VALIDATION STUDY

on the

POLYGRAPH 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 two separate entities. 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. A comparison of the Quadri-Zone Technique versus the Backster and Federal Zone Techniques revealed that the Quadri-Zone was superior to the other two systems, reaching an accuracy of 100 percent in identifying the Innocent and the Guilty with a significant reduction in Inconclusives. In addition, the data from instant study also revealed that the Stimulation Test should be administered as the first polygraph chart to avoid countertrend scores. Both Upper and Lower breathing patterns should be recorded in polygraph tests. There was a major sex difference in the breathing response of male versus female. The most productive tracing overall was the Pneumo, followed by the Cardio and then the GSR. The most productive overall tracing for the Innocent was the Pneumo, followed by the GSR and the Cardio. The most productive overall tracing for the Guilty was the Cardio, followed by the Pneumo and the GSR. Included in this study was a Blind Scoring of polygraph charts which showed extremely high correlations for the individual and total chart scores with no errors. A Predictive Table For Estimating Error Rates was developed for use by Polygraphists and Attorneys. The mean chart score for Defense Attorney cases versus Police cases were very similar and extremely close. The percentage of Defense Attorney cases found Guilty was 90 percent versus the Innocent 7.6 percent, clearly refuting the "Friendly Polygraphist" concept. It is believed that the Polygraph Quadri-Zone Comparison Technique has effectively removed prior obstacles to the admissibility of polygraph results in Court.

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Chapter 1

INTRODUCTION

The polygraph technique uses physiological parameters to determine physiological changes related to truth or deception. A fundamental premise is that there are differences in physiological responses for truth versus deception. The polygraphist scientifically formulates questions within a structured test which are designed to elicit the differences in physiological responses.

This study examines the Single-Issue Polygraph test familiarly known as the Specific Test normally used to resolve criminal cases. This type of polygraph test is not designed for multiple issues such as Pre-Employment and Employee Screening.

At the present time, there are two basic methods used by polygraphists, the clinical approach and the numerical approach, in arriving at a determination of truth or deception. Initially, the clinical method was predominant. The polygraphist evaluated the case facts and examined the examinee's behavior and deportment during the pre-test interview which he used as an adjunct to the polygraph charts. In fact, some polygraph schools taught their polygraph students to use a behavior checklist which when completed would give the polygraphist an assessment of the examinee's guilt or innocence on the basis of his demeanor and behavior. This assessment would then be compared with the findings obtained from the examinee's polygraph charts. If the two evaluations did not match, inconclusive findings would be rendered. During those early years (1926-1945), when the Relevant-Irrelevant polygraph technique was the primary technique used in criminal cases, the polygraph test was used more as an interrogative tool than as a scientific means of determining truth or deception. However, this attitude changed with the introduction of the Control Question Technique developed by John E. Reid in 1946. Reid's test contained control questions designed to elicit a lie from the examinee, usually of the same type or category as the issue for which the examinee was being tested. These control questions are used to offer another threat to the innocent examinee to focus on, and more importantly, a means of

comparison with the relevant or crime questions asked on the same test. However, in spite of the fact that Reid's test was more objective than its predecessor, the reliance on the examinee's behavioral cues as an adjunct to the polygraph charts persisted, to a lesser degree perhaps, but the polygraphist's approach was still clinical. Reid's approach was a significant improvement over the earlier ones, and is considered by most polygraphists as the fork in the crossroads of polygraphy. Unlike earlier techniques which sought confessions, Reid's Control Question Test sought to verify the truthfulness of the examinee's statement(s), assisted by an evaluation of the examinee's behavioral cues. The clinical approach minimizes inconclusive results because these polygraphists seem to rely on their analysis of the examinee's behavior when the polygraph charts are marginal. The proponents of this approach believe that the polygraphist's decision regarding the truthfulness of an examinee has such important consequences for both the examinee and society that it is morally incumbent upon the conscientious polygraphist to incorporate all relevant information including the examinee's demeanor and behavior in formulating his decision. (Barland 39, P.158)

The second method was developed by Cleve Backster in 1959 which he named the Tri-Zone Comparison Technique. The major contribution this technique made to polygraphy was the introduction of a numerical scoring system in the analysis of the polygraph charts. In addition, Backster also introduced two symptomatic questions into his test to determine if an outside issue was bothering the examinee and interfering with the examinee's "Psychological Set", a term also introduced by Backster to explain that an examinee's focus of attention will be on the greatest threat to his well-being, dampening out lesser threats also present on the test. Backster's Tri-Zone Comparison Test also differs from Reid's test in that Backster's Probable-Lie Control Questions have time bars which exclude the period of the crime or matter for which the examinee is being polygraphed. Backster's method is often referred to as the numerical approach. Unlike the **clinical approach**, the **numerical approach** bases its conclusions as to truth or deception solely upon the numerical scores obtained from the examinee's polygraph charts. Backster argued that it is up to the jury to weigh all available evidence when making its decision; the polygraphist is being retained to obtain physiological information, therefore it is incumbent upon the polygraphist to rigorously exclude all nonpolygraphic sources of information when making a decision as to truth or deception. (Barland 39, P.159). This scoring system is standardized so that other polygraphists trained in this numerical approach can independently score the charts, offering an objective chart evaluation. The numerical approach has largely displaced the clinical approach in specific type tests dealing with single

issues found mostly in criminal cases. Backster's test also differs from other tests which use the clinical approach in that Backster's test contains a probable-lie control question to be compared with each relevant question, hence a perfect balance. The numerical scoring system contains an inconclusive area which dictates that unless the scores obtained from the polygraph charts exceed the minimum required scores established from empirical data (Raskin 162, P. 8-25), inconclusive results will be rendered. A Study conducted by Dr. Gordon Barland, Dr. David Raskin, and Dr. John A. Podlesny in 1978 entitled "Validity and Reliability of Detection of Deception" revealed that when the numerical scores reached -6 (minus for deception) or +6 (plus for truthful) a decision could be rendered with an expected accuracy of 90 percent. This study found that the inconclusive rate climbed dramatically as the score increased beyond -6 or +-6. Backster's numerical scoring system formed the basis for all Zone of Comparison Tests. Backster however does not subscribe to the -6 +6 score cut-off, (Weaver 222) and in fact requires that for each polygraph chart administered, a minimumn required score is added to the total score. This means that if two polygraph charts are conducted a minimum of -9 for a finding of deception is required, for three charts a minimum of -13 is required, and the minimum required score increases as the number of charts increases. By the same token if two polygraph charts are conducted a minimum of +5 must be attained to reach a conclusion of truthful, +7 for three charts, and +9 for four charts. American Polygraph Association standards require that a minimum of two polygraph charts be administered on the same issue before a determination of truth or deception can be rendered.

After administering several hundred Tri-Zone Comparison polygraph examinations following graduation from the Backster School of Lie-Detection, this author (Matte) conducted experiments using fictitious crimes that the examinees believed to be real, to test the effectiveness of the probable-lie control questions before using those control questions in the actual crime test for which the examinee was being polygraphed. These experiments were also used in the administration of Arther's Known Lie test which is similar to the Reid test. (Matte 129, P.158-159) These experiments showed that when the control questions are weak or ineffective, the examinee will oftentimes show a mild reaction to the neighboring relevant questions, and in some cases will show a strong response to the relevant question(s). Experiments also showed that following the administration of a stimulation test, designed to convince the examinee that the test is able to detect a lie, innocent examinees who previously showed a response to the relevant questions, now shifted their psychological set from the relevant questions to the probable-lie control questions. It became apparent to this author that a fear that an error might be made on the test was the major cause of responses to the relevant questions by innocent examinees. These experiments also showed that some guilty examinees did not respond to the relevant

questions to a degree that would produce the minimum scores necessary to reach a definite conclusion. Analysis of these cases by this author revealed that in the majority of cases, these guilty examinees had lost their fear of detection because they had in fact been detected, but the case against them had not been proven, and the polygraph test was their major hope of escaping prosecution. Hence, they **hoped that an error** would be made on their test so that their **culpability would not be discovered.** It appeared that the guilty examinee's fear of detection was rechanneled into hope that an error would be made on the test regarding his involvement in the crime. This author concluded that two additional areas needed to be probed during the conduct of a Zone of Comparison Test; (1) examinee's fear of error and (2) examinee's hope that an error might be made on the test. This apparent need resulted in the development of the polygraph Quadri-Zone Comparison Technique.

Interestingly, Dr. Paul Ekman in his 1985 book "Telling Lies" devoted primarily to verbal and non-verbal behavior, discusses the element of "fear" in his chapter on the 'Polygraph as Lie Catcher' and states "The severity of the punishment will influence the truthful person's fear of being misjudged just as much as the lying person's fear of being spotted - both suffer the same consequence." Dr. Ekman feels that the polygraph examination, like behavioral clues to deceit, is vulnerable to what he terms the "Othello error" because Othello failed to recognize that Desdemona's fear might not be a guilty adulterer's anguish about being caught but could be a faithful wife's fear of a husband who would not believe her.

Dr. Ekman also agrees with Dr. Lykken who wrote "For the Control Question Technique to work as advertised, each subject must be made to believe that the test is nearly infallible (not true) and that giving strong control responses will jeopardize him (the opposite is true). It is implausible to suppose that all polygraphers will be able to convince all subjects of these two false propositions." Dr. Ekman's and Dr. Lykken's reasoning seems plausible but is contested by Dr. David Raskin who cites two studies (Ekman 52, P.201) in which mistakes on a pretest were purposefully made so that the suspect would know that the polygraph test was fallible and the results showed no noticeable decrease in the subsequent detection of lying. Dr. Raskin holds that a skilled polygraphist should be able to conceal from the examinee which question is more important to his fate, the control question or the relevant question. In the distant past, this author (Matte) in experiments involving real-life cases, has deliberately announced the wrong card number to the subject who was administered a stimulation test wherein several numbered cards had been presented to him. Such Stimulation tests were conducted after the first polygraph chart regarding the crime had been conducted. The purpose of announcing the wrong card number even

though the polygraph chart clearly showed that the subject had selected another was to convince the subject that contrary to what had been published in the media, this was not a card trick but a valid test based on the polygraphic tracings. A second chart was then conducted and the correct card number was announced. In not one instance when this technique was applied were there any indications of a subsequent false reading, although it must be admitted that this procedure was not done frequently and no statistics were maintained. Dr. Ekman cites the following reasons for an innocent subject to show more response to the relevant questions than the control questions, thus producing a false positive result (Truthful called Deceptive) in his polygraph test: 1. The police are fallible, therefore the polygraphist must also be fallible. 2. The police are unfair, therefore the innocent subject distrusts them (polygraphist). 3. Machines are fallible hence a distrust of technology in general. The media has published much unfavorable information about the polygraph. 4.. The suspect is a fearful or hostile person; angry towards authority. 5. The suspect, even though innocent, has an emotional reaction to the events involved in the crime.

This author (Matte) recognizes that all of the above mentioned reasons furnished by Dr. Ekman may on occasion cause a problem on a polygraph test; mainly that an innocent subject under those conditions may fear that he will respond to the relevant questions; hence will respond (to a degree equal to his fear). However, this problem is not as widespread ad Dr. Ekman reports from our harshest critics (50 percent) (Ekman 52, P.205) as evidenced by the data of this research even without the benefit of the Quadri-Zone safeguards. However, this author (Matte) acknowledges and discusses those problems in his textbook (Matte 128) and offers practical remedies which when implemented have successfully resolved the problems. Since the publication of this author's textbook introducing the Polygraph Quadri-Zone Comparison Technique, this author has also published the Polygraph Quadri-Zone Reaction combination Guide (Matte 133) which provides the Polygraphist who uses the Quadri-Zone Comparison Technique with twenty-three possible reaction combinations which may be found on a polygraph chart. This Guide identifies each reaction combination with an indication of what each one represents and offers a remedy when applicable. It is important to note that in the past, the polygraphist who was faced with equally strong reactions to both the control and relevant questions automatically assumed that because the control questions were ideally formulated, they were effective. Therefore when faced with afore-mentioned problem, the polygraphist would weaken the control questions. This in my view was an erroneous assumption which was subsequently supported by my research and development of the Polygraph Control Question Validation Prodecure (Matte 132), a

forerunner of the Quadri-Zone Comparison Technique. The Quadri-Zone on the other hand provides the Polygraphists with a decision making process based on the subject's "Fear of Error" or "Hope of Error" as to whether the control questions should be weakened or strengthened. This author (Matte) has always been very sensitive to the possibility, no matter how remote, of an innocent person consistently producing greater reactions to the relevant questions than its neighboring control questions resulting in a false positive determination (Innocent found Guilty). By the same token, false negative results (Guilty found Innocent), while not as disturbing, is a serious area of concern in the administration of justice.

The Polygraph Quadri-Zone Comparison Technique was published in the Journal of the American Polygraph Association in December 1978 and in this authors's textbook in 1980 which as been used at various polygraph schools in the United States, however until now there have been no validation studies conducted on this new polygraph technique which might explain its omission in the discussion of polygraph techniques in the Office of Technology Assessment's Report entitled "Scientific Validity of Polygraph Testing" published in 1983, even though it did reflect Matte's textbook in the report's references. The OTA Report concluded that the application of the polygraph to specific-incident criminal investigations was the only one to have been extensively researched. OTA identified six prior reviews of such research as well as ten field and fourteen analog studies that met minimum scientific standards and were conducted using the control question technique. The six prior reviews revealed an average accuracy range from 64 to 98 percent. The ten indidivual field studies revealed correct guilty detections ranged from 70.6 to 98.6 percent and averaged 86.3 percent; and correct innocent detections ranged from 12.5 to 94.1 percent and averaged 76 percent. The false positive rate (innocent persons found deceptive) ranged from 0 to 75 percent and averaged 19.1 percent; and false negative rate (guilty persons found nondeceptive) ranged from 0 to 29.4 percent and averaged 10.2 percent. The fourteen individual analog studies revealed that correct guilty detections ranged from 35.4 to 100 percent and averaged 63.7 percent; correct innocent detections ranged from 32 to 91 percent and averaged 57.9 percent; false positives ranged from 2 to 50.7 percent and averaged 14.1 percent; and false negatives ranged from 0 to 29.7 percent and averaged 10.4 percent. However it must be noted that in the review of aforementioned research studies, OTA recomputed the data to include inconclusive results as errors. Exclusion of inconclusives would raise the overall accuracy rates calculated. The OTA stated in its conclusion 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.

Interestingly, a "Review of the Office of Technology Assessment Report on Polygraph Validity" conducted by Clark McCauley and Robert F. Forman, published in Basic and Applied Social Psychology, 1988 argues that use of the lambda statistic to summarize polygraph accuracy in the OTA report was inappropriate because the studies examined differ widely in base rates of guilt and innocence. Using Lykken's (1981) average accuracy statistic and avoiding overlapping data sets found in the OTA report, the review finds that field studies, analog studies, and guilty knowledge studies produce very similar average accuracy (82 percent to 88 percent).

The following year (1984) the Department of Defense published its report entitled "The Accuracy and Utility of Polygraph Testing." This study reflected the accuracy of control question tests in criminal investigations ranged from 80 percent to 95 percent. The Bersh (1969) field validation study was designed to estimate the accuracy of the polygraph technique in Department of Defense investigations. This study found that in criminal investigations there was an agreement rate of 90 percent for guilty subjects and 94 percent for innocent subjects between the decisions of military examiners and the criterion of unanimous decisions of JAG attorneys who had reviewed the investigative dossiers minus the polygraph outcome. This study also reflected the accuracy attained in laboratory studies, several of which used numerically scored control question tests in mock crime situations with the physiological measures typical of the field. Thus these studies used procedures similar to Defense Department procedures (Barland and Raskin, 1975; Rovner et al., 1978; Raskin and Hare, 1978; Podlesny and Raskin, 1978; Honts, 1982; Gatchel et al., 1983; Hammond, 1980). These studies correctly classified from 75 percent to 100 percent of the guilty subjects and from 57 percent to 100 percent of the innocent subjects. The mean correct classification rate weighed for number of subjects in this study is 90 percent for guilty subjects and 80 percent for innocent subjects.

A study of existing literature (Ansley 17,P.53-61) 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 is essential that this study use data obtained from polygraph charts acquired in real-life cases. For instance, students used in mock paradigms are usually offered a small reward for attempting to defeat the polygraph test, but the student whose

role is to play the guilty examinee cannot be expected to have a "Fear of Detection" as experienced by a real-life criminal who has committed a crime. Nor should we expect the other students whose role is that of the innocent examinee to have any "Fear of Error" regarding the outcome of their polygraph test, which when pronounced may produce a false positive result in a real-life polygraph test. (Lykken 119, P. 232)

The reliability of the polygraph instrument in accurately recording on a moving chart an examinee's rate and depth of respiration with a pneuomograph, his measure of perspiration or electrodermal response with a galvanometer, and cardiovascular activity with a sphygmomanometer is well documented (Raskin 160, P. 12-20).

Until 1978, polygraph instruments consisted of three-pen all mechanical components known as Emotional Stress Monitors. The top recording channel was a mechanical recording channel for recording respiration. It did not provide any means for controlling tracing size or amplitude. The polygraphist had to work with whatever tracing size was recorded, which sometimes was inadequate. The next recording channel, usually located in the middle of the instrument because of its greater pen excursion, was the Galvanometer also known as the GSR. It had a 250,000 ohm amplifier. With this recording channel the polygraphist balanced a twenty-three micro amp current to the subject to record changes in the subject's galvanic skin response. The bottom recording channel was used to record heart rate and changes in relative blood pressure. The difficulty with this mechanical recording channel was that sometimes an optimum recording was not obtainable. The amount of pressure required in the blood pressure cuff to obtain even a marginal tracing from some obese subjects was prohibitive because of the discomfort factor.

