4 per case. The average total score per Guilty case without the Zone Four adjustment was -19.7 and with the Zone Four adjustment was -25.1. This shows that the "Hope of Error" is a significant factor, increasing the Guilty case score by 27%.

The accuracy of the Quadri-Zone Comparison Technique with and without the use of Zone Four is compared in Table 6. With the Zone Four, the Quadri-Zone scoring System found 91% of the Innocent cases as Truthful, none Deceptive and 9% Inconclusive. Without the Zone Four the Matte Scoring System would have found 43% of the Innocent cases as Truthful, 5% Deceptive and 52% Inconclusive. Therefore Zone Four prevented a 5% False Positive error rate and reduced the Inconclusives from 52% to 9%. With Zone Four the Quadri-Zone System found 97% of the Guilty cases as Deceptive, none Truthful and 3% Inconclusive. Without the Zone Four the Quadri-Zone System would have found 81% of the Guilty as Deceptive, 2% Truthful and 17% Inconclusive. Therefore the Zone Four prevented a 2% False Negative error rate and reduced the Inconclusives from 17% to 3%. This comparison shows that the Zone Four is important in reducing the number of Inconclusives and in reducing the number of errors when the Matte Quadri-Zone Comparison Technique is used.

The Blind Scores show extremely high correlations fro the individual chart scores (.97 to .99) and for the total scores (.99). This shows the reliability and validity of the scoring process. A properly trained individual can score the chart responses accurately and will arrive at the same decisions as any other similarly trained Polygraphist. In terms of reliability of chart interpretation, the blind reviewers who applied numerical scoring to the quadri-zone chart sets came to the same decision as the original Polygraphist in all 311 polygraph charts of the 122 cases. Blind reviews did not change any decisions of DI or NDI to inconclusive or to opposite decisions.

DISCUSSION

Barland (Barland 1985) in his mock paradigm cases found 35% Inconclusives for Innocent cases, 26% Inconclusives for Guilty cases, and 32% Inconclusives overall. In this study using the Matte scoring system without the Zone Four we found 52% Inconclusives for Innocent cases, 17% Inconclusives for Guilty cases and 34% Inconclusives overall. We notice that the number of Inconclusives for the "real" Innocent is larger than for the "mock" cases. This could be expected and explained mainly by the rising threshold found in the Matte scoring system. However, for the Guilty cases there was a significant drop in Inconclusives.

TABLE 6 SUMMARY TABLE COMPARING ACCURACY OF THE MATTE QUADRI-ZONE COMPARISON TECHNIQUE SCORING METHOD FOR THE VALUE OF THE ZONE 4 IN ARRIVING AT DECISIONS

1. Percent data **including** the Inconclusives
   Comparing Matte Scoring Guide with (WI) Zone 4
   and without (WO) Zone 4 (23-24).

GROUND TRUTH	POLYGRAPH DECISION %		
	Truthful	Deceptive	Inconclusives
Innocent With Zone 4	91%	0%	9%
Guilty With Zone 4	0%	97%	3%
Innocent Without Zone 4	43%	5%	52%
Guilty Without Zone 4	2%	81%	17%

2. Percent data **excluding** the Inconclusives
   Comparing Matte Scoring Guide with (WI) Zone 4
   and without (WO) Zone 4 (23-24).

GROUND TRUTH	POLYGRAPH DECISION %		
	Truthful	Deceptive	Inconclusives
Innocent With Zone 4	100%	0%	9%
Guilty With Zone 4	0%	100%	3%
Innocent Without Zone 4	89%	11%	52%
Guilty Without Zone 4	2%	98%	17%

On the topic of psychodynamics, Barland suggests that "the psychodynamics of actual criminal suspects undergoing polygraph examinations are no doubt quite different" (Barland 1985). The drop in the Inconclusive for the Guilty cases is a possible outcome due to the involvement of the persons in real situations. There has been a consistent criticism of the "mock crime" cases where the persons may not react the same since they have no true involvement. In real cases the accused person is really either guilty or innocent and has stronger reactions. We found that the psychodynamics may be a true factor for the Guilty. A comparison of the data from Barland (mock) and this study (real-life) shows a significant drop in the Guilty Inconclusives even with the increasing threshold. This shows that for the "real-life" Guilty, their physiological responses are much stronger, allowing the Polygraphist to make more frequent definite decisions.