In 1978 the Stoelting Company put into manufacture the Ultrascribe series which continues as the current polygraph instrument. This polygraph instrument is manufactured with three to five recording channels, either mechanical or electronic, depending on the customer's selection. The electronic recording modules are superior to the mechanical recording modules in that the polygraphist is able to control the size (amplitude) of the tracing without any distortion, allowing for tracing size that permits realistic chart interpretation. The largest portion of polygraph instruments manufactured today are equipped with four electronic recording modules. Normally two electronic recording channels are used to record respiration from two vantage points, abdominal (lower) and thoracic (upper), to give a clearer picture of the changes that occur. Furthermore, with the electronics, adjustment in the amplitude of the tracing may be made by the polygraphist without any tracing distortion, allowing for greater accuracy in polygraph chart interpretation. The GSR is now a

1,000,000 ohm amplifier which balances a seven micro amp current to the subject, recording changes in galvanic skin response, commonly known as "cold sweat". It had been found by the U. S. Government that using only a 250,000 ohm GSR amplifier, did not allow the polygraphist to record changes in galvanic skin response of everyone in the population. The 1,000,000 ohm GSR amplifier used now provides for greatly enhanced sensitivity. The electronic recording channel used to record heart rate and relative blood pressure changes uses a very sensitive pressure transducer to change pneumatic signals to electrical signals. This signal is processed by an amplifier which has the capability of increasing the signal so that even weak heart rate or small relative blood pressure changes can be recorded on the polygraph chart. This allows the polygraphist to see superior quality tracings in which to make his determination. In the last decade we have seen the emergence of a much more sensitive recording instrument from the two principal polygraph manufacturing companies (Stoelting, Lafayette) which allows the polygraphist to obtain much better physiological tracings from the subject, providing more accurate results (Stoelting 190).

Polygraph manufacturing companies such as Stoelting and Lafayette have responded to claims made by polygraph critics (Lykken 118, P.238-240, 303-304) that countermeasures in the form of physical movement during the polygraph examination can successfully defeat the polygraph, by manufacturing and marketing a "movement sensing chair." But the first movement chair was designed by John E. Reid, noted polygraphist in 1946 as a result of research which reflected that blood pressure changes could be artificially induced by muscular contraction and relaxation. Even the medical profession failed to recognize the possibility that the mere exertion of unobserved muscular pressure could produce a similar effect. Reid's original model consisted of metal bellows in the arms and seat bottom of the chair which pneumatically activated recording pens on the polygraph chart. This instrument was so effective in identifying physical movements that it prompted attorney F. Lee Bailey to offer a reward of $10,000.00 to anyone who could beat the polygraph. Dr. Lykken admits in his book (Lyken 119, P. 239) that Mr. Bailey's money is quite safe if the test is administered by a competent polygraphist utilizing a movement sensing chair. Dr. Lykken explains however that a polygraphist of Reid's experience would be looking for the slightest movement which would be interpreted as a deliberate countermeasure. Dr. Lykken raises the question of tongue biting as one covert self-stimulation which Reid's special chair cannot detect. Dr. Lykken admits that "there is no doubt that it would be hard to beat a lie test when the examiner expects you to try and knows how you mean to do it." (Lykken 119, P.240)

Over the years, the motion chair has been refined from a bulky, mechanical pneumatic device to the current electrically enhanced strain-gauge transducer type of device. Research conducted by Mike Stephenson and Glenn Barry at the Canadian Police College Polygraph School (1988; Stephenson 185) involving twelve subjects who used thirty-six physical countermeasures such as pushing left/right foot onto the floor, contraction of anal sphincter, curling toes, right/left thigh contraction, left/right forearm push, pressing on GSR plates, right/left heel press, right/left palm press, left/right elbow pushed down, resulted in a percentage detection rate for the polygraphist using the movement chair of 85 percent. Without the benefit of the movement chair the polygraphist obtained a detection rate of only 9 percent. An observer placed directly in front of the subject obtained a detection rate of 36 percent. It must be noted that the subjects of Stephenson-Barry's research were polygraph examiner trainees who completed ten weeks of a twelve-week polygraph examiners course well versed on physical countermeasures in a non-test situation. The results indicate that the motion chair is a very useful piece of equipment for the polygraphist in a time when various ways to defeat the polygraph are broadly published. However Stephenson and Barry specifically directed subjects to move parts of their bodies and observed whether these movements could be detected, and whether or not they could be evaluated on the charts as countermeasures, with and without the Lafayette Activity Sensor. Dr. Stanley Abrams and Lt. Michael Davidson (Abrams 1, P.16-20) conducted a study to evaluate the impact of movement as a countermeasure upon polygraph testing and to ascertain further if the activity sensor is an effective counter to these attempts to distort the findings. In this study additional movements were incorporated in the form of tongue biting, stepping on a tack, tensing of the jaw, and tightening of the buttocks. The results of this study revealed that in every movement made by the subjects, a change resulted in the tracings in at least one of the three measures being employed. In 36 percent of the cases, the tracings demonstrated distortion caused by the movements which were readily interpreted as movements. This was particularly the case when the movement was on the upper portion of the body and on the same side as the blood pressure cuff. Despite concentrating on that part of the body to be moved, only 12 percent of the movements were actually observed. In 5 percent of the movements that were seen, no changes in the tracings occurred that would indicate that a movement had been made. Combining both the behavioral reactions not seen in the tracings and those indications of movement present in the tracings, a total of 44 percent of the countermeasures were detected. The activity sensor, however, was able to detect 92 percent of these movements. This included both the tongue biting and stepping down on a tack. As Dr. Abrams points out in his discussion of the study, it would take a sophisticated subject to

create responses to the right questions (Control Questions) and he would still face the problem of suppressing an arousal at the relevant questions. Inasmuch as this study involved a mock paradigm where the "Fear of Detection" is not present, the question arises regarding a real-life situation where the relevant questions offer a real threat to the subject, as to whether that real threat would still elicit a greater arousal from the Guilty subject than the Control questions to which the subject is applying a physical countermeasure. It appears from the higher rates of accuracy reported in the research for deceptive subjects, that the majority of individuals are not employing countermeasures of this nature (Patrick and Iacono, 1987; OTA Study, 1983). It may be that the reactions to the relevant questions in real-life testing exceed the reactions of the controls even though purposeful movements are made. It is quite apparent from aforementioned research that when either pain, muscular tension or movements are used, the activity sensor is highly effective in detecting these countermeasures. Such an activity sensor should be seriously contemplated as an additional component in the administration of polygraph examinations. However, manufacturers of activity sensors at the present time require that polygraphists sacrifice one of the channels on their polygraph instruments for the recording of subject movement, which is not practical inasmuch as most polygraph instruments only have four channels, the minimum required for an adequate polygraph test. The alternative is to add a channel to existing ones which is easily accomplished since current four and five pen polygraph instruments are designed to accept an additional channel.

In this validation study which encompasses a total of one hundred and twenty-two verified cases conducted at the Buffalo Police Department by Officer Thomas E. Armitage and Officer Ciro F. LaCorte, and at Matte Polygraph Service, Inc., by this Author (Matte), no movement chair or activity sensor was used. However it should be noted that Armitage and LaCorte during their polygraph internship and subsequent training in the Quadri-Zone Comparison Technique by this author (Matte) were indoctrinated regarding the importance of the pre-test procedure. The Quadri-Zone pre-test procedure prohibits the use of any type of accusatory or interrogative approach. All subjects regardless of the evidence against them must be treated and told that they are looked upon as being innocent of the offense for which they are being polygraphed. Furthermore that it is expected that an innocent person will follow the polygraphist's instructions to the letter which includes no movement whatsoever including facial muscles, and only a guilty subject will disobey instructions and move during the test (which lasts only about four minutes per chart). This has the effect of warning the guilty as later verified subject that if he attempts a physical countermeasure he may reveal his culpability before the charts have been completed.

The warning serves notice to the guilty subject that the polygraphist is alert to such countermeasures and has the means to identify them. Under such circumstances, the prudent guilty subject will opt for the passive, cooperative posture of the innocent. The subjects in this validation study were always seated so that their profile was in full view of the polygraphist, with their eyes closed during the test, and their front view was recorded on closed circuit television at both the Buffalo Police Department and at Matte Polygraph Service, Inc. This author for instance can even tell from the pneumograph tracing when a subject swallows. While this author and associates have been extremely successful in detecting countermeasures as evidenced by the data in this research study, the addition of an activity sensor would serve to eliminate any doubt regarding the possibility of a false negative (Guilty found Truthful), especially when the results are being considered in judicial proceedings.

There has been at least one research approach that successfully attempted to avoid the apparent weaknesses of both analog and field studies by combining the best features of each (Ekman 52, P. 213-214). It is called a hybrid study in which the researcher arranges matters so that a real crime can occur. Ground truth is known as in an analog study, and similar to a field study, there is a lot at stake for both the truthful and deceptive subject. Netzer Daie, a member of the Scientific Interrogation Unit of the Israeli Police in Jerusalem conducted such a hybrid study involving twenty-one Israeli policemen who were administered a paper and pencil test which was chemically treated to reveal alterations, and these subject were given an opportunity to cheat with dire consequences if they were caught. Seven of the twenty-one policemen were found to have changed their answers through the chemically treated answer sheet but were unaware of its discovoery. All twenty-one subjects were subsequently informed that they were suspected of cheating on the examination and were offered an opportunity to exonorate themselves by taking a polygraph examination. Three of the seven cheaters confessed and another cheater and two innocent suspects refused to be polygraphed. A third cheater did not show up for the test. Therefore only fifteen of the original twenty-one policemen were polygraphed which included two cheaters and thirteen non-cheaters. The Control Question Technique was used and both cheaters were accurately detected. Two of the thirteen non-cheaters were also erroneously diagnosed as deceptive (false positives). We (Matte, Reuss) believe that had the Quadri-Zone Comparison Technique been used in above hybrid study, the two false positives would have been avoided. But this hybrid study supports other research studies which indicate that polygraph tests including the control question test are bias against the innocent. The data in this validation study reflects that the Zone Comparison Techniques which employ control questions identify a greater percentage of guilty subjects than innocent subjects (Tables 14, 22, 30) but most of this inequity is corrected when the Quadri-Zone Comparison Technique is used (Tables 13, 21, 29).

Dr. Ekman reports having been told by Dr. Lykken (Ekman 52, P.215) that he, Lykken believes OTA credited field studies that **selectively** sampled the records examined, and thus the estimates of the field studies are inflated. In anticipation of such charges, we would like to point out that all polygraph examinations conducted at the Buffalo Police Department and at Matte Polygraph Service, Inc., during the period January 1985 thru December 1987 (Armitage), and January 1986 thru April 1987 (Matte) wherein the Quadri-Zone Comparison Technique was used were reported in this study without exception. All verified cases were separated from the unverified cases and all data is reported in Chapter 3 of this study. All data in this study is based on the verified cases. This significantly reduced the sampling bias as evidenced by the data contained in Tables 1 and 8.

Examination of the data in this validation study will show that the Zone of Comparison Technique in general is a robust test for scoring systems in common, and once threshold is reached, the decisions are accurate. The data further shows that both the Federal Zone Comparison Technique and the Backster Zone Comparison Technique which are the leading polygraph techniques have imperfections and weaknesses that can be rectified with the incorporation of a "Fourth Zone" as found in Matte's Quadri-Zone Comparison Technique. Adaptation by the Federal System of an increasing score threshold as used by the Backster and Matte Scoring Systems would increase the accuracy of the Federal System.

Chapter 2

STRUCTURE AND METHODOLOGY

OF THE

QUADRI-ZONE COMPARISON TECHNIQUE

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 163). The addition of a fourth zone of comparison, hence the Quadri-Zone, was necessitated by the need to identify and measure the "Fear of Error" in innocent as-later-verified subjects, the principal cause of false positives and prevent false negatives in those cases where the guilty as-later-verified subject has rechanneled his fear of detection into hope of passing or beating the test (Hope of Error).

The Polygraph Quadri-Zone Comparison Technique is a polygraph technique used exclusively for single-issue tests. It was developed in 1976 by this author (Matte) after two years of research and experimentation with fictitious crime tests used in conjunction with actual crime tests in real-life situations (Matte 132). In order to test the effectiveness of the control questions to be used in an actual crime test, the same control questions were first inserted into a fictitious crime test similar to the crime for which the subject was to be polygraphed. The subject was then administered the fictitious crime test, which the subject believed to be real, expecting the subject to show a response only to the control questions, not the relevant questions dealing with a fictitious crime. This author (Matte) observed that some subjects showed mild reactions to the relevant questions and a few showed significantly greater reactions to the relevant questions than the control questions contained in the same test. The purpose of inserting the control questions into a fictitious crime test was to insure their effectiveness prior to inserting them into the actual crime test. If the controls proved to be faulty, they were ameliorated or changed and tested again until they were found to be effective. In that manner we would have two sets of charts reflecting the subjects physiological tracings on the control versus relevant questions in a situation where ground truth is known. These known-truth charts not only verified the effectiveness of the control questions but also provided a comparison with the charts obtained in the actual crime test. After conducting many such tests, it was found that once the subject was convinced of the accuracy of the test, his "psychological set" shifted from the relevant questions to the control questions to which he was lying or had doubts about his truthfulness to them. Reassuring the subject was accomplished by

administering a stimulation test involving the use of numbered cards from which the subject selects one to which he is instructed to lie on the test. The card selected is only known to the subject but his physiological reaction on the polygraph chart reveals the number to the polygraphist who then shows the subject his chart and the number he selected. The above is one of several methods that may be used to reassure the subject about the accuracy of the test.

It was also found that when the reactions to the fictitious relevant questions were mild, they could be transferred to the control questions by simply reviewing the control questions prior to the administration of the next polygraph chart. Review of only the control questions prior to the conduct of the next chart had the effect of strengthening or increasing the intensity of the controls. (Matte 132).

It became evident to this author (Matte) that the "fear that an error" would be made on the test was the "factor" responsible for the Innocent subject's reactions to the fictitious relevant questions. The control questions seldom had to be changed. The subject knew he was lying to the control questions or had some doubt about the veracity of his answers to those controls. He also knew that he was being truthful to the relevant questions. When the polygraphist reviewed only the control questions with the subject after the conduct of the first chart, the subject realized that the instrument had accurately identified his lie to the control questions, not to the relevant questions about which he was concerned. Now his psychological set would be focussed onto the control questions in all succeeding charts. In some cases, habituation to the controls diminished their effectiveness which was easily rectified by simply reviewing the control questions again with the subject which had the effect of refocussing the subject's attention to the importance of being truthful to those control questions. It was found that the guilty as-later-verified subject's psychological set was not misdirected from the relevant questions onto the probable-lie control questions as a result of this stimulation procedure, primarily because the relevant questions are structurally more intense than the control questions. This research showed that false positives usually occur when the innocent subject's fear that an error will be made on his test is greater than his fear of discovery that he lied to the earlier-in-life probable-lie control questions on the same test.

Conversely, this same research showed that false negatives (guilty found truthful) may occur when the guilty as-later-verified subject has rechanneled his fear of detection into hope of passing or beating the test. This type of examinee has a defeatist attitude, whether because of overwhelming evidence

against him or some other factor, he has lost the will to fight and has resigned himself to whatever fate befalls him. He has not confessed to his crime, but simply became passive. The prospect of "passing" a polygraph examination which may be of assistance in his cause is of greater emotional importance than "fear of detection" to a crime he feels "detected" but not proved. In such an instance, crime questions may elicit only mild responses.

The aforementioned factors responsible for false positives and false negatives were named by this author (Matte) as "Inside Issue" factors because the source of its problems are internal rather than external. A Fourth Zone of Comparison was developed to identify the presence of those factors in Specific-Issue Polygraph tests. This Fourth zone encompasses a "Fear of Error" question which is considered a control question designed to elicit a reaction from the Innocent subject, and a "Hope of Error" question considered a relevant question designed to elicit a reaction from the Guilty subject. This Fourth Zone is positioned after Zones Two and Three which are the only other Zones which contain a Control versus Relevant question pair which is numerically scored for a determination of Truth or Deception. Zone One contains only two Symptomatic Questions which are designed to identify the presence of an "Outside Issue" that may be bothering the examinee. Zone One is not scored nor is it used for a determination. Therefore, the purpose of the Fourth Zone is to identify the presence of "Inside-Issue" factors that might interfere with the functions of the two primary zones numerically scored for a determination of truth or deception, namely the probable-lie control questions and the relevant questions.

To further clarify the term "Zone" Backster's three zones consist of (1) the Symptomatic questions used to identify the presence of an "Outside Issue" that might be bothering the examinee, which is labeled the "Black Zone", (2) the Probable-Lie Control Questions, labeled the "Green Zone: and (3) the Relevant questions labeled "Red Zone." Only Zones 2 (Green Zone) and Zone 3 (Red Zone) are quantified for a determination of truth or deception. The Fourth Zone added by this author (Matte) consists of two "Inside-Issue" questions to determine the presence of "Fear of Error" or "Hope of Error" by the examinee and is labeled the "White Zone". This Zone is also quantified and added to the scores obtained from comparisons made between Zones 2 and 3.

As depicted in the diagram depicting the Quadri-Zone Test Structure (Appendix A), only Zones Two, Three and Four which funnel into Spots 1, 2, and 3 are numerically scored for a determination. Zone One which is referred to as the Black Zone consists of two symptomatic questions designed to identify the presence of an "Outside-Issue" which might interfere with the polygraph examination.

The two primary zones used for a determination of truth or deception are Zones Two (Green Zone) and Three (Red Zone), which funnel into Spots 1 and 2. Those two Spots each contain a pair of control versus strong relevant questions. Both relevant questions deal with the same issue; in fact, if the examinee is lying to one of the relevant questions, he must also be lying to the other relevant question. The polygraphist studies each of these two Spots to determine which of the two questions in each pair (control vs relevant) has the greatest physiological evidence of sympathetic/parasympathetic activity or response. A score from zero to three is obtained from each question pair on each tracing, independent from each other. In each analysis, if the relevant question prevails, a minus sign precedes the score. If the control question prevails, a plus sign precedes the score. Ideally, one would expect a complete absence of reaction to one of the question pair and a strong response to its neighboring question used for intercomparison. One would also expect the location of each response to be consistent in all tracings in both Spots and in all charts conducted on that issue. But, in actual practice what frequently occurs is a strong response to one question and a milder response to its neighboring question. Occasionally one tracing will produce a score contrary to the general score trend. This does not prevent a solid determination of Truth or Deception, unless several contrary scores are obtained, which would then result in inconclusive findings.

The cause of false positives or false negatives is oftentimes the same cause that produces inconclusives. Therefore, the Fourth Zone of comparison which includes a "Fear of Error" question which is compared against a "Hope of Error" question for a plus or minus score in Spot 3 (see Appendix A) is not only useful in the final scoring of all three Spots in avoiding false positives and false negatives and reducing the number of inconclusives, but it also helps the Polygraphist identify problem areas as each polygraph chart is run, and implement remedial action prior to the conduct of subsequent charts, as depicted in the Polygraph Quadri-Zone Reaction Combination Guide (Matte 134).

The Polygraph Quadri-Zone Comparison Technique employs only two primary Spots to obtain its scores, Spots 1 and 2, inasmuch as Spot 3 contains "Inside-Issue" questions that are expected to produce scores only when Spots 1 and/or 2 are less than fully productive and effective. Yet the Quadri-Zone Comparison Technique requires a minimum score of -5 per chart for a determination of Deception and a +4 per chart for a Truthful determination, and at least two polygraph charts must be conducted before a determination can be made, which means that for Deception a minimum score of -10 for two charts, -15 for three charts, -20 for four charts must be obtained; and a minimum truthful score of +8 for two charts, -12 for three charts, and -16 for four charts must be attained.

In contrast, the U. S. Federal Polygraph School (USAMPS) (Weaver 226, P.34-42), the Canadian Polygraph College (Koppang 86), each require that a minimum of three polygraph charts be conducted on a Specific or Single-Issue test, yet only a minimum total score of -6 be attained for a determination of Deception, and a total score of +6 be attained for a determination of Truthful. Interestingly, this plus 6, minus 6 cut-off was initially recommended by the authors of the Utah Study (Raskin 161) because higher scores would have produced an unacceptably high inconclusive rate. Using that minus 6 plus 6 cut-off threshold assured its authors of an approximate 90 percent accuracy rate. Yet in 1985 the U. S. Army which uses this low threshold experienced a 5.2 percent inconclusive rate (Brisentine 41). For cases used in this study, the Matte Polygraph Service, Inc., which has been using the Quadri-Zone Comparison Technique since 1976, experienced a 4.4 percent inconclusive rate. We believe that two factors are responsible for this low inconclusive rate in spite of the high score requirement.

a. Only two control vs relevant question pairs (Spots) are used in the Quadri-Zone versus three Spots in the U. S. Army test. Experiments by this author (Matte) revealed that the narrower the scope of threatening questions for the examinee to focus on, the more intense his psychological set will be on those questions. The greater the number of threatening questions the examinee has to focus on, the weaker his psychological set becomes, like a beam of light that is spread too thin. The examinee's psychological set may focus on only one or two of the relevant or control questions which may even dampen the remaining relevant or control questions on the same test (Backster 34, P.48-50). Yet all of these question pairs (Spots) have to be scored.

b. Spot 3 of the Quadri-Zone is designed to recoup response energy lost from the other two Spots (1 and 2) if they should become less then fully productive which means that scores otherwise lost because of defective control-relevant question pair, are recaptured, saved by this "Inside-Issue" factor zone.

The basic structure of the Polygraph Quadri-Zone Comparison Technique (Appendix A) contains an Irrelevant Question, A Sacrifice Relevant Question of medium strength, a Symptomatic question, a Probable-Lie Exclusive Control question followed by a Strong Relevant question, another Probable-Lie Exclusive Control question followed by another Strong Relevant question (dealing with same issue), the "Fear of Error" question followed by the "Hope of Error" question, concluded by another symptomatic question.

A minimum of two polygraph charts, each containing the same questions must be conducted before a determination can be made. In each chart that follows the initial chart, the relevant questions are switched in position so that each relevant question is compared with a different control question.

After the administration of the first polygraph chart of the Quadri-Zone Comparison test, a Sensitivity/Stimulation test is administered to the examinee to reassure the Innocent subject of the accuracy of the test which also has the effect of stimulating the guilty subject.

The entire pre-test interview which precedes the actual administration of the polygraph test is non-accusatory. It is absolutely essential that the polygraphist conduct himself in a professional manner and treat all examinees with dignity and impartiality. The examinee must feel that the Polygraphist is not influenced by the case information/allegations and that the results will be based solely on the polygraph charts conducted on the examinee. This is accomplished by a thorough explanation of the polygraph instrument, the physiology recorded, and the procedure which involves a complete review of all test questions prior to the examination and the fact that all polygraph charts will be numerically scored. It is also very important to advise the subject that the polygraph charts will not be scored until they have all been run. This will prevent the subject from inquiring about the results after each chart has been conducted. It will also have the effect of keeping the subject alert until all charts have been completed. No inquiry or interrogation regarding the relevant questions is permitted between charts. Otherwise it would have the effect of strenghtening the relevant questions rendering them more threatening to the subject who may be innocent. However, in fact, the Polygraphist conducts a Spot Analysis upon completion of each chart and consults the Quadri-Zone Reaction Combination Guide.

The Quadri-Zone Reaction combination Guide (Appendix D) is consulted after each chart to determine if remedial action is needed prior to the administration of the next chart. Remedial action may include the weakening or strengthening of the control questions by altering the age category or changing the scope of the control questions. Perhaps the mere review of the control questions will suffice. Other remedial action may require the administration of a Stimulation test or a Silent Answer test. (Appendix D). When scoring the polygraph charts the polygraphist normally starts at the top in the pneumograph tracing because the subject's breathing affects the other two tracings (GSR, Cardio). The Polygraphist evaluates the first Control vs Relevant question pair by comparing the physiological responses on the polygraph chart at the control question and its neighboring relevant question to determine which of the two questions elicited the greatest response. Both pneumograph tracings are analyzed but only the most productive pneumograph tracing is scored. A score

from 0 to 3 is assigned to the most productive pneumograph tracing for that Control vs Relevant question pair and this score is preceded by a Plus if the score favors the Control question or aMinus if the score favors the Relevant question. It should be noted that the Control question always precedes the Relevant Question within the question pair being intercompared to afford the innocent subject's response to the Control question a chance to dampen its neighboring Relevant question (Backster 34) which is structurally more intense. Similarly, a score is assigned to that Control/Relevant question pair in the GSR tracing and in the Cardio tracing ranging from 0 to 3. All of those scores are tallied at the bottom for a total score ranging from 0 to 9 preceded by a Plus if the scores favor the Control question or a Minus if the scores favor the Relevant question. Assignment of the scores is based on standardized physiological rules (Matte 129, 137). The second Control/Relevant question pair is scored in a similar manner and a total is acquired. Then the "Fear of Error" question which functions as a Control question is compared with the "Hope of Error" question which functions as a Relevant question and scored in the same manner as the preceeding two Control/Relevant question pairs for a total score from 0 to 9 in either the Plus or Minus area. It is therefore conceivable that a total score of Minus or Plus 27 might be attained in each chart. Elimination of the weakest score or the score that does not follow the general trend in each question pair was discontinued by this author (Matte) and his associates in 1980. The Federal Polygraph Institute and the Backster School of Lie Detection also discontinued that practice several years ago. On rare occasions a polygraph chart may be eliminated from the scoring process because of distortion caused by subject movement during the test, artifact caused by noise, wrong answer or talking by subject during the test, or poor chart tracings requiring adjustment of polygraph instrument components. In two cases of this study, a polygraph chart was eliminated from the score tally because of countertrend score caused by the preceeding Stimulation Test administered after the first chart. In both cases the "Fear of Error" question produced greater scores than the "Hope of Error" question, indicating that a problem existed and the Control questions needed to be strenghtened prior to the conduct of subsequent charts. This remedial action in both cases reversed the countertrend producing accurate (verified) results.

Unlike some polygraph techniques that permit the comparison of each Relevant question to either Control or the strongest Control question, the Quadri-Zone Technique requires comparison of each relevant to the control immediately preceeding it. However since both relevant questions (33 and 35 in Appendix D) are switched in positions on each chart, each relevant is eventually compared with each control question.

In the actual scoring of polygraph charts, the Quadri-Zone differs only slightly from the Federal Technique and the Backster Technique in that when there is a presence of mild reaction in both the Relevant question and its neighboring Control question of equal magnitude in the pneumograph or cardiograph tracing, a numerical value of zero is assigned. However, when there is a presence of strong response manifested by a distinct reaction and relief tracing segment in both the Relevant question and its neighboring Control question of equal magnitude, a Minimum Deception score must be given to this question set for a score of Minus 1. The rationale is that both questions appear to be equally threatening to the examinee, its degree being proportionate to the degree of the responses, which indicates that while the examinee may be attempting deception to the Relevant question, its neighboring Control question may be too intense due to faulty structure, embraces a more serious unknown crime, or a countermeasure attempt was made by deliberate intense concentration on the Control question. The Polygraphist must keep in mind that an examinee may be able to cause a reaction on the Control question, but cannot control an oncoming reaction to the Relevant question. The GSR tracing is excluded from this rule because of its ultra-sensitivity which can easily cause some subjects to produce wide pen excursions on both question pairs necessitating a score of zero.

The Polygraph Quadri-Zone Reaction Combination Guide (Matte 134) provides users of the Polygraph Quadri-Zone Comparison Technique with a Chart Analysis Guide in twenty-three possible reaction combinations within the zones of comparison. The Polygraphist conducts a Spot Analysis upon completion of each chart to determine which reaction combination coincides with his chart. The Quadri-Zone Reaction Combination Guide will then instruct the Polygraphist as to what that reaction combination indicates and what remedial action must be taken if warranted prior to the administration of the next polygraph chart. This Guide was also designed for eventual use in the computerization of polygraph chart analysis and quantification.

Chapter 3

A FIELD STUDY

USING CONFIRMED CASES

In the population there are Innocent (Truthful) persons and Guilty (Deceptive) persons. There are none who are in-between. On any given case the "Ground Truth" is either Innocent or Guilty. In any given polygraph test it would be very desirable to be able to be accurate in making the decision on any individual as to guilt or innocence. It is also undesirable for a procedure to produce a number of inconclusive decisions. A procedure that can increase accuracy while decreasing the number of inconclusives should be a benefit. Any procedure that increases that accuracy should be welcome by the polygraph field and adopted for general use by Polygraphists.

This study validates such a system, namely the Polygraph Quadri-Zone Comparison Technique. Based on the results of this study, all polygraph use in criminal cases should follow this system to increase the accuracy of the decision. Such adoption on a broad scale will increase the acceptance of the Polygraph in the Courts and in the general public since both want an increased accuracy in the administration of justice.

It is difficult to accept the case where an individual, who is Innocent "Truthful", is called Guilty "Deceptive". This "False Positive" case clouds the field and raises the question of the value of the Polygraph in criminal cases. Equally disturbing is the case where an individual who is Guilty "Deceptive" is called Innocent "Truthful". This "False Negative" case means that someone may "escape" who deserves punishment. Neither the Courts nor the public want this to occur either. Since in our justice system a person is "Innocent" until proven "Guilty" such errors would really taint use of the Polygraph in the administration of justice. This study establishes confidence in the value of this scoring system in distinguishing the Truthful from the Deceptive examinee while reducing the number of inconclusives. While inconclusives do not cause "harm" to either guilty or innocent subjects, the large number found in some studies such as Barland (39, P.157-173) would leave a serious question as to the real ability to use the technique in determining "Truth" or Deception". Any procedure that reduces the inconclusives while also increasing accuracy should be welcomed by Polygraphists, the Courts and the Public.

This study establishes the validity of the Polygraph Quadri-Zone Comparison Technique and compares it with the two leading scoring systems, one developed by Cleve Backster as the Backster Tri-Zone Comparison Technique, and the other, the U. S. Army Modified Zone Comparison Technique, also a Tri-Zone Technique, used by the Department of Defense Polygraph Institute, referred herein as the Federal System.

This study used pooled data from the cases of the Buffalo Police Department conducted by Officer Thomas E. Armitage, Polygraphist who was assisted by Officer Ciro F. LaCorte, Polygraphist, each having more than nine years of experience in the administration of the Polygraph Quadri-Zone Comparison Technique, and the Matte Polygraph Service, Inc., conducted by James Allan Matte, Polygraphist and inventor of the Quadri-Zone Technique. During the period from January 1985 thru December 1987 there were a total of 113 Specific-Issue polygraph tests employing the Quadri-Zone Comparison Technique conducted at the Buffalo Police Department. Of those 113 cases, 32 were confirmed and 79 were unconfirmed. At the Buffalo Police Department, 29 of the 32 confirmed cases were administered by Armitage and 3 were administered by LaCorte. 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. During the period from January 1986 thru April 1987 there were a total of 145 Specific-Issue polygraph tests employing the Quadri-Zone Comparison Technique conducted at Matte Polygraph Service. Of those 145 cases, 90 were confirmed and 55 were unconfirmed (Table 54). The majority of confirmed cases were verified by confession. (Ground Truth Table 9).

Of the 122 confirmed cases, 64 were males and 58 were females. The race of examinees was divided into 84 White, 37 Black and 1 American Indian. The age of examinees ranged from 16 to 60 and averaged 32. The education 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. The types and number of offenses represented in this study are as follows: Larceny 74, Homicide 13, Assault 3, Fraud 4, Arson 3, Espionage 2, Pollution 2, Rape 3, Sodomy 4, Indecent Exposure 1, Obscene Calls 3, Child Molestation 6, Illegal Drugs 2, Informant 2.

Comparisons of the data for the Innocent and the Guilty show that the mean chart score for the Innocent Armitage cases was +5.7 and Matte +6.1. The mean case scores for the Innocent Armitage cases was +13.2 and Matte +13.1. The mean chart score for the Guilty Armitage cases was -9.1 and Matte 9.6. The mean 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. This tends to refute any argument that police cases would have higher scores than those of a private Polygraphist.

The Zone Four (Fear of Error) factor caused 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, increasing the Innocent case score by 123 percent. This shows that the "Fear of Error" factor is extremely significant and cannot be ignored in the scoring of Innocent cases.

The Zone Four (Hope of Error) factor caused 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 percent.

Of the 90 confirmed cases conducted by Matte, 39 were tests conducted for Defense Attorneys. Three Attorney cases were found Truthful, and two of those cases were Inconclusive; 34 were found Deceptive and confirmed by confession. Table 51 shows a comparison of the mean scores for these Guilty Defense Attorney (Matte) cases to the Guilty Police (Armitage) cases and to the Commercial (Matte) cases. The Defense Attorney cases showed a mean chart score of -9.38. The Police cases showed a mean chart score of -9.1. The Commercial cases showed a mean chart score of 9.96. From this data it can be seen that the mean scores for all

these Guilty cases are very similar and all are well beyond the required threshold for making the Deceptive decisions. Since all these means are extremely close, there was no indication that a case confirmed Guilty was treated or found any differently whether it was a Defense Attorney, Police, or Commercial case. The polygraph procedure and scoring process proved to be quite consistent for all three types of cases. This data certainly dispells the myth (Lykken 119, P. 223-224) of the "Friendly Polygraphist" who is unduly influenced to find the defendant examinee "truthful" in order to get repeat business, and the unfounded assertion (Whitman 227, P.30; Cargill 44, P.36) that since the defendant examinee is protected by the "Privilege Communication" umbrella that prohibits the Polygraphist from divulging unfavorable results, the defendant examinee should have no "fear of detection". The "Fear of Detection" seems to be about the same and there seems to be no difference for the three case situations. The "Fear of Detection" for the Defense Attorney clients might be thought to be less intense because of the protection of the Attorney-Client relationship. Our data does not support this statement. The "Fear of Detection" might be thought to be more intense for the Police cases because of the threat of imprisonment if found Deceptive. Our data does not support this statement. We can find no evidence to support the concept that the "Fear of Detection" or the resultant polygraph scores were any different for any of the three types of cases; Defense Attorney, Police, or Commercial.

The reason for such a high rate of confessions from Defense Attorney clients should not be credited solely to the interrogative experience of the Polygraphist, but rather to the fact that it is much easier to obtain a confession from a subject who knows that the disclosure of the information cannot be used

against him because the test results and any admissions thereof are protected and treated as "Privileged Communication." On the other hand, a guilty subject polygraphed by a Police Polygraphist knows that a confession or admission can land him in prison. This is the most likely reason for the higher rate of confessions obtained at Matte Polygraph Service than at the Buffalo Police Department during the period this study was conducted, although some of the confessions (Matte) were obtained by the Defense Attorney subsequent to the polygraph test and relayed to Matte for confirmation.

The Barland studies (Barland 39), assumed a normal curve of distribution of the data. This was tested by converting the data of truth and the data of deceptive to Z scores to test the assumption. In our study, Table 10 shows this conversion. A test was run (Goodness of Fit Test, Table 37) on the data. The conclusion is that these scores are distributed as a normal distribution.

A criticism of a field study of this type comes from Ginton (Ginton 62, P.148) "The problems in field studies stem mainly from the difficulties in obtaining a reliable criterion against which the polygraph results can be validated," as well as in avoiding a substantial sampling bias." (Oren, 1975; Ginton et al 1982). Ginton states this is an impossible mission (conventional approach) and this introduces substantial Sampling Bias.

Our study followed cases with a 47 percent confirmed (Table 53). There is a strong reliance on confessions to confirm. This high percentage of confirmed cases helped to reduce sampling bias.

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.

The following data was obtained from each and every polygraph chart/case listed in this study as a verified case without exception: Case Number; Name of Polygraphist; Type of Offense; Method of Verification; Sex of Examinee; Race of Examinee; Age of Examinee; Educational Level of Examinee; Conclusion (Deception Indicated/No Deception Indicated/Inconclusive); Score for Chart 1,2,3,4 without Zone 4 (Fear/Hope of Error); Total Score without Zone 4; Countertrend scores; Score for Chart 1,2,3,4 with Zone 4; Total Score with Zone 4; Whether Stimulation test was used and at what location; Whether Zone 4 was used to Increase/Decrease Strength of Controls; Were Scores from Zone 4 Needed to Reach a

Definite Conclusion; Whether Zone 4 Caused or Avoided False Positive/Negative or Inconclusive; Did Examinee Answer "Yes" to "Fear of Error" question during test; Most Productive Pneumograph tracing for Male and Female Subjects; Most productive Overall Tracing for Male and Female Subjects.

In all 122 cases, not one single subject answered "Yes" to the "Fear of Error" question on the actual polygraph test.

No significant differences were found in the data from the two sources (Matte-Armitage) when scores were compared by the Matte Quadri-Zone System, the Backster Tri-Zone System or the Federal System according to the Goodness of Fit tests (Table GOF-1). Not only were there no significant differences in the data, but on inspection of the data it can be seen that the values are quite similar.

As explained in more detail in Chapter 2 of this study, in the establishment of the control questions, exclusive control questions were used as customary in the Quadri-Zone Comparison Technique. This age bar assures that the control questions do not encompass the period in which the crime was committed and for which the examinee is being polygraphed.