When the Zone Four adjustment is added for the Matte Quadri-Zone system, the Inconclusives are significantly reduced to 9% for the Innocent cases, 3% for the Guilty cases, and 6% overall. This shows that a major psychodynamic factor is the "Fear of Error/Hope of Error" factor as measured by the Zone Four. This factor would be expected to be greater for the "real-life" cases over the "mock" cases and appears to be a significant measurable psychodynamic factor leading to the large number of Inconclusives especially for the Innocent cases.

As noted by Barland (Barland, 1985), an extreme score is more accurate in making a decision and a score nearer zero has a greater possibility of an error, if a decision is made. Increasing the threshold with each chart run, is a method which is consistent with this statement. It guards against accumulating enough small scores to reach a fixed threshold.

Barland developed a predictive table based on the mock data which could be used as a model for developing a similar table based on real cases. In comparing our real case results with the mock data results we found some similarities and some differences. Barland predicted (Barland, 1985) that 80% of the time a Guilty subject will score minus 15 or higher for 3 charts. For our Guilty subjects, without the Zero Four the scores were this high or higher 81% of the time with 19% (12 cases) not scoring this high showing that the probability is about the same for the "real" cases as the "mock" cases. However, when the Zone Four adjustment is added to the scores then the subjects score this high or higher 97% of the time and only 3% (2 cases) (see Table 6) did not show this much reaction, showing that the probability is much greater when the scores are adjusted for the Hope of Error factor.

Barland also predicted a 1% probability for an Innocent subject to fall in this "Guilty range." We found 5% (3 Innocent cases) (see Table 6) that fell in this range. When the scores were adjusted for the "Fear of Error" factor, the cases were called Inconclusive and the False positive errors were avoided.

As noted by Barland, as one approaches the appropriate tail of each curve, the estimated probability of an error approaches the infinitesimal. this study, using the rising threshold, uses this concept in the decision making and shows the increased accuracy in the Truthful and deceptive

decisions. However, one might expect a greater number of Inconclusives due to the wider range before threshold. Without the Zone Four this is the case (Table 6-1) with 52% of the Innocent cases and 17% of the Guilty cases being called Inconclusive. With the Zone Four this is significantly controlled with only 9% of the Innocent cases and 3% of the Guilty cases being called Inconclusive.

The Quadri-Zone adjustment of scores increases the accuracy and reduces the errors as well as the Inconclusives. False Positive and False Negative errors were eliminated (the accuracy increased) (Table 6-2) by adjustment the scores using the Quadri-Zone. In Barland's study, the decision was correct in 96% of the Truthful cases supporting the accuracy of a decision based on a smaller score in the Truthful cases. The decision was correct in only 88% of the Deceptive cases showing the need for a stronger criterion (higher threshold) for the deceptive cases. The Matte Scoring Guide uses this concept in setting the thresholds, and this study suggests that this is a valid concept.

To obtain the high percentage of accuracy in the result, Barland had to eliminate the Inconclusives for his tally. Without the Zone Four we would have been correct (Table 6-2) in 89% of the Truthful (Innocent) cases and 98% of the Deceptive (Guilty) cases showing that the real case data is similar to the mock crime data. However, the Zone Four adjustment increases the accuracy to 100% (Table 6-2).

Using the Matte Quadri-Zone Comparison Technique, there was a greater accuracy in decision making not only in the finding of Truth-Deception, but in reducing the number of Inconclusives. Barland had to eliminate the Inconclusive cases in order to get a high accuracy rate, but we found so few Inconclusives that we could state our accuracy while including all the cases, increasing the utility of this technique for use in criminal investigations.