Three physiological measures were scored: respiration (pneumo), skin resistance/perspiration (GSR), and cardiovascular activity (cardio). For the respiration tracing, graphs were obtained from both the chest (upper pneumo) and the abdomen (lower pneumo), but only the most productive pneumo tracing was scored. The scores were obtained from the amplitudes of the tracings (for details Matte 129, 137) when responses were compared for the relevant versus the control questions. Differences were noted in the productivity of each of these tracings. The differences in the amplitudes were measured and given a value based on the amount of the difference. The scale for the scoring is: +3, +2, +1, 0, -1, -2, -3, based on the amount of difference; negative for the relevant greater than the control, positive for the control greater than the relevant, and zero if the arousals are about even, with the exception that when there is equal but strong arousal in either the pneumo or cardio tracing, a -1 score is assigned to this question pair, as explained in more detail in Chapter 2 of this study.

All of the polygraph charts in this study were examined to determine which of the two pneumograph tracings (thoracic or abdominal) was the most productive on the basis of the clarity and

purity of its tracing, and adequacy of its amplitude. The polygraph charts in this study all reflect the thoracic pattern on the upper channel and the abdominal pattern on the lower channel. The key question tested here is whether there is a significant difference in the pneumograph tracings for the persons tested. The possibilities are that the tracings will be equal, or the upper or lower pneumo will show a more significant physiological response. We have also asked the question whether there are any sex differences in this response on the pneumo tracing. A further question tested is whether there are any differences for the innocent versus the guilty case responses for the pneumo tracing.

For the pneumo tracings the Lower was most productive for 52 percent of the cases, the Upper 16 percent, and they were the same in 33 percent of the cases. According to the Goodness of Fit test using the Chi Square, assuming there should be a random chance of either to predominate or they should be equal, we reject the hypothesis that there are no significant differences ($p = .05$ level). There is a strong indication that there is a dominant trace overall (the lower pneumo), with the upper being significant in the least number of cases.

There are major sex differences in the significant pneumo tracings. The Upper is more significant in 33 percent of the females, but none of the males. The Lower is significant in 75 percent of the males, but only 26 percent of the females. The Upper and Lower are about the same for 41 percent of the females, but only 25 percent of the males. For the number of same cases for each sex, there is a significant difference between the number and the expected value ($p = .0000011$). There is a major sex difference in the breathing response of male versus female. For the females 74 percent favor an Upper breathing response or an equal Upper and Lower. Only 26 percent of the females show a lower dominance in breathing response. For the males 100 percent favor a lower or equal Upper and Lower breathing response. In this study no males showed an upper dominance in breathing response. There is a significant difference in the data for males ($p = .0000015$). This indicates that males show a definite tendency to show stronger Lower breathing responses. We fail to reject the hypothesis that there is a significant difference for females ($p = .339$). This indicates that there is a stronger probability of an equal chance of Upper, Lower, or Equal dominance in the pneumo tracing for females. (Table 48).

When the males were compared for the Innocent cases versus the Guilty cases, the most productive pneumo (Lower) was predominant for a greater percentage of Innocent cases (83 percent) versus Guilty cases (72 percent). When the females were compared for the Innocent cases versus the Guilty cases, the Innocent cases maintained about the same equal distribution between the two pneumo tracings. However, for the Guilty cases there was a shift away from the Upper Pneumo toward the equalization of Upper and Lower Pneumo (Table 48).

The most productive pneumograph tracing for all of the Innocent cases is the Lower (Abdominal) (43 percent) versus equal productivity (Upper-Lower) (29 percent) and Upper (Thoracic) (28 percent). The most productive pneumo tracing for all of the Guilty cases is the Lower (39 percent) versus equal productivity (Upper-Lower) (36 percent) and Upper (5 percent).

All of the polygraph charts in this study were also examined to determine which of the three parameters (Pneumo, GSR, Cardio) was the most productive tracing on the basis of the sum of the verified scores attained in each tracing. The most productive tracing overall tends to be the Pneumo (43 percent), to the Cardio (32 percent), and the GSR (24 percent). They were of equal physiological response in only 2 percent of the cases. One might think they should be randomly distributed equally or of equal response. According to the data, we strongly reject the hypothesis that they are of equal response, ($p = .0000001$). This was also equally rejected for both male and female subjects. According to the Chi Square - Goodness of Fit test on the data, we also reject the concept that there is an equal chance distribution of response in the three tracings, ($p = .005$). The data indicates that there is a strong response on the Pneumo and Cardio for males with a significantly lower response in the GSR. The female distribution is more equal for the three tracings and we fail to reject the hypothesis that there are significant differences ($p = .33$). Since there was no significant difference in the responses for females, we could not define a dominant physiologigal tracing for the females.

When the males were compared for the Innocent cases versus the Guilty cases, the most productive overall tracing for the Innocent cases was quite predominantly the pneumo (67 percent) versus the Guilty cases which was the Cardio (46 percent) followed closely by the Pneumo for the Guilty (37 percent). The GSR was lowest for both the Innocent (11 percent) and Guilty cases (15 percent)(Table 38). Clearly the pneumo tracing was the more significant overall physiological tracing for the Innocent male (67 percent) but dropping to only 37 percent for the guilty

males. This shift was caused by the increased productivity of the Cardio tracing for the Guilty (46 percent) versus the Innocent (22 percent).

When the females were compared for the Innocent versus the Guilty cases, the most productive overall tracing for the Innocent cases was predominently the GSR (43 percent) followed by the Pneumo (38 percent), and the Cardio (18 percent). The most productive overall tracing for the Guilty cases was the Pneumo (44 percent) followed by the Cardio (39 percent) and the GSR (17 percent). Clearly the GSR was the more significant physiological tracing for the Innocent females (43 percent versus the Guilty (17 percent)(Table 48). For the females the Cardio shifted from being the most productive in the Innocent (18 percent) to the second most productive in the Guilty (39 percent).

The most productive overall tracing for all of the Innocent cases is the Pneumo (47 percent) followed by the GSR (33 percent) and the Cardio (19 percent).

The most productive overall tracing for all of the Guilty cases is the Cardio (44 percent) followed by the Pneumo (39 percent) and the GSR (16 percent).

The overall distribution is significantly different ($p = .04$) showing that the Pneumo tracing is the significant tracing, with Cardio a close second and GSR the least commonly dominant response. There is therefore a significant sex difference in the responses with the males showing stronger Pneumo and Cardio curves versus the female with a more likely balance among the physiological tracings. (Table 49, MPO-1).

Since the pneumo tracing is the most significant and the lower pneuomo the most productive, this would strongly indicate that the Lower Pneumo needs to be used on all subjects, but especially males. Since this has not been common past practice among many polygraphists who use only one Pneumo, this data strongly suggests a change in practice for all future applications of the polygraph in order to increase the validity of their decisions. It would seem from this study that those who have been using only the Upper Pneumo have been missing important physiological responses in their polygraph testing, especially for the male cases.

The following is an examination of the data and a descriptive explanation of the function of Tables 13, 15, 17, 19, and 37.

Table 13, depicts the Matte Quadri-Zone Scoring Guide with Zone Four (Question 23 and 24) corrections. This table is based on the decisions that were made in the cases used in this study. The basic study data was used to show the validity of the polygraph for confirmed specific tests in criminal cases using the Matte Scoring Guide as applied in polygraph use. This data shows that Armitage made 16 correct decisions for Innocent cases and 2 Inconclusive decisions for Innocent cases out of a total of 18 cases, with no False Positive decisions. This data further shows that Matte made 37 correct decisions for Innocent cases and 3 Inconclusive decisions for Innocent cases out of a total of 40 cases with no False Positive decisions. This data shows that Armitage made 13 correct decisions for Guilty cases and 1 Inconclusive decision for Guilty cases out of a total of 14 cases with no False Negative decisions. This data further shows that Matte made 49 correct decisions for Guilty cases and 1 Inconclusive for Guilty cases out of a total of 50 cases with no False Negative decisions.

Table 15, converts the raw data depicted in Table M-1 to percentages. It shows that Armitage correctly identified 50 percent of his cases as Truthful and 41 percent of his cases as Deceptive and had a total 9 percent Inconclusive rate. Matte correctly identified 41 percent of his cases as Truthful and 54 percent of his cases as Deceptive and had a total 4 percent Inconclusive rate. There were no False Positives or False Negatives made by either Polygraphist (Matte, Armitage).

Table 17, looks separately at the Innocent and Guilty cases including the Inconclusives as part of the total percentages of polygraph outocomes for cases conducted by Armitage and Matte. This table shows that Armitage correctly identified 89 percent of his Innocent cases as Truthful and 11 percent of his Innocent cases as Inconclusive. Matte correctly identified 93 percent of his Innocent cases as Truthful and 7 percent of his Innocent cases as Inconclusive. Overall, this study shows 91 percent of the Innocent cases were correctly identified as Truthful, and 5 percent were Inconclusive. There were no False Positive errors for Innocent cases. This table further shows that Armitage correctly identified 93 percent of his Guilty cases as Deceptive and 7 percent of his Guilty cases as Inconclusive. Matte correctly identified 98 percent of his Guilty cases as Deceptive and 2 percent of his Guilty cases as Inconclusive. Overall, this study shows 97 percent of the Guilty cases were correctly identified as Deceptive and 3 percent were Inconclusive.

Table 19, looks separately at the Innocent and Guilty cases excluding the Inconclusives as part of the total percentages of polygraph decisions for cases conducted by Armitage and Matte. For all decisions made for both Armitage and Matte on Innocent cases, the decisions were 100 percent accurate. In 5 percent of the Innocent cases the Polygraphists were not able to reach a decision. For all decisions made for both Armitage and Matte on Guilty cases, the decisions were 100 percent accurate. In 3 percent of the Guilty cases the Polygraphists were not able to reach a decision. There were no errors, either False Positive or False Negative. There were 115 correct decisions made with 100 percent accuracy. The Polygraphists were not able to reach a decision in 7 cases which translates into a 6 percent Inconclusive rate.

In summary, the Matte Quadri-Zone Comparison Technique made 115 correct decisions out of 122 cases which is 94 percent with 7 cases out of 122 that were found Inconclusive which is 6 percent. There were no errors of the decisions made.

Table 37, using the "Goodness of Fit" test with the Chi Square shows that there are no significant differences between the data and ground truth. According to this test, the decisions made by Armitage did not significantly differ from ground truth. This test further shows that the decisions made by Matte did not significantly differ from ground truth. Overall, on a test of all cases the "Goodness of Fit" test shows that the decisions made using the Quadri-Zone Comparison Technique did not significantly differ from ground truth. The results of this test indicate that the data is quite reliable. The observed data are quite similar to the expected values and do not indicate that any other significant factor has affected the data.

In these studies a much more demanding threshold for decision was used (Table 7) than is used for the Backster Scoring Guide or the Federal Scoring Guide (Barland, 1985). The Matte Quadri-Zone System demands an average per chart of +4 for Truthful and -5 for Deception and does not allow the total score to accumulate, and then be used against a set threshold. The threshold increases with the number of charts used in the scoring. Backster uses a similar system, but the threshold does not increase as rapidly with each chart. The Truthful increases +2 per chart and the Deceptive increases -4 per chart. The Federal System uses a set threshold that requires only a +-6 regardless of the number of charts conducted. This system requires a minimum of three charts (an average of +-2 per chart). Thus, in the Federal System the extra charts may be run to gain a threshold whereas, in the Matte or Backster Systems, as extra charts are run the threshold also increases in proportion.

The study shows that the scoring systems are robust for determining the guilty as deceptive. The percentage of guilty cases that were found was high and there was little error. Table 39 shows that for the Guilty cases (Matte 97%, Backster 91% and Federal 98%) they all were able to reach correct decisions for a large percentage of cases. The accuracy of the decisions was also high (Matte 100%, Backster 98%, Federal 98%) with a very low error rate. All the systems proved powerful in correctly determining the guilty. Both the Federal and Backster Scoring Systems showed a 2 percent error rate for Guilty decisions.

A significant difference was seen in the Innocent cases. The Matte Quadri-Zone System was able to make 91 percent correct decisions for the cases and was 100 percent accurate for the decisions made. There were no errors and a 9 percent Inconclusive rate. The other systems would only have been able to make correct decisions 60 percent of the time and these decisions would be only 92 percent accurate. There would have been a 34 percent Inconclusive rate for each system and an 8 percent error rate. (Table 28 and 36). When the scores for the other systems were adjusted by the Quadri-Zone, they also showed low inconclusives and low error rate. This demonstrates that the scoring system is robust, but the "Fear of Error" factor is very significant for the innocent cases. This study indicates that the Fourth Zone containing the "Fear/Hope of Error" questions needs to become universal to increase the ability of the systems to reach correct decisions. There is an indication from the adjusted tables that the Matte System scale for the innocent may have too high a threshold and could become even more effective if the threshold is lowered by one point for the extra charts. There can be no doubt that the weaknesses in the Federal and Backster systems are in their ability to reach correct decisions in the innocent cases. These results are consistent with the high number of Inconclusives found in other research studies. Barland (38) found it necessary to eliminate the Inconclusives from his data in order to report the accuracy for decisions he could reach. Our study shows that the Inconclusives can be significantly reduced and correct truthful decisions increased when the "Fear of Error" correction is applied to the positive scores.

One might expect that the Matte System increases the accuracy in making a call Truthful or Deceptive. The data in this study do support this conclusion. However, one might expect a greater number of Inconclusives due to the wider range before threshold. The data do not support this and show that the accuracy was 91 percent for the Truthful (Innocent) and 97 percent for the Deceptive (Guilty) without eliminating any cases and with a low inconclusive rate. Also the Matte System had no errors. All decisions made were correct.

When the scores are compared for the Matte Scoring Guide to the Backster and Federal Scoring Guides with the Zone 4 (Questions 23 & 24) adjustment (Table 42) there were no significant differences found in the Scoring Guides for the three systems. The percents of decisions only differed by one percent for the Innocent, one percent for the Deceptive and 2 percent for the Inconclusives. Using the Goodness of Fit tests Tables 37, BB-1, FF-1 show that there are no significant differences in the data. Table 42 shows the value of the Matte System in determining the Innocent and the Guilty without making any False Positive or False Negative errors. There were 4 percent Inconclusives for the Innocent and 2 percent Inconclusives for the Guilty. The Backster System would have found one percent more Innocent cases with one percent less Inconclusives. The percent of Guilty cases would be the same. The Federal System would have found the same one percent more Innocent cases and one percent more of Guilty cases. The scoring system without an increasing threshold tends to produce more conclusions, but increases the probability of error. There would be a one percent False Positive error with this system and 2 percent less Innocent Inconclusives with 1 percent less Guilty inconclusives. The scores for the three systems were amazingly similar showing that the number scoring system is very robust and the differences in threshold and totaling process are not as critical as long as the scores are adjusted for the Zone Four (23-24).

The critical factor is the adjustment of the scores using the Zone Four (23-24) as shown in Table 45. Without the Zone Four the Matte System (Table 45a) would show a significant drop in Innocent cases and a drop in Guilty cases with a corresponding increase in Inconclusives. There would have been one percent False Negative cases. This shows that the Matte System requires the Zone Four for Accuracy. Since that is the normal way the system is used in practice this confirms the correctness of this design.

The Backster System would have shown significantly less Innocent cases and slightly less Guilty cases with corresponding increases in Inconclusives (Table 45b). There would have been one percent False Negative cases and there would have been two percent False Positive cases using this system. This system seems to be highly accurate in determining the Guilty cases, but is less accurate in determining the Innocent cases. The number of errors might be unacceptable. Since this system does not normally use the Zone Four, this study establishes that it should be used and when used it will greatly increase the accuracy of the decisions in reducing errors, reducing Inconclusives, and especially in determining the Innocent cases.

The Federal System would have shown significantly less Innocent cases, but the same number of Guilty cases, with corresponding increases in Inconclusive (Table 45c). There would have been two percent False Negative cases and there would have been one percent False Positive cases using this system. This system seems to be highly accurate in determining the Guilty cases but is less accurate in determining the Innocent cases. The number of errors might be unacceptable. Since this system does not normally use the Zone Four, this study establishes that it should be used and when used it will greatly increase the accuracy of the decisions in reducing errors, reducing inconclusives, and especially in determining the Innocent cases.

When the Matte Quadri Zone (Zone Four) is used there are actually less cases of Inconclusives showing that greater accuracy has been attained not only in the determination of Innocence or Guilt, but in reducing the number of inconclusives (Matte 34% to 6%, Backster 20% to 5%, Federal 16% to 3%). Barland (Barland 39) shows his accuracy was attained only by eliminating the inconclusives from his data calculations. With the Zone Four we found so few inconclusives that we could state our accuracy while including all the cases in the study. This was true for all three Scoring Guides when scores were adjusted using the Quadri-Zone (Zone Four). (Tables 17, 26, 34, 43, 46).

Barland (Barland 38, p.145) in his mock paradigm cases found 35 percent Inconclusives for Innocent cases, 26 percent Inconclusives for Guilty cases, and 32 percent Inconclusives overall. Applying the Federal System (Table 34) in our study using confirmed real-life cases we found 34 percent Inconclusives for Innocent cases, Zero Inconclusives for the Guilty cases and 16 percent Inconclusives overall. In our study we noted that the number of Inconclusives for the "real" Innocent is about the same as in the "mock" cases. However, for the Guilty cases there was a significant drop in Inconclusives. On the topic of psychodynamics, Barland suggests that this 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 our study (real-life) shows a significant drop in the Guilty Inconclusives. This shows that for the "real-life" Guilty, their physiological responses are much stronger, allowing the Polygraphist to make more frequent definite decisions.

We found that the psychodynamics does appear to be a different factor for the Innocent cases. There did not appear to be stronger physiological responses since the Inconclusives are almost identical for the Barland study and our study. However, we further noted that when Zone Four is applied to the Federal Zone Comparison System, the Innocent Inconclusives dropped from 34 percent to 5 percent (Table 46c). This indicates that the "Fear of Error" factor as measured by Zone Four, is a significant factor in the psychodynamics of the Innocent cases.

As noted by Barland (Barland 38), 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. Barland predicts (Barland 38) that 80 percent of the time a Guilty subject will score minus 15 or higher. We found that the probability is much greater than that. He has predicted that his figure overstates the probability of error. He also predicts a 1 percent probability for an Innocent subject to fall in this "Guilty range". Using the Backster and Federal Scoring Guides as used in practice we did find this to be true. However, when the scores were adjusted using the Zone Four, this was not true for the Matte or Backster Scoring Guides for the 122 cases. It was still true for the Federal System because it does not use an increasing threshold.

As noted by Barland (Barland 38), as one approaches the appropriate tail of each curve, the estimated probability of an error approaches the infinitesimal. Our 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. The data do not support this.

The Quadri-Zone adjustment of scores increases the accuracy and reduces the errors as well as the Inconclusives. We had one case of False Positive and one of False Negative that were eliminated by the Zone Four adjustment. These would have been errors if the Federal System was used, but the errors were eliminated (the accuracy increased) by adjusting the scores using the Quadri-Zone.

In Barland's Study (Barland 38), the decision was correct in 96 percent of the Truthful cases supporting the accuracy of a smaller value in the Truthful cases. The decision was correct in only 88 percent of the Deceptive cases showing the need for a stronger criterion (higher threshold) for the deceptive cases. The Matte Scoring Guide and the Backster Scoring Guide both use this same concept. The consistency of the systems in getting accurate decisions indicates that this is a valid concept.

To obtain the high percentage of accuracy in the results, Barland had to eliminate the Inconclusives from his tally. Using our data from Table 30 in the same way on this system the decision would be correct in 92 percent of the Truthful (Innocent) cases and 98 percent of the Deceptive (Guilty) cases showing that our data is parallel to the data in his study. However, the Zone Four allows the Polygraphist to reach a higher level of accuracy in decisions without eliminating any cases.

When the scores are compared using the Federal System a similar number of Inconclusives are found (Table 29), but when the Matte Quadri-Zone is used, there are actually less cases of Inconclusives showing that greater accuracy has been attained not only in the finding of Truth-Deception, but in reducing the number of Inconclusives. Barland shows his accuracy was attained only by eliminating the Inconclusives from his data calculations. We found so few Inconclusives that we could state our accuracy while including all the cases in the study.

We found that the Stimulation Test, when used after the first polygraph chart has been administered, had a tendency to cause stronger reactions on the control or relevant questions consistent with ground truth on the second and subsequent polygraph charts that followed. However, in some instances, the Stimulation test caused strong reactions to the relevant questions inconsistent with the general trend and ground truth. (Table 12). Discussion of the Stimulation Test is found in Chapter 2 of this study.

When the Stimulation Test is given before Chart One, the Innocent cases show a negative correlation (-.434) between the changes (between Chart One and Chart Two) and the countertrend indicating the influence was positive and not related to a stimulation that produces a countertrend. The correlation of .1 for Chart One values and the countertrend is quite low, also supporting this point. (Table 52, A.1.)

When the Stimulation Test is given before Chart Two, the higher positive correlation (.441) between the changes and the countertrend scores indicates that in the Innocent cases the Stimulation Test causes a significant influence counter to the final scores and counterproductive to the use of the polygraph. This supports the recommendation that the Stimulation Test is better given before the First Chart rather than before Chart Two. (Table 52, A.2.)

For the Guilty subjects the changes have a negative correlation (-.003) to the countertrend when the Stimulation Test is given before Chart One and a slight positive correlation (.108) when given before Chart Two. This indicates that the Stimulation Test is more effective if given before Chart One and slightly counterproductive when given before Chart Two. (Table 52, B.1.2.)

The data for both Innocent and Guilty cases show some counterproductive effect when the Stimulation Test is used before Chart Two, but an effect in the direction of the final outcome if used before the First Chart. This effect is most predominant for the Innocent cases. This result might be expected since the Innocent cases would clearly have the greatest "Fear of Error" and therefore, be most probable for the reaction that something might be wrong with the polygraph test when the Stimulation Test is used before Chart Two. This reaction would not be expected before Chart One since the examinee would consider this as part of the start of the testing procedure. Such a response would explain the countertrend tendency. All the data support the general conclusion that the Stimulation Test should be used before Chart One, and not before Chart Two. (Table 52).

It should be noted that the Countertrend scores averaged -5 per case for the Innocent and +2 per case for the Guilty.

Blind Scoring of the data was done to show the reliability of the scores and the consistency of the scoring process in reaching the same decisions. In this study, all polygraph charts were assigned a case number and were removed from the files and furnished with blank scoring sheets to three separate Polygraphists (Matte, Armitage, and LaCorte) at different times and locations with instructions to score the charts without the benefit of any case information. As previously mentioned, all three of these Polygraphists have at least nine years of experience in the administration of the Quadri-Zone Comparison Technique and longer in the numerical scoring of polygraph charts. The total number of polygraph charts represented in the 122 cases included in this study and scored by aforementioned Polygraphists is 311. The scores on the individual charts were compared by a correlation test for their similarity. We found correlations in the .99 range (Table 11) between the original scores and the Blind Scores. The total blind scores for all Matte (90) cases tallied was -775 for Matte, -748 for Armitage, and -711 for LaCorte. For the Armitage (32) cases, the total was -72 for Armitage, -72 for Matte, and -53 for LaCorte. This shows that the Scoring System is extremely valid for indidivual charts. Also the total scores arrived at for each case were compared for their correlation. We found correlations in .99 range (Table 11) between the Original total scores and the Blind total scores. This shows that the

Scoring System is extremely valid for total scores upon which decisions are made. If the Blind Scores had been used to make decisions in our study, all of the decisions would have been the same. There were no blind scores for the 122 cases that had enough difference in value to cause a change in decision. This was an internal check on the universal nature of the scoring process. The technique of numerical scoring is repeatable and proves to have close similarity for the individual scores, the totals, and the decisions. Anyone trained in the technique can score the charts. A second scorer is recommended (Matte 129) for important cases where a judicial decision may be involved. The consistency of the scoring by Armitage has been noted in previous cases when Armitage's field study cases were sent to the New York School of Lie Detection in 1979 to be blind scored. It was reported to Matte by the Senior School Instructor that there was only a one point difference per chart between their scoring of Armitage's polygraph charts in five cases, each involving a minimum of at least two charts, and the scores furnished by Armitage.

This study also provides for the first time in polygraph history a Predictive Table for Estimating Error Rates based on data obtained from confirmed real-life polygraph cases. This method for estimating the accuracy of individual control question tests was first advanced by Dr. Gordon H. Barland (38, P. 142-147) who developed such a table based on polygraph charts obtained in laboratory research involving mock crimes. But Dr. Barland felt that it would be premature to apply his predictive table to criminal investigations until similar tables have been developed from verified real-life cases. One of the goals of this study was to develop such a predictive table for Polygraphists administering the Quadri-Zone Comparison Technique.

We first separated the Guilty from the Innocent cases. We then determined the mean score per chart and standard deviation for each set of cases. The scores were than converted to Z-Scores. The Z-Scores were then matched with probabilities from a Table of Cumulative Normal Probabilities for each set of cases. Each of the two tables (Innocent-Guilty) reflects the maximum highest and lowest score values. Each score is matched to a probability that an Innocent or Guilty case will reach a mathematical score that low or that high respectively; that a percentage of the time an Innocent or Guilty case will score this value or higher/lower respectively; and the potential for error based on the probability that a Guilty or Innocent case will score this value or higher/lower respectively.

Dr. Barland (38, P. 147) shows his Probabilities in his Table 2 for the mock cases. Our study shows comparative tables (Table 10a-1, 10b-1) which are based on real-life cases excluding the Zone Four adjustment. These tables were calculated using the same statistical method as Dr. Barland, therefore the figures can be compared to show the effect of the real-life factor on the probabilities versus the mock paradigm factor.

For the Innocent cases we observed that for scores below -3 the probabilities for the real-life cases (.042) are much lower than for the mock cases (.2). This trend is also shown for the higher scores where the Probability of 1 is reached at a 3-chart value of +42 versus +22 for Dr. Barland. The real-life curve is shifted toward a greater positive value for the real-life Innocent cases. This matches an expected concept that the real-life Innocent examinee whll show a stronger response.

For the Guilty cases we observed that for scores zero or higher the probabilities for the real-life cases (.002) are much lower than for the mock cases (.2). This trend is also shown for the lower scores where the Probability of 1 is reached at a 3-chart value of -50 versus -23 for Dr. Barland. The real-life curve is shifted toward a greater negative value for the real-life guilty cases. This matches an expected concept that the real-life Guilty examinee will show a stronger response.

In comparing Dr. Barland's mock cases with our study cases (Tables 10a-2, 10b-2) which are based on real-life cases including the Zone Four adjustment we were able to compare the value of the Quadri-Zone Technique in obtaining the probabilities. These tables were calculated using the same statistical method as Dr. Barland, therefore the figures can be compared to show the effect of the real-life factor including the Fear/Hope of Error adjustment on the probabilities versus the mock paradigm factor.

For the Innocent cases we observed that for scores below -3 the probabilities for the real-life cases (.002) are much lower than for the mock cases (.2). This trend is also shown for the higher scores where the Probability of 1 is reached at a 3-chart value of +48 versus +22 for Dr. Barland. The real-life adjusted curve is shifted toward an even greater positive value (for -3: .042 to .002; for probability 1: +42 to +48) for the real-life Innocent cases. This supports our concept that the real-life score when adjusted with the Quadri-Zone for the Innocent examinee will show an even stronger response.

For the Guilty cases we observed that for scores zero or higher the probabilities for the real-life cases (.001) are much lower than for the mock cases (.2). This trend is also shown for the lower scores where the Probability of 1 is reached at a 3-chart value of -56 versus -23 for Dr. Barland. The real life adjusted curve is shifted toward a greater negative value (for zero: .002 to .001; for probability 1: -50 to -56) for the real-life Guilty cases. This supports our concept that the real-life score when adjusted with the Quadri-Zone for the Guilty examinee will show an even stronger response.

Our Predictive Tables 10 also show the probabilities converted to a percent of the time an Innocent or Guilty case will score the indicated value. This percent is also used to express the potential error that would be made if a decision were reached for the given value. It can be seen from the Tables 10a-2, 10b-2 that the real-life scores when adjusted using the Quadri-Zone have a much lower probability of error for any given value.

In this field study we have shown that the Matte Quadri-Zone Comparison Technique produces extremely accurate results in identifying the Innocent as Truthful and the Guilty as Deceptive. There are very few cases where a decision cannot be made (Inconclusive). On the 122 cases in this study the system did not make a single error in any decision reached. It was found that the most productive pneumo tracing for males was the lower (abdominal) pneumo. It was found that the most productive pneumo tracing for females was the upper (thoracic) pneumo or equal upper and lower. It was found that the most productive tracing overall tends to be the pneumo, followed by the cardio, and then the GSR. The males tend to have stronger responses on the pneumo and cardio, with a significantly lower response in the GSR. The female distribution is more equal for the three tracings. The study clearly refutes the "friendly polygraphist" concept that the fear of detection may be significantly reduced in examinee-clients of Defense Attorneys. On the contrary, the data shows a greater percentage of guilty (90%) versus innocent (7.6%) was found in the defense attorney cases as opposed to cases conducted by the Buffalo Police Department (Guilty 40.6%; Innocent 50%).

The Stimulation Test should be administered as the first polygraph chart instead of after the first chart to avoid the possibility of countertrend scores. The scoring process, as shown by the blind scores, is valid for the individual charts, the total scores and the decisions made.

Chapter 4

COMPARISON OF SCORING METHODS

In 1978 Drs. Gordon H. Barland, David C. Raskin, and John A. Podlesny published a research project entitled "Validity and Reliability of Detection of Deception." In this project the authors discovered that when the scores obtained from polygraph charts went beyond +-6 from 0, the inconclusive rate increased dramatically. Their research further established from empirical data that when the score reached +-6 they were assured of an approximate accuracy rate of 90 percent. Therefore for practical reasons, to avoid a high inconclusive rate, the minimum score required to make a determination of truth or deception was established as +-6. In 1982, a presentation was made by Dr. Brian Lynch of the Canadian Police College at the American Polygraph Association Seminar at Vancouver, B.C., regarding a research project he had conducted using students in mock crime situations. Lynch also arrived at the conclusion from his research that the minimum required score to reach a determination should be at +-6, and this would assure the Polygraphist of an approximate accuracy rate of 88 percent. In both instances above, the Polygraphist may conduct two, three or more charts in order to obtain this minimum required score; the threshold does not increase with the number of charts conducted.

This author (Matte) challenged Lynch's minimum score as being dangerously low, and pointed out to Lynch that under those conditions, it was conceivable that the three polygraph charts normally conducted on a subject would only have to produce a -2 per chart which would total -6 to call that subject Deceptive. When one considers that each chart which contains three Relevant-Control question pairs can produce a score of -27 for a total score of -81 for three charts, a total score of -6 seems rather paltry to call a subject Deceptive. Furthermore, an 88 percent accuracy rate may satisfy researchers in the academic world where no one gets hurt, however in the real world where mistakes cost someone real pain, an 88 percent accuracy is totally unacceptable to this author (Matte). In the real world of commercial polygraph testing, clients don't remember all of the good calls a Polygraphist has made over the years, he only remembers the mistake, which can cost the Polygraphist the loss of that client. From a humanistic point of view, a conscientious Polygraphist would find it hard sleeping at night knnowing that there was a 12 percent chance that the person he called Deceptive that day may in fact be Innocent. Lynch reluctantly admitted and recommended that those who felt a need for a higher accuracy rate and were willing to accept the higher Inconclusive rate could raise the minimum score requirement accordingly.

In this author's (Matte, 29) textbook published in 1980, an argument for a higher threshold and one that advances with each chart conducted was presented on the basis of logic rather than empirical data. Since the data from this validation study supports this argument "logique", it is restated herewith.

Backster initially developed the scoring method and labeled each score as follows. 0 = ? +-1 = Lean towards Truth or Deception +-2 = Truth or Deception +-3 = Upgrade to TT or DD (double Truth or double Deception). Backster also eliminated the weakest score or the score that did not follow the general trend in each of the question pairs scored. Therefore in his Zone Comparison Test which contained only two question pairs there were a total of 6 spots to score but 2 of those spots were eliminated from the tally leaving only 4 spots whose scores would determine the outcome. Each chart would provide 4 spots and a minimum of two polygraph charts were required before a determination of Truthfulness or Deceptiveness could be made. Therefore, we should expect that of the four spots on a polygraph chart, at least one of those spots would produce a -2 (Deception) score and the other three spots produce at least a -1 (lean towards deception) score before Deception should be indicated. A finding of Deception should not be based on charts that produce only four -1 (lean towards deception) scores. The requirement for only one -2 (deception) score on each chart is based on the principle that the subject's psychological set may be focused upon only one of the relevant questions, that which has the greatest threat to his well-being. That question may produce a -2 or even a -3 score, however the other relevant question may produce only minimal response as a result of the examinee's strong focus on the question to which he feels most threatened. The serious consequences deceptive polygraph results may have on an examinee, especially if the results are admitted into evidence, dictates that a convincing scientific argument be presented validating the results. An offer of four -1 scores which are all minimum deception scores, although consistent throughout two or more charts will not present a convincing argument to prove the guilt of an examinee. If a person is guilty of a crime for which he is being polygraphed, at least one of the relevant questions should be of a sufficient threat to produce a -2 response in at least one of the three tracings on one of the relevant questions.

In order to establish reliability, two or more charts producing an absolute minimum in each chart of a -2 score plus a minimum total score of -3 from the other tracings in the same chart for a minimum grand total of -5 in each chart should be obtained before a definite conclusion of deception should be rendered. The only exception to this rule occurs when an "Inside Issue" factor dampens the responses to the primary relevant

questions, but the lost response energy is recouped by the "Inside Issue" relevant question; however the total score for each chart must still meet the minimum score requirement of -5 per chart. Obviously, evidence of a consistently greater score tally will correspondingly decrease the probability of error.

In the application of this scoring method to determine Truthfulness, a +1 score for each of the four spots is required for a total of +4 per chart conducted, hence since a minimum of two charts must be conducted for a determination, a score of +8 is required to call a person Truthful, +12 for three charts, and +16 for four charts. The lower score is justified on the basis that weaker responses are expected from control questions which are structurally less intense than the relevant questions. If each of the four spots produces a +1 score each reflecting mild response to those control questions as opposed to no response to the neighboring relevant questions, it can be safely assumed that the results reflect truthfulness regarding the issue for which the examinee was tested.

When Matte's Quadri-Zone Scoring System is compared to Backster's Tri-Zone Scoring System, we see many similarities, and that is because the Backster System formed the basis for the Quadri-Zone Comparison Technique. Both systems have an increasing threshold; no longer do either of them eliminate the weakest score or the score that doesn't follow the general trend (all scores are calculated in the final tally). However, unlike the Quadri-Zone system which increases its threshold after the first chart by 5 points for each Deceptive chart and 4 points for each Truthful chart, Backster's system increases its threshold after the first chart by 4 points for each deceptive chart and 2 points for each Truthful chart. (Table 7).

When we compare the Federal Scoring System to Matte's Quadri-Zone and Backster's Tri-Zone Scoring Systems the difference is more significant in that the Federal System has a fixed threshold that does not increase with the administration of additional polygraph charts. (Table 7).

An increasing threshold would normally invite an increase in the percentages of Inconclusives, but would also increase the accuracy of those cases where a definite decision was made. Conversely the lower the threshold the less number of Inconclusives may be expected but a lower accuracy rate may also be expected. The data in this study supports this theory. (Table 22, 40, 46).

However, as reflected in Table 46, when Zone Four is included, as is normal procedure in the Quadri-Zone System, the increasing threshold provides the highest accuracy without increasing the Inconclusive rate. This is true of all three systems.

For the purposes of this study we have compared the Matte Quadri-Zone Scoring System to the Backster Scoring System and the Federal Scoring System to determine the accuracy of each system in correctly identifying the Innocent versus the Guilty. In this study the accuracy of the efficiency of each system in making decisions by use of the polygraph when compared to ground truth is shown in Table 40 (12 MBF) which uses the data of Tables 17 (2 M-1), 26 (2 B-2), and 34 (2 F-2). These tables test the ability of each scoring system to reach correct decisions compared to known confirmed cases. These tables are generated to show the score and accuracy of the polygraph decisons for the Innocent and Guilty cases separately **including** the Inconclusives. Thus each correct decision made is a percentage of the total number of cases.

Each percent developed shows the effectiveness of the particular system of scoring to correctly identify the Innocent/Guilty cases for the total number of cases. This expresses the ability of that system to accurately make decisions.

The accuracy of the Matte Quadri-Zone Scoring System is shown in Table 17. The Matte Scoring System found 91 percent (53 cases) of the Innocent cases as Truthful and 9 percent (5 cases) as Inconclusive out of a total of 58 cases. There were no Innocent cases found Deceptive, therefore there were no False Positive errors. The Matte Scoring system found 97 percent (62 cases) of the Guilty cases as Deceptive and 3 percent (2 cases) as Inconclusive out of a total of 64 cases. There were no Guilty cases found Truthful, therefore there were no False Negative errors. The overall accuracy of the decision making process was 94 percent (115 cases) with 6 percent inconclusives (7 cases) with no False Positive or False Negative errors.