The Office of Technology Assessment's 1983 Report evaluated both analog and field studies conducted on polygraph tests pertaining to specific-incident criminal investigations and found that in the field studies examined, false positives averaged 19.1 percent and false negatives averaged 10.2 percent. However a review of field validation studies of the Zone Comparison Technique revealed significant difference in their results. In Bersh (1969) where a panel of attorneys reviewed the evidence and their conclusions were compared with the examiner's decisions (real cases), with a 10.5% false negative, and the innocent were correctly identified 94.1%, with a 5.9% false positive, no inconclusives. In Barland and Raskin (1975) when ground truth was determined by a panel the Guilty were correctly identified 91.5% with no error and an 8.5% inconclusive. The Innocent were correctly identified 29.4% with a 52.9% false positive and 17.6% inconclusive. When ground truth was determined by judicial outcome the Guilty were correctly identified 90.9% with no error and a 9.1% Inconclusive. The Innocent were correctly identified 12.5% with a 75.0% false positive and a 41% Inconclusive. Judging from the findings obtained in analog and field studies, there appears to be a greater potential for making errors against the Innocent than against the Guilty examinee.

In this study we used confirmed cases from two separate entities; the Buffalo Police department and Matte Polygraph Service. While both entities used cases from the approximate same period, the Buffalo Police Polygraphist (Armitage) had to extent that period because for a period of time he was overwhelmed with the conduct of Pre-Employment polygraph tests on police applicants during which period he did not conduct any Quadri-Zone tests. Furthermore, Armitage found it more difficult to obtain confirmed cases, i.e., (113 cases, 32 confirmed), then Matte (145 cases, 90 confirmed. 39 of the 90 confirmed cases were for defense attorneys wherein a confession is protected by privilege communication. Those Matte cases where the results were confirmed by investigation (21%) were only accepted as verified after the Director of Security of that agency produced credible evidence supporting his findings. Cases verified by confession are most credible because of the manner and circumstances in which they are obtained. The Quadri-Zone Technique requires that there be absolutely no accusatory or interrogative approach used in any portion of the pre-test interview or between the administration of polygraph charts, or else the test is invalidated. A post-test interrogation is only conducted when the scores tallied from the examinee's polygraph charts conclusively show deception. All post-test interviews/interrogations were videotaped with the consent of each examinee showing that all of his rights were observed. The likelihood of a false confession in the sample of this study is improbable. In fact, the law in Erie County where all of the aforementioned polygraph examinations were conducted, specifically requires that at the request of the examinee a tape recording of the entire examination will be maintained for a period of 45 days for review by authorities or the examinee's representative, and this right is included in the release form presented to the examinee. Both the Buffalo Police Department and Matte Polygraph Service videotape all polygraph examinations with the consent of the examinee, and the tapes are maintained for at least one year.

We noted no significant difference in the number of inconclusives between the confirmed and unconfirmed cases. We fail to see any difference in the subjects whose cases were unconfirmed and the confirmed cases appear to be a representative sample of the total cases.

The decisions of the Polygraphists in 122 confirmed cases were correct in every case in which they made a decision of truth or deception. The blind reviews of the charts were consistent with the original decisions. There were no errors, and the inconclusive rate was only 6 percent. These results are from the cases of three polygraphists of which two are Police Polygraphists who conducted polygraph tests for the Buffalo Police Department, and one is in private practice, all trained and experienced in the Quadri-Zone Comparison Technique.

We further collected data from each of the 311 polygraph charts to determine the following which will be reported in future articles in Polygraph:

A. Data was collected from each polygraph chart to determine the most productive pneumograph tracing, the most productive overall tracing, most productive tracings for males and females, and the most productive tracings of innocent versus guilty subjects.

B. Countertrend scores were gathered to determine the effect and best positional use of the Stimulation Test.

C. A Predictive Table was developed for Estimating Error Rates based on data from this study for use by Polygraphists, Attorneys and the Courts.

D. The mean scores were collected from polygraph charts of guilty subjects polygraphed by the Police versus the mean scores of subjects polygraphed for Defense Attorneys, and Commercial cases, to determine whether the "Fear of Detection" factor is significantly different for any of the aforementioned groups and tests the "Friendly Polygraphist" concept.

E. A comparison of scoring methods; Army Zone Comparison, Backster Zone Comparison, and Quadri-Zone Comparison; to determine the efficiency of each scoring system with fixed and increasing score thresholds in identifying the innocent and the guilty.

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