The accuracy of the Backster Scoring System is shown in Table 26 (2 B-2). The Backster Scoring System would have found 60 percent (35 cases) of the Innocent cases as Truthful, 34 percent (20 cases) as Inconclusive, and there were 5 percent (3 cases) as Deceptive out of a total of 58 cases. Therefore there was a 5 percent False Positive error rate. The Backster Scoring System would have found 91 percent (58 cases) of the Guilty cases as Deceptive, 8 percent (5 cases) as Inconclusive, and 2 percent (1 case) as Truthful out of a total of 64 cases. Therefore there was a 2 percent (1 case) False Negative error. The overall accuracy of the decision making process was 76 percent (93 cases) with 20 percent (25 cases) Inconclusives and a 3 percent (4 cases) error rate.

The accuracy of the Federal Scoring System is shown in Table 34 (2 F-2). The Federal Scoring System would have found 60 percent (35 cases) of the Innocent cases as Truthful, 34 percent (20 cases as Inconclusive, and there were 5 percent (3 cases) as Deceptive out of a total of 58 cases. Therefore there was a 5 percent False Positive error rate. The Federal Scoring System would have found 98 percent (63 cases) of the Guilty cases as Deceptive, no Inconclusives, and 2 percent (1 case) as Truthful out of a total of 64 cases. Therefore there was a 2 percent (1 case) False Negative error. The overall accuracy of the decision making process was 80 percent (98 cases) with 16 percent (20 cases) Inconclusives and a 3 percent (4 cases) error rate.

In summary, the Matte Quadri-Zone System makes a much higher rate of decisions with no errors and a much lower Inconclusive rate than either the Backster System or the Federal System.

In order to compare the polygraph systems for the accuracy of the decisions reached (Table 41 (13 MBF), the systems were compared **excluding** the Inconclusives thus each correct decision made is a percentage of the total number of decisions that were made. Each percent developed shows the effectiveness of the particular system of scoring to correctly identify the Innocent/Guilty cases for the total number of decisions. This expresses the accuracy of the decisions made for each system.

The accuracy of the Matte Quadri-Zone System is shown in Table 19 (3 M-1). The Matte Quadri-Zone System was 100 percent (53 cases) accurate in identifying the Innocent as Truthful with no Innocent identified as Deceptive. There were no False Positive errors. The Matte Quadri-Zone System was 100 percent (62 cases) accurate in identifying the Guilty as Deceptive with no Guilty identified as Truthful. There were no False Negative errors. The overall accuracy of the decisions made was 100 percent (115 cases) with no errors.

The accuracy of the Backster System is shown in Table 28 (3 B-2). The Backster System was 92 percent (35 cases) accurate in identifying the Innocent as Truthful with 8 percent (3 cases) of Innocent identified as Deceptive. This is a False Positive error rate of 8 percent. The Backster System was 98 percent (58 cases) accurate in identifying the Guilty as Deceptive with a 2 percent (1 case) of the Guilty identified as Truthful. This is a False Negative error rate of 2 percent. The overall accuracy of the decisions made was 96 percent (93 cases) with 5 percent (4 cases) error rate.

The accuracy of the Federal System is shown in Table 36 (3 F-2). The Federal System was 92 percent (35 cases) accurate in identifying the Innocent as Truthful with 8 percent (3 cases of Innocent identified as Deceptive. This is a False Positive error

rate of 8 percent. The Federal System was 98 percent (63 cases) accurate in identifying the Guilty as Deceptive with a 2 percent (1 case) of the Guilty identified as Truthful. This is a False Negative error rate of 2 percent. The overall accuracy of the decisions made was 96 percent (98 cases) with a 4 percent (4 cases) error rate.

In summary, the Matte Quadri-Zone System is 100 percent accurate for the decisions made. This is more accurate than the decisions made using the Backster or the Federal System.

According to this study, the Matte Quadri-Zone System is superior in making accurate decisions with reduced inconclusives and a zero error rate and suggests that the improvements in the technique used in the Quadri-Zone System be adopted by the users of the Backster and Federal Systems.

Chapter 5

ACCURACY OF SCORING METHODS WITH AND WITHOUT ZONE FOUR

In this validation study we have compared the Matte Quadri-Zone Scoring System to the Backster Scoring System and the Federal Scoring System to determine the accuracy of each system in correctly identifying the Innocent versus the Guilty as they would be used without the Zone Four versus with the use of Zone Four. The Matte Quadri-Zone Scoring System normally uses the Zone Four. The Backster and the Federal Systems do not normally use the Zone Four. Thus this comparison shows the value of the Zone Four as it would be applied in each system.

The accuracy of each of the systems in making decisions with and without Zone Four is summarized in Table 46. These tables test the ability of each of the scoring systems to reach correct decisions compared to known confirmed cases with and without the Zone Four. These tables are generated to show what the scoring accuracy would be of the polygraph decisions for the Innocent and Guilty cases separately including the Inconclusives, if the decisions were made with and without the Zone Four being used. Thus each correct decision made is a percentage of the total number of cases.

The accuracy of the Matte Quadri-Zone Scoring System is compared in Table 46 based on Tables 17 and 18.-2. With the Zone Four, the Matte Scoring System found 91 percent of the Innocent cases as Truthful, No deceptive and 9 percent Inconclusive. Without the Zone Four the Matte Scoring System would have found 43 percent of the Innocent cases as Truthful, 5 percent Deceptive and 52 percent inconclusive. Therefore Zone Four prevented a 5 percent False Positive error rate and reduced the Inconclusives by 43 percent from 52 percent to 9 percent. With Zone Four the Matte Scoring System found 97 percent of the Guilty cases as Deceptive, no Truthful and 3 percent Inconclusive. Without the Zone Four the Matte Scoring System would have found 81 percent of the Guilty as Deceptive, 2 percent Truthful and 17 percent Inconclusive. Therefore Zone Four prevented a 2 percent False Negative error rate and reduced the Inconclusives by 14 percent from 17 percent to 3 percent. This comparison clearly shows that the Zone Four is very important in reducing the number of Inconclusives and in reducing the number of errors when the Matte Scoring System is used.

The accuracy of the Backster Scoring System is compared in Table 46b based on Tables 25 and 26. With the Zone Four the Backster Scoring System would have found 93 percent of the Innocent cases as Truthful, with no Deceptive and 7 percent Inconclusive. Without the Zone Four the Backster Scoring System

would have found 60 percent of the Innocent cases as Truthful, 5 percent Deceptive, and 34 percent Inconclusive. Therefore Zone Four would have prevented 5 percent False Positive errors and reduced the Inconclusives by 27 percent from 34 percent to 7 percent. With the Zone Four the Backster Scoring System would have found 97 percent of the Guilty cases as Deceptive with no Truthful, and 3 percent Inconclusive. Without the Zone Four the Backster Scoring System would have found 91 percent of the Guilty as Deceptive with 2 percent Truthful, and 8 percent Inconclusive. Therefore Zone Four would have prevented two False Negative errors and reduced Inconclusives by 5 percent from 8 percent to 3 percent. This comparison clearly shows that the Zone Four would be very important in reducing the number of Inconclusives and in reducing the number of errors if it were used with the Backster Scoring System.

The accuracy of the Federal Scoring System is compared in Table 46c based on Tables 33 and 34. With the Zone Four the Federal Scoring System would have found 93 percent of the Innocent cases as Truthful, with 2 percent Deceptive and 5 percent Inconclusive. Without the Zone Four the Federal Scoring System would have found 60 percent of the Innocent cases as Truthful, 5 percent Deceptive and 34 percent Inconclusive. Therefore Zone Four would have reduced the error rate from 5 percent to 2 percent for False Positives and the Inconclusives by 29 percent from 34 percent to 5 percent. With Zone Four the Federal Scoring System would have found 98 percent of the Guilty cases as Deceptive with no Truthful, and 2 percent Inconclusive. Without the Zone Four the Federal Scoring System would have found 98 percent of the Guilty as Deceptive with 2 percent Truthful, and no Inconclusives. Therefore Zone Four would have prevented 2 percent False Negative errors and reduced the Inconclusives by 2 percent from 2 percent to zero. This comparison clearly shows that the Zone Four would be very important in reducing the number of Inconclusives and in reducing the number of errors if it were used with the Federal Scoring System.

In comparing these three systems, the Table 43 shows how they compare when the Zone Four is applied for each system. For the Innocent cases, Matte found 91 percent Truthful, Backster 93 percent Truthful, and Federal 93 percent Truthful; Matte no Deceptive, Backster No Deceptive, Federal 2 percent Deceptive; Matte 9 percent Inconclusive, Backster 7 percent Inconclusive, and Federal 5 percent Inconclusive. All three systems identified about the same number of Innocent cases as Truthful but the Federal system would have made a 2 percent False Positive error. This appears to be the result of their fixed scoring threshold. The Matte System found the highest percentage of Inconclusives which is consistent with its higher increasing scoring threshold. The Backster system which uses a slightly lower increasing scoring threshold would have found less inconclusives without increasing

the number of errors. The Backster Scoring System is the best of the three in correctly identifying the Innocent when used with the Zone Four. This would suggest that the Matte Scoring System reduce its Truthful threshold by about 1 point per chart which would then have shifted 2 percent of the Inconclusive decisions to correct Truthful decisions.

For the Guilty cases, according to Table 43, when using Zone Four, Matte found 97 percent of them Deceptive, Backster 97 percent Deceptive, and Federal 98 percent Deceptive; Matte no Truthful, Backster no Truthful, and Federal no Truthful; Matte 3 percent Inconclusive, Backster 3 percent Inconclusive, and Federal 2 percent Inconclusive. All three systems identified about the same number of Guilty cases as Deceptive with a very high percentage of accuracy and no errors. The Inconclusive rate would be about the same and would be very low if Zone Four had been used. This shows that the scoring systems would all be very robust at identifying the Guilty cases as Deceptive without creating an error and with a high percentage of correct decisions if the Zone Four is used in each system. The scoring threshold seems accurate at -6 and above since there would be ono errors. The increasing thresholds of Backster and Matte did not significantly increase the inconclusives as predicted in other studies (Raskin, 162, 163). This would indicate that for the Guilty subjects that once a threshold level of reaction is reached the response is strong enough and persistent enough to sustain the increase in threshold with each new chart.

In comparing these three systems the Table 43 shows how they compare without the use of Zone Four. For the Innocent cases Matte would have found 43 percent Truthful, Backster 60 percent Truthful, and Federal 60 percent Truthful; Matte 5 percent Deceptive, Backster 5 percent Deceptive, Federal 5 percent Deceptive; Matte 52 percent Inconclusive, Backster 34 percent Inconclusive, Federal 34 percent Inconclusive. All three systems had a fairly low percentage of truthful cases showing the weakness of these scoring systems to find the Innocent cases as Truthful without the use of Zone Four. Since the thresholds for the Innocent in all three systems is fairly high, it appears that the strength of the physiological arousal as evidenced by the scores is weaker for the Innocent than for the Guilty. This is consistent with the published literature and supports the general viewpoint as recommended by Backster, Matte (129), et al, that the scoring thresholds should be lower for the Truthful compared to the Deceptive cases. All three systems would have made the same percentage of False Positive errors. This shows that the different thresholds would not cause any change in the number of False Positives that would be found. The high threshold of the Matte System would create the greatest number of Inconclusives as expected if Zone Four were not used. The high rate of

inconclusives on all the systems is consistent with the published literature and indicates the weaker responses for the Innocent cases. Since this inconclusive level is significantly reduced by the Zone Four in all three systems, this shows that much of the response factor leading to Inconclusives rather than Truthful decisions is the "Fear of Error" factor as measured by Zone Four for the truly Innocent cases.

For the Guilty cases without the use of Zone Four, according to Table 43b, Matte would have found 81 percent of the Guilty cases as Deceptive, Backster 91 percent Deceptive and Federal 98 percent Deceptive; Matte 2 percent Truthful, Backster 2 percent Truthful, and Federal 2 percent Truthful; Matte 17 percent Inconclusive, Backster 8 percent Inconclusive, and Federal No Inconclusive. This shows that with an increasing theshold, the number of cases that can be correctly called Deceptive decreases and are called inconclusive. The lower threshold of the Federal System would correctly identify the greatest number of Guilty cases as Deceptive. All systems would have made a 2 percent False Negative error rate. Without the Zone Four, as the threshold increases for the Guilty cases, there is a significant increase in the Inconclusive rate as would be expected from a higher threshold, and this is consistent with published studies on setting the threshold at -6 to avoid too many Inconclusives. (Raskin, 162, 163).

The accuracy of the decisions made for each of the systems with and without Zone Four is summarized in Table 47. These tables test the accuracy of the decisions compared to known confirmed cases with and without Zone Four. These tables are generated to show what the accuracy of the decisions would be for the Innocent and Guilty cases separately **excluding** the Inconclusives if the decisions were made with and without the Zone Four being used. Thus each percent represents the percent of correct decisions that would have been made.

The accuracy of the Matte Quadri-Zone Scoring System is compared in Table 47 based on Tables 19 and 20. With the Zone Four the Matte Scoring System made 100 percent correct decisions for the Innocent cases as Truthful with no Deceptive decisions. Without the Zone Four the Matte Scoring System would have made 89 percent correct decisions for the Innocent cases as Truthful with 11 percent as Deceptive. This shows that the Zone Four increased the number of correct decisions that were made. It also reduced the number of False Positive errors from 11 percent to Zero.

The accuracy of the Backster Scoring System is compared in Table 47 based on Tables 27 and 28. With the Zone Four the Backster System would have made 100 percent correct decisions for

the Innocent cases as Truthful with no Deceptive decisions. Without the Zone Four the Backster Scoring System would have made 92 percent correct decisions for the Innocent cases as Truthful with 8 percent as Deceptive. This shows that the Zone Four increased the number of correct decisions that would have been made if the Backster System were to use the Zone Four. It also would have reduced the number of False Positive errors from 8 percent to Zero.

The accuracy of the Federal Scoring System is compared in Table 47 based on Tables 35 and 36. With the Zone Four the Federal System would have made 98 percent correct decisions for the Innocent cases as Truthful with 2 percent as Deceptive. Without the Zone Four the Federal Scoring System would have made 92 percent correct decisions for the Innocent cases as Truthful with 8 percent as Deceptive. This is consistent with the Barland Study (Barland 38) showing 92 percent accuracy on decisions. This shows that the Zone Four increased the number of correct decisions that would have been made if the Federal System were to use the Zone Four. It also would have reduced the number of False Positive errors from 8 percent to 2 percent.

In comparing these three systems, the Table 44 shows how they compare when the Zone Four is used for each system when excluding the Inconclusives. For the Innocent cases, Matte made 100 percent correct decisions, Backster would have made 100 percent correct decisions, and the Federal would have made 98 percent of the decisions as Truthful with 2 percent as Deceptive. This shows that when using the Zone Four, all three systems are quite accurate in making decisions for the Innocent cases, but the lower threshold of the Federal System allows for a 2 percent False Positive error rate. This shows that for all the Truthful decisions reached by the Matte and Backster systems, the Truthful decisions reached are extremely accurate. This supports the conclusion that when the Zone Four is used with the Matte and Backster Systems, the Truthful decisions reached with the polygraph are valid. For the Guilty cases, Matte made 100 percent correct decisions, Backster would have made 100 percent correct decisions, and the Federal would have made 100 percent correct decisions. This shows that for all the Deceptive decisions reached by the three systems, the decisions would be extremely accurate. This supports the conclusion that when the Zone Four is used, the Deceptive decisions reached with the polygraph are valid.

In comparing these three systems, the Table 44 shows how they compare without the use of Zone Four and excluding the Inconclusives. For the Innocent cases, Matte would have made 89 percent correct decisions, Backster 92 percent correct decisions,

and Federal 92 percent correct decisions as Truthful. This shows that the systems are all fairly accurate in making correct decisions for the Innocent cases. Matte would have made 11 percent False Positive decisions, Backster 8 percent False Positive decisions, and Federal 8 percent False Positive decisions. This shows that the differences in the thresholds in the three systems has no significant effect on the correctness of the Truthful decisions reached. For the Guilty cases, Matte would have made 98 percent correct decisions, Backster 98 percent, and Federal 98 percent. All three systems would have made a 2 percent False Negative error (without Zone Four). This shows that the differences in the threshold do not cause a significant effect on the accuracy of the decisions made.

The Goodness of Fit Test employing the Chi Square was used to test for any significant differences in the data. The differences between the observed decisions and the ground truth were compared for any significance. The hypothesis of no significant differences was rejected for any probability less than .05.

The Matte Quadri-Zone Scoring System is shown in Table 37 (MM-1) with Zone Four and Table 37 (MM-2) without Zone Four. Table MM-1 shows the data as used in the study for comparison of the Armitage cases versus the Matte cases. There were no significant differences found between these data. The close similartity of the values for the observed and expected would indicate that the decision making process for both sets of cases is reliable. By comparison when the Zone Four is not used, a significant difference was found in the data. This implies that there are other factors that would have influenced the decision making process. This supports our conclusion that the "Fear of Error" and the "Hope of Error" factors, as measured by the Zone Four, have a significant influence on the accuracy of the decisions.

For the Backster Scoring System, Table 37 (BB-1 and BB-2) the conclusions are the same for the comparison of the Armitage and Matte sets. If the Zone Four had been used, there would have been no significant differences found in the data. By comparison without the Zone Four, a significant difference was found. This implies that there are other factors that have influenced the decision making process. Since the Backster System users do not normally use the Zone Four, its adoption and implementation into the system would significantly reduce the influence that the other factors might have on the accuracy of the decisions.

For the Federal Scoring System, Table 37 (FF-1 and FF-2) the conclusions are the same for the comparison of the Armitage and Matte sets. If the Zone Four had been used, there would have been no significant differences found in the data. By comparison without the Zone Four, a significant difference was found. This implies that there are other factors that have influenced the decision making process. Since the Federal System users do not

normally use the Zone Four, its adoption and implementation into the system would significantly reduce the influence that the other factors might have on the accuracy of the decisions.

When the Zone Four is applied to the three systems, all of the significant differences are lost and the observed values closely approximate the expected values. It appears that the main single factor most indicative of the high number of inconclusives reported in previous research is the "Fear of Error" or "Hope of Error" as measured by the Zone Four. This study seems to have identified the main factor that contributes to the large number of inconclusives as reported in previous studies. This study provides a system for measuring this factor which can then be used to adjust the scores in order to make correct decisions for more cases.

In summary, a review of aforementioned data suggests that an increasing threshold as used in the Quadri-Zone Comparison Technique and the Backster Tri-Zone Comparison Technique be adopted by the Federal Zone Comparison Technique to reduce the False Positive and False Negative error rate without significantly increasing the inconclusive rate. The data further suggests that the minimum required Truthful scores reflected in the Quadri-Zone be lowered from an average of 4 points per chart to an average of 3 points per chart to increase its identification of the Innocent. The data shows that this change will reduce the inconclusive rate of the Truthful and increase the percentage rate of correct identification of the Truthful in the Quadri-Zone System. The current thresholds for 2, 3 and 4 charts are higher than needed to avoid the False Positive errors and tends to lead to unnecessary Inconclusives.

Chapter 6

CONCLUSIONS AND RECOMMENDATIONS

The results of this study clearly demonstrate the validity and reliability of the Polygraph Quadri-Zone Comparison Technique. It further confirms and supports the theoretical concept of Zone Four consisting of the "Fear/Hope of Error" questions which are designed to prevent False Positive/Negative errors and reduce the number of Inconclusives. The data from this study which is based on one hundred and twenty-two confirmed real-life cases shows that the Quadri-Zone Comparison Technique with its built-in safeguards enjoys a 100 percent accuracy. In this study, the Quadri-Zone Comparison Technique correctly identified 91 percent of the Innocent as Truthful and 9 percent as Inconclusive, with no errors. It further correctly identified 97 percent of the Guilty as Deceptive and 3 percent as Inconclusive, with no errors.

It must be noted that aforementioned conclusions are based on Single-Issue tests wherein only two Control versus Relevant question pairs dealing with the same issue were used. This data does not apply to polygraph tests which employ mixed general questions where the examinee may be truthful to one relevant question but lying to another relevant question on the same test. It should also be noted that the "Zone Four" is designed for Single-Issue Tests only.

The confirmed data used in this study was obtained from two separate sources, the Buffalo Police Department (Armitage), and the Matte Polygraph Service, Inc. (Matte). It was shown that there are no significant differences between the data and ground truth. The decisions made by Armitage and Matte using the Quadri-Zone Comparison Technique did not significantly differ from ground truth. This indicate that the data is quite reliable. The observed data are quite similar to the expected values and do not indicate that any other significant factor has affected the data.

When we compared the Polygraph Quadri-Zone Comparison Technique to the Backster Tri-Zone Comparison Technique and the Federal Zone Comparison Technique, we found that all three were highly accurate in identifying the Guilty as Deceptive. However, the data in this study showed a significant difference between the Quadri-Zone Technique and the Backster and Federal Zone

Techniques in its ability to correctly identify the innocent cases as truthful. Including the Inconclusives the data showed the Quadri-Zone Technique made decisions for 91 percent of the cases with 100 percent accuracy and no errors with 9 percent Inconclusives, where as the other systems made decisions only 60 percent of the time with 92 percent accuracy with 5 percent errors, and with 34 percent inconclusives. This study shows that the Quadri-Zone Comparison Technique makes a much higher rate of decisions with no errors and a much lower inconclusive rate than either the Backster Technique or the Federal Technique.

We compared the Matte Quadri-Zone Scoring System to the Backster Scoring System and the Federal Scoring System to determine the accuracy of each system in correctly identifying the Innocent versus the Guilty as they would be used without the Zone Four (Fear/Hope of Error) versus with the use of Zone Four. This comparison clearly showed the value of the Zone Four as it would be applied in each system. With the Zone Four in the Innocent cases, Matte made 100 percent correct decisions, Backster would have made 100 percent correct decisions, and the Federal would have made 98 percent correct decisions with 2 percent as Deceptive. This shows that when Zone Four is used, all three systems are very accurate in making decisions for the Innocent cases, but the lower threshold of the Federal system allows for a 2 percent False Positive error rate. For the Guilty cases, when Zone Four is used all three Scoring Systems would have made 100 percent correct decisions. This supports the conclusion that when the Zone Four is used, the Truthful and the Deceptive decisions reached with the polygraph are extremely accurate. The data in this study suggests that an increasing threshold as used in the Quadri-Zone Comparison Technique and the Backster Tri-Zone Comparison Technique be adopted by the Federal Zone Comparison Technique to reduce the False Positive and False Negative error rate without significantly increasing the Inconclusive rate. The data further suggests that the minimum required Truthful scores reflected in the Quadri-Zone be lowered from an average 4 points per chart to an average of 3 points per chart to increase its identification of the Innocent. The data shows that this change will reduce the Inconclusive rate of the Truthful and increase the percentage rate of correct identification of the Truthful in the Quadri-Zone System. The current Truthful thresholds are higher than needed to avoid the False Positive errors and lead to unnecessary inconclusives.

In examining the countertrend scores, scores that do not follow the true trend as later established by ground truth, we found that in some instances that the Stimulation Test caused strong reactions to the relevant questions inconsistent with the general trend and ground truth, when it was administered after the conduct of the first polygraph chart. We believe that the Stimulation Test is important in obtaining the proper psychological set for the examinee, but should be used as the first polygraph chart, before the test regarding the issue is administered. This has the effect of increasing the strength of the responses, but does not cause a countertrend.

The Blind Scores show extremely high correlations for the individual chart scores and for the total scores. 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. It is recommended that a second Polygraphist score the charts as a quality control for important cases. The scores should be similar and the decisions should be the same for any properly administered and scored polygraph test.

In comparing the Barland (38) study using mock paradigm cases to the basic data of our study using real-life confirmed cases, we found that there were some differences in the polygraph data. There seemed to be a close similarity between the two sets of data. The psychodynamic differences predicted by Barland were noted especially for the Guilty real-life cases where the physiological responses were stronger. When the Zone Four "Fear of Error/Hope of Error" factor is included in the data, then this factor can be readily identified as the major psychodynamic factor contributing to the cause of the number of Inconclusives in his study.

In developing the Predictive Tables 10, we noted that the real-life cases showed stronger responses than the mock paradigm cases. This would tend to increase the accuracy of decisions based on these scores. The Quadri-Zone adjustment to the scores shows an even greater increase in the potential accuracy of decisions based on the scores with a corresponding decrease in the potential for error. This Predictive Table can be a reference for Polygraphists and attorneys in evaluating the accuracy of a polygraph decision and the potential for error for a given polygraph case score provided it is based on the Quadri-Zone Comparison Technique.

In this study we reviewed existing research literature regarding physical countermeasures and the development of movement sensing chairs. No movement sensing chair was used in any of the cases examined in this study. Nevertheless, an extremely high accuracy rate was obtained in identifying the Innocent and the Guilty. We feel certain that this is the result of the structured pre-test interview and test instructions, the positioning of the subject with the Eyes-Closed Technique and the videotaping of the examination. However, as test subjects become more sophisticated, the need for a movement sensing chair will no doubt become a necessary accessory to the polygraph equipment. It will certainly be useful in eliminating any doubt regarding the possibility of a False Negative (Guilty found Truthful) as a result of physical countermeasures, especially when the results are being considered in judicial proceedings.

Of the two pneumograph tracings, the Lower (abdominal) tracing was the most productive. There is a major sex difference in the breathing response of male versus female. For the females 74 percent favor an Upper breathing response or an equal Upper and Lower. Only 25 percent of the females show a lower dominance in breathing response. For the males 100 percent favor a lower or equal Upper and Lower breathing response. In this study no males showed an upper dominance in breathing response. The most productive pneumo tracing for the Innocent versus the Guilty Males was the Lower pneumo. The most productive pneumo tracing for the Innocent versus Guilty Females was the Upper pneumo for the Innocent but equal productivity of Upper and Lower Pneumo for the Guilty. Overall the most productive pneumograph tracing for all of the Innocent cases is the Lower (abdominal). The most productive pneumograph tracing for all of the Guilty cases is the Lower 39 percent versus equal productivity (Upper-Lower) 36 percent and Upper 5 percent.

The most productive tracing overall tends to be the Pneumo, followed by the Cardio and then the GSR. There is a strong response on the Pneumo and Cardio for males with a significantly lower response in the GSR. The female distribution is more equal for the three tracings. The most productive overall tracing for the Innocent cases was the pneumo, versus the Guilty cases which was the Cardio followed closely by the Pneumo. The GSR was lowest for both the Innocent and Guilty cases.

The most productive overall tracing for the Innocent females was predominently the GSR followed by the Pneumo and the Cardio. The most productive overall tracing for the Guilty females was the Pneumo followed by the Cardio and the GSR.

The most productive overall tracing for all of the Innocent cases is the Pneumo followed by the GSR and the Cardio. The most productive overall tracing for all of the Guilty cases is the Cardio followed by the Pneumo and the GSR.

Since the pneumograph tracing is the most significant and the lower pneumo the most productive, this would strongly indicate that the lower pneumo needs to be used on all subjects, but especially males.

Polygraph tests conducted for Defense Attorneys have been criticized as having a high rate of False Negatives (Guilty found Truthful) due to a purported lack of "Fear of Detection" by the client polygraphed. It has also been held that a defense Polygraphist may be unduly influenced to find the defendant examinee Truthful to insure repeat business. The concept of the "Friendly Polygraphist" appears to have been accepted by many members of the psychological and legal community without supporting evidence from polygraph research scientists. This study completely refutes that concept. From the total number of cases examined in this research study a total of 39 cases were conducted for Defense Attorneys. 34 of those cases were confirmed as Deceptive. Furthermore, the Defense Attorney cases showed a mean chart score of -9.38 as opposed to the Police cases which showed a mean chart score of -9.1. The Commercial cases showed a mean chart score of -9.96. It becomes quite apparent from this data that the mean scores for all of these Guilty cases are very similar and extremely close.

Although it is often said that the polygraph has been uniformly held inadmissable in Courts of Law, such a statement is misleading. In fact, more than half of the States in the United States have admitted polygraph results into evidence under Agreement and Stipulation, and some have even admitted polygraph results over objections (Daniels 147, Battle 148, & Appendix H). Even in those cases where polygraph results were denied admission, the language is generally open ended. For the most part, the rationale today remains the same as enunciated in the Frye case. In that case, it was simply held that the polygraph had not yet been shown to be of sufficient reliability and acceptance within the scientific community to justify admission at that time. In short, the rationale of most Courts which have considered the issue anticipate that a time may come when sufficient reliability and acceptance can be shown. This study has attempted to address

by scientific examination the various factors which determine validity and reliability. Whether these factors are explored by the Court prior to ruling on the admission of polygraph evidence or whether they may serve to frame issues which must be addressed during the trial, this study has identified crucial dimensions which affect the validity and reliability of any specific-issue polygraph examination.

Due to the extreme accuracy of the Polygraph Quadri-Zone Comparison Technique as reflected in this research study, we recommend that the results of this unique polygraph technique be seriously considered in judicial proceedings when the following conditions are met:

a. The Polygraph Quadri-Zone Comparison Technique is used in its pure form without deviation.

b. No interrogative or accusatory approach be used during any portion of the pre-test interview and/or between the conduct of the polygraph charts. No interrogative or accusatory approach be used until all polygraph charts have been conducted for all issues being tested and the results conclusively indicate Deception.

c. The results of the Polygraph Quadri-Zone Comparison Technique are based on a minimum of at least two polygraph charts per issue and the charts have been numerically scored in accordance with the Polygraph Quadri-Zone Comparison Technique standards.

d. The Conclusion Table used should require a minimum total score averaging at least -5 per chart conducted for a determination of Deception and at least a +3 score per chart for a determination of Truthful.

e. If a Stimulation Test is used, that it be used only as the first polygraph chart, before the charts pertaining to the issue for which the examinee is being polygraphed.

f. As a minimum, a fully electronic, four-channel polygraph instrument be used wherein both the thoracic and abdominal breathing patterns, the galvanic skin response and the cardiovascular responses are recorded on a polygraph chart.

g. All polygraph charts be marked with the sensitivity settings of each parameter recorded, any movement or other artifact, and the time/date each chart was completed. All polygraph charts should bear the examinee's signature.

h. A standard or portable polygraph chair with wide, elongated arm rests be used for the actual polygraph test, to insure optimum polygraph tracings.

i. The entire polygraph examination be recorded as a minimum on audio tape but preferably on video tape, to include the pre-test and post-test interviews, to afford the Court and both counsels the opportunity to critique the examination procedures.

j. The Polygraphist administering the polygraph test must have graduated from a Polygraph School accredited by the American Polygraph Association, wherein the student-polygraphist received formal training in the Zone Comparison Technique and numerical scoring of polygraph charts. The Polygraphist must also have successfully completed a field project study involving the conduct of at least twenty-five real-life specific issue cases, following completion of the academic portion of the formal course of instruction.

k. The Polygraphist must have received formal instruction in the administration of the Polygraph Quadri-Zone Comparison Technique at a Polygraph School accredited by the American Polygraph Association, or has met the requirements of paragraphs j, l, and m and has successfully completed a course of instruction in the administration of the Polygraph Quadri-Zone Comparison Technique by a Polygraphist who meets all of the aforementioned qualifications and has himself administered a minimum of at least one hundred such polygraph tests.

l. The Polygraphist must have at least three years of full-time experience in the conduct of specific-issue polygraph tests using a Zone Comparison Technique and numerical scoring system of chart analysis immediately prior to the administration of the polygraph test being considered.

m. The Polygraphist must have administered a minimum of at least one hundred real-life Polygraph Quadri-Zone Comparison Technique examinations.

If all of the aforementioned conditions are met, the results of this study indicate an expected accuracy of 100 percent in decisions reached in specific-issue cases.

We believe that with the advent of this new, extremely accurate polygraph technique, prior obstacles to the admissibility of the results of properly administered polygraph examinations are no longer present.

TABLE 1 POLYGRAPH SCORES
FOR ALL CASES IN SEQUENCE

NUM	CASE	C10	C20	C30	C40	TSWO	C13	C23	C33	C43	GS23
1	A1A	-10	-9	-11		-30	-10	-12	-13		-35
2	A2A1	2	1	4		7	4	4	5		13
3	A3A2	8	4			12	10	3			13
4	A4A1	7	4			11	8	3			11
5	A5A2	-8	5	-9		-12	-8	2	-9		-15
6	L6A1	6	-2	-1	5	8	8	-1	5	11	23
7	L7A2	-15	-10	-9		-34	-18	-11	-9		-38
8	L8A3	-9	-9	-5	-6	-29	-8	-4	0	-3	-15
9	A9A	1	-5	2		-2	3	-1	4		6
10	A10A	-4	-2	-8		-14	-4	1	-12		-15
11	A10B	-5	-15			-20	-3	-15			-18
12	A11A	5	6			11	5	6			11
13	A11B	-6	3	-8		-11	-7	2	-5		-10
14	A12A	-4	-13	-8		-25	-3	-17	-12		-32
15	A13A	-12	-6			-18	-17	-14			-31
16	A14A	-6	-6	-1		-13	-8	-6	-4		-18
17	A15A	6	9			15	9	10			19
18	A15B	-5	5			0	-1	9			8
19	A16	7	4			11	14	4			18
20	A17	-6	-9			-15	-8	-10			-18
21	A18	4	5	4		13	8	8	7		23
22	A19	-3	1	3		1	0	7	6		13
23	A20	7	-1			6	12	6			18
24	A21A	-3	5	4		6	1	13	10		24
25	A21B	4	0			4	6	2			8
26	A22	9	2			11	13	6			19
27	A23A	4	8			12	6	11			17
28	A23B	-4	-6	-2		-12	-4	-4	-7		-15
29	A24	0	2			2	7	1			8
30	A25	-6	-10			-16	-6	-15			-21
31	A26A	-6	-6	-6		-18	-10	-9	-1		-20
32	A26B	-9	-12			-21	-12	-11			-23
*** Total ***		-51	-57	-51	-1	-160	-13	-32	-35	8	-72

TABLE 1 POLYGRAPH SCORES
FOR ALL CASES IN SEQUENCE

NUM	CASE	C10	C20	C30	C40	TSWO	C13	C23	C33	C43	GS23
33	M1	3	-4	-9	-5	-15	-1	-4	-10	-5	-20
34	M2	-12	-9	-2	-2	-25	-12	-13	-2	-1	-28
35	M3	0	0			0	4	4			8
36	M4	2	1			3	4	4			8
37	M5	7	-13	4	8	6	10	0	4	10	24
38	M6	6	3			9	10	4			14
39	M7	3	2			5	4	4			8
40	M8	-12	-11			-23	-15	-11			-26
41	M9	-9	-9			-18	-12	-12			-24
42	M10	-5	-10			-15	-7	-8			-15
43	M11	-6	-12	-14		-32	-9	-17	-19		-45
44	M12A	-3	3	10		10	-2	7	12		17
45	M12B	4	5			9	7	10			17
46	M13A	-6	-8	-6		-20	-6	-10	-9		-25
47	M13B	-8	-10	-14		-32	-11	-11	-14		-36
48	M14	0	-3	0	3	0	3	0	5	5	13
49	M15	3	-1			2	6	2			8
50	M16	-3	1			-2	0	8			8
51	M17	2	6			8	7	8			15
52	M18	5	2			7	7	5			12
53	M19	-1	6			5	3	5			8
54	M20	0	6			6	7	9			16
55	M21	0	0			0	6	2			8
56	M22	8	0	10		18	11	3	11		25
57	M23	-9	-11	-12		-32	-10	-14	-13		-37
58	M24	5	4			9	12	8			20
59	M25	8	-4			4	12	-3			9
60	M26	-7	-9	-2	-10	-28	-8	-10	-5	-11	-34
61	M27	-2	-5	0	-13	-20	-4	-9	0	-16	-29
62	M28	15	8			23	20	10			30
63	M29	6	1			7	8	3			11
64	M30	0	10			10	1	13			14
65	M31	11	5			16	18	10			28
66	M32	10	0			10	11	0			11
67	M33	4	7			11	5	13			18
68	M34	4	14			18	9	12			21
69	M35	4	7			11	7	7			14
70	M36	3	3			6	9	5			14
71	M37	-7	5			-2	-2	10			8
72	M38	-4	-1	-5	-9	-19	-5	-3	-10	-12	-30
73	M39	-8	-8			-16	-11	-11			-22
74	M40	-4	0	2		-2	-4	3	4		3
75	M41	-10	-6	-8		-24	-10	-11	-12		-33
76	M42	2	7			9	2	13			15
77	M43	-2	-9	-8		-19	-4	-11	-11		-26
78	M44	6	5			11	7	7			14
79	M45	-1	-7	9		1	2	-5	15		12
80	M46	6	4			10	6	6			12
81	M47	4	7			11	6	7			13
82	M48	-2	0			-2	2	7			9

TABLE 1 POLYGRAPH SCORES
FOR ALL CASES IN SEQUENCE

NUM	CASE	C10	C20	C30	C40	TSWO	C13	C23	C33	C43	GS23
83	M49	5	0			5	8	3			11
84	M50	6	-3			3	8	0			8
85	M51	5	3			8	8	8			16
86	M52	-5	-5			-10	3	2			5
87	M53	-2	-15	-11	-13	-41	-1	-17	-9	-18	-45
88	M54A	1	-10	-8		-17	0	-12	-10		-22
89	M54B	-8	-7	-8		-23	-9	-12	-9		-30
90	M54C	-7	-10			-17	-9	-11			-20
91	M55A	-4	-6	-1	-4	-15	-9	-11	-5	-2	-27
92	M55B	-6	-3	-9	-3	-21	-9	-3	-12	-7	-31
93	M56	-10	-7	-6		-23	-12	-11	-9		-32
94	M57A	-9	-4	-3		-16	-7	-6	-7		-20
95	M57B	-12	-10			-22	-15	-12			-27
96	M58A	-7	-11			-18	-5	-8			-13
97	M58B	-3	-8			-11	3	-3			0
98	M59A	-8	-2	-12		-22	-10	-1	-19		-30
99	M59B	-9	-11			-20	-9	-13			-22
100	M60	-3	-8	-8		-19	-4	-8	-10		-22
101	M61A	2	-10	-5		-13	2	-10	-11		-19
102	M61B	-3	-6			-9	-5	-8			-13
103	M62A	-8	-10			-18	-10	-13			-23
104	M62B	-5	-9			-14	-9	-12			-21
105	M63A	-9	-9			-18	-11	-10			-21
106	M63B	-6	-10			-16	-9	-14			-23
107	M64A	-8	-10	-5		-23	-13	-11	-7		-31
108	M64B	-4	-8			-12	-7	-11			-18
109	M65A	-4	-5	-3		-12	-6	-7	-6		-19
110	M65B	-9	-7	-6		-22	-10	-8	-7		-25
111	M66	-9	-7	-7		-23	-12	-7	-9		-28
112	M67A	-5	-11	-12		-28	-8	-15	-12		-35
113	M67B	-4	-5	-8		-17	-9	-8	-13		-30
114	M68A	-11	-7	-12		-30	-13	-7	-14		-34
115	M68B	-4	-7	-8		-19	-2	-9	-13		-24
116	M69A	8	5	-1		12	5	-2	-1		2
117	M69B	-8	-5	-3		-16	-7	-6	-10		-23
118	M70A	-13	-9	-3	-9	-34	-15	-13	-5	-11	-44
119	M70B	-7	-8	-10		-25	-9	-9	-12		-30
120	M71A	-1	-10	-6		-17	-3	-12	-6		-21
121	M71B	-6	-13			-19	-9	-17			-26
122	M71C	-12	-6			-18	-16	-7			-23
*** Total ***											
		***	***	***	-57	-761	***	***	***	-68	-775

TABLE 2 POLYGRAPH SCORES FOR ARMITAGE AND MATTE CASES, LISTED BY RANK SCORES

NUM	CASE	C10	C20	C30	C40	TSWO	C13	C23	C33	C43	GS23
7	L7A2	-15	-10	-9		-34	-18	-11	-9		-38
1	A1A	-10	-9	-11		-30	-10	-12	-13		-35
14	A12A	-4	-13	-8		-25	-3	-17	-12		-32
15	A13A	-12	-6			-18	-17	-14			-31
32	A26B	-9	-12			-21	-12	-11			-23
30	A25	-6	-10			-16	-6	-15			-21
31	A26A	-6	-6	-6		-18	-10	-9	-1		-20
11	A10B	-5	-15			-20	-3	-15			-18
16	A14A	-6	-6	-1		-13	-8	-6	-4		-18
20	A17	-6	-9			-15	-8	-10			-18
5	A5A2	-8	5	-9		-12	-8	2	-9		-15
8	L8A3	-9	-9	-5	-6	-29	-8	-4	0	-3	-15
10	A10A	-4	-2	-8		-14	-4	1	-12		-15
28	A23B	-4	-6	-2		-12	-4	-4	-7		-15
13	A11B	-6	3	-8		-11	-7	2	-5		-10
9	A9A	1	-5	2		-2	3	-1	4		6
18	A15B	-5	5			0	-1	9			8
25	A21B	4	0			4	6	2			8
29	A24	0	2			2	7	1			8
4	A4A1	7	4			11	8	3			11
12	A11A	5	6			11	5	6			11
2	A2A1	2	1	4		7	4	4	5		13
3	A3A2	8	4			12	10	3			13
22	A19	-3	1	3		1	0	7	6		13
27	A23A	4	8			12	6	11			17
19	A16	7	4			11	14	4			18
23	A20	7	-1			6	12	6			18
17	A15A	6	9			15	9	10			19
26	A22	9	2			11	13	6			19
6	L6A1	6	-2	-1	5	8	8	-1	5	11	23
21	A18	4	5	4		13	8	8	7		23
24	A21A	-3	5	4		6	1	13	10		24
*** Total ***		-51	-57	-51	-1	-160	-13	-32	-35	8	-72

TABLE 2 POLYGRAPH SCORES FOR ARMITAGE AND MATTE CASES, LISTED BY RANK SCORES

NUM	CASE	C10	C20	C30	C40	TSWO	C13	C23	C33	C43	GS23
43	M11	-6	-12	-14		-32	-9	-17	-19		-45
87	M53	-2	-15	-11	-13	-41	-1	-17	-9	-18	-45
118	M70A	-13	-9	-3	-9	-34	-15	-13	-5	-11	-44
57	M23	-9	-11	-12		-32	-10	-14	-13		-37
47	M13B	-8	-10	-14		-32	-11	-11	-14		-36
112	M67A	-5	-11	-12		-28	-8	-15	-12		-35
60	M26	-7	-9	-2	-10	-28	-8	-10	-5	-11	-34
114	M68A	-11	-7	-12		-30	-13	-7	-14		-34
75	M41	-10	-6	-8		-24	-10	-11	-12		-33
93	M56	-10	-7	-6		-23	-12	-11	-9		-32
92	M55B	-6	-3	-9	-3	-21	-9	-3	-12	-7	-31
107	M64A	-8	-10	-5		-23	-13	-11	-7		-31
72	M38	-4	-1	-5	-9	-19	-5	-3	-10	-12	-30
89	M54B	-8	-7	-8		-23	-9	-12	-9		-30
98	M59A	-8	-2	-12		-22	-10	-1	-19		-30
113	M67B	-4	-5	-8		-17	-9	-8	-13		-30
119	M70B	-7	-8	-10		-25	-9	-9	-12		-30
61	M27	-2	-5	0	-13	-20	-4	-9	0	-16	-29
34	M2	-12	-9	-2	-2	-25	-12	-13	-2	-1	-28
111	M66	-9	-7	-7		-23	-12	-7	-9		-28
91	M55A	-4	-6	-1	-4	-15	-9	-11	-5	-2	-27
95	M57B	-12	-10			-22	-15	-12			-27
40	M8	-12	-11			-23	-15	-11			-26
77	M43	-2	-9	-8		-19	-4	-11	-11		-26
121	M71B	-6	-13			-19	-9	-17			-26
46	M13A	-6	-8	-6		-20	-6	-10	-9		-25
110	M65B	-9	-7	-6		-22	-10	-8	-7		-25
41	M9	-9	-9			-18	-12	-12			-24
115	M68B	-4	-7	-8		-19	-2	-9	-13		-24
103	M62A	-8	-10			-18	-10	-13			-23
106	M63B	-6	-10			-16	-9	-14			-23
117	M69B	-8	-5	-3		-16	-7	-6	-10		-23
122	M71C	-12	-6			-18	-16	-7			-23
73	M39	-8	-8			-16	-11	-11			-22
88	M54A	1	-10	-8		-17	0	-12	-10		-22
99	M59B	-9	-11			-20	-9	-13			-22
100	M60	-3	-8	-8		-19	-4	-8	-10		-22
104	M62B	-5	-9			-14	-9	-12			-21
105	M63A	-9	-9			-18	-11	-10			-21
120	M71A	-1	-10	-6		-17	-3	-12	-6		-21
33	M1	3	-4	-9	-5	-15	-1	-4	-10	-5	-20
90	M54C	-7	-10			-17	-9	-11			-20
94	M57A	-9	-4	-3		-16	-7	-6	-7		-20
101	M61A	2	-10	-5		-13	2	-10	-11		-19
109	M65A	-4	-5	-3		-12	-6	-7	-6		-19
108	M64B	-4	-8			-12	-7	-11			-18
42	M10	-5	-10			-15	-7	-8			-15
96	M58A	-7	-11			-18	-5	-8			-13
102	M61B	-3	-6			-9	-5	-8			-13

TABLE 2 POLYGRAPH SCORES FOR ARMITAGE AND MATTE CASES, LISTED BY RANK SCORES

NUM	CASE	C10	C20	C30	C40	TSWO	C13	C23	C33	C43	GS23
97	M58B	-3	-8			-11	3	-3			0
116	M69A	8	5	-1		12	5	-2	-1		2
74	M40	-4	0	2		-2	-4	3	4		3
86	M52	-5	-5			-10	3	2			5
35	M3	0	0			0	4	4			8
36	M4	2	1			3	4	4			8
39	M7	3	2			5	4	4			8
49	M15	3	-1			2	6	2			8
50	M16	-3	1			-2	0	8			8
53	M19	-1	6			5	3	5			8
55	M21	0	0			0	6	2			8
71	M37	-7	5			-2	-2	10			8
84	M50	6	-3			3	8	0			8
59	M25	8	-4			4	12	-3			9
82	M48	-2	0			-2	2	7			9
63	M29	6	1			7	8	3			11
66	M32	10	0			10	11	0			11
83	M49	5	0			5	8	3			11
52	M18	5	2			7	7	5			12
79	M45	-1	-7	9		1	2	-5	15		12
80	M46	6	4			10	6	6			12
48	M14	0	-3	0	3	0	3	0	5	5	13
81	M47	4	7			11	6	7			13
38	M6	6	3			9	10	4			14
64	M30	0	10			10	1	13			14
69	M35	4	7			11	7	7			14
70	M36	3	3			6	9	5			14
78	M44	6	5			11	7	7			14
51	M17	2	6			8	7	8			15
76	M42	2	7			9	2	13			15
54	M20	0	6			6	7	9			16
85	M51	5	3			8	8	8			16
44	M12A	-3	3	10		10	-2	7	12		17
45	M12B	4	5			9	7	10			17
67	M33	4	7			11	5	13			18
58	M24	5	4			9	12	8			20
68	M34	4	14			18	9	12			21
37	M5	7	-13	4	8	6	10	0	4	10	24
56	M22	8	0	10		18	11	3	11		25
65	M31	11	5			16	18	10			28
62	M28	15	8			23	20	10			30
***	Total	***									
		***	***	***	-57	-761	***	***	***	-68	-775

TABLE 3 POLYGRAPH SCORES FOR ALL CASES LISTED BY RANK SCORES

NUM	CASE	C10	C20	C30	C40	TSWO	C13	C23	C33	C43	GS23
43	M11	-6	-12	-14		-32	-9	-17	-19		-45
87	M53	-2	-15	-11	-13	-41	-1	-17	-9	-18	-45
118	M70A	-13	-9	-3	-9	-34	-15	-13	-5	-11	-44
7	L7A2	-15	-10	-9		-34	-18	-11	-9		-38
57	M23	-9	-11	-12		-32	-10	-14	-13		-37
47	M13B	-8	-10	-14		-32	-11	-11	-14		-36
1	A1A	-10	-9	-11		-30	-10	-12	-13		-35
112	M67A	-5	-11	-12		-28	-8	-15	-12		-35
60	M26	-7	-9	-2	-10	-28	-8	-10	-5	-11	-34
114	M68A	-11	-7	-12		-30	-13	-7	-14		-34
75	M41	-10	-6	-8		-24	-10	-11	-12		-33
14	A12A	-4	-13	-8		-25	-3	-17	-12		-32
93	M56	-10	-7	-6		-23	-12	-11	-9		-32
15	A13A	-12	-6			-18	-17	-14			-31
92	M55B	-6	-3	-9	-3	-21	-9	-3	-12	-7	-31
107	M64A	-8	-10	-5		-23	-13	-11	-7		-31
72	M38	-4	-1	-5	-9	-19	-5	-3	-10	-12	-30
89	M54B	-8	-7	-8		-23	-9	-12	-9		-30
98	M59A	-8	-2	-12		-22	-10	-1	-19		-30
113	M67B	-4	-5	-8		-17	-9	-8	-13		-30
119	M70B	-7	-8	-10		-25	-9	-9	-12		-30
61	M27	-2	-5	0	-13	-20	-4	-9	0	-16	-29
34	M2	-12	-9	-2	-2	-25	-12	-13	-2	-1	-28
111	M66	-9	-7	-7		-23	-12	-7	-9		-28
91	M55A	-4	-6	-1	-4	-15	-9	-11	-5	-2	-27
95	M57B	-12	-10			-22	-15	-12			-27
40	M8	-12	-11			-23	-15	-11			-26
77	M43	-2	-9	-8		-19	-4	-11	-11		-26
121	M71B	-6	-13			-19	-9	-17			-26
46	M13A	-6	-8	-6		-20	-6	-10	-9		-25
110	M65B	-9	-7	-6		-22	-10	-8	-7		-25
41	M9	-9	-9			-18	-12	-12			-24
115	M68B	-4	-7	-8		-19	-2	-9	-13		-24
32	A26B	-9	-12			-21	-12	-11			-23
103	M62A	-8	-10			-18	-10	-13			-23
106	M63B	-6	-10			-16	-9	-14			-23
117	M69B	-8	-5	-3		-16	-7	-6	-10		-23
122	M71C	-12	-6			-18	-16	-7			-23
73	M39	-8	-8			-16	-11	-11			-22
88	M54A	1	-10	-8		-17	0	-12	-10		-22
99	M59B	-9	-11			-20	-9	-13			-22
100	M60	-3	-8	-8		-19	-4	-8	-10		-22
30	A25	-6	-10			-16	-6	-15			-21
104	M62B	-5	-9			-14	-9	-12			-21
105	M63A	-9	-9			-18	-11	-10			-21
120	M71A	-1	-10	-6		-17	-3	-12	-6		-21
31	A26A	-6	-6	-6		-18	-10	-9	-1		-20
33	M1	3	-4	-9	-5	-15	-1	-4	-10	-5	-20
90	M54C	-7	-10			-17	-9	-11			-20
94	M57A	-9	-4	-3		-16	-7	-6	-7		-20

TABLE 3 POLYGRAPH SCORES FOR ALL CASES LISTED BY RANK SCORES

NUM	CASE	C10	C20	C30	C40	TSWO	C13	C23	C33	C43	GS23
101	M61A	2	-10	-5		-13	2	-10	-11		-19
109	M65A	-4	-5	-3		-12	-6	-7	-6		-19
11	A10B	-5	-15			-20	-3	-15			-18
16	A14A	-6	-6	-1		-13	-8	-6	-4		-18
20	A17	-6	-9			-15	-8	-10			-18
108	M64B	-4	-8			-12	-7	-11			-18
5	A5A2	-8	5	-9		-12	-8	2	-9		-15
8	L8A3	-9	-9	-5	-6	-29	-8	-4	0	-3	-15
10	A10A	-4	-2	-8		-14	-4	1	-12		-15
28	A23B	-4	-6	-2		-12	-4	-4	-7		-15
42	M10	-5	-10			-15	-7	-8			-15
96	M58A	-7	-11			-18	-5	-8			-13
102	M61B	-3	-6			-9	-5	-8			-13
13	A11B	-6	3	-8		-11	-7	2	-5		-10
97	M58B	-3	-8			-11	3	-3			0
116	M69A	8	5	-1		12	5	-2	-1		2
74	M40	-4	0	2		-2	-4	3	4		3
86	M52	-5	-5			-10	3	2			5
9	A9A	1	-5	2		-2	3	-1	4		6
18	A15B	-5	5			0	-1	9			8
25	A21B	4	0			4	6	2			8
29	A24	0	2			2	7	1			8
35	M3	0	0			0	4	4			8
36	M4	2	1			3	4	4			8
39	M7	3	2			5	4	4			8
49	M15	3	-1			2	6	2			8
50	M16	-3	1			-2	0	8			8
53	M19	-1	6			5	3	5			8
55	M21	0	0			0	6	2			8
71	M37	-7	5			-2	-2	10			8
84	M50	6	-3			3	8	0			8
59	M25	8	-4			4	12	-3			9
82	M48	-2	0			-2	2	7			9
4	A4A1	7	4			11	8	3			11
12	A11A	5	6			11	5	6			11
63	M29	6	1			7	8	3			11
66	M32	10	0			10	11	0			11
83	M49	5	0			5	8	3			11
52	M18	5	2			7	7	5			12
79	M45	-1	-7	9		1	2	-5	15		12
80	M46	6	4			10	6	6			12
2	A2A1	2	1	4		7	4	4	5		13
3	A3A2	8	4			12	10	3			13
22	A19	-3	1	3		1	0	7	6		13
48	M14	0	-3	0	3	0	3	0	5	5	13
81	M47	4	7			11	6	7			13
38	M6	6	3			9	10	4			14
64	M30	0	10			10	1	13			14
69	M35	4	7			11	7	7			14
70	M36	3	3			6	9	5			14

TABLE 3 POLYGRAPH SCORES FOR ALL CASES LISTED BY RANK SCORES

NUM	CASE	C10	C20	C30	C40	TSWO	C13	C23	C33	C43	GS23
78	M44	6	5			11	7	7			14
51	M17	2	6			8	7	8			15
76	M42	2	7			9	2	13			15
54	M20	0	6			6	7	9			16
85	M51	5	3			8	8	8			16
27	A23A	4	8			12	6	11			17
44	M12A	-3	3	10		10	-2	7	12		17
45	M12B	4	5			9	7	10			17
19	A16	7	4			11	14	4			18
23	A20	7	-1			6	12	6			18
67	M33	4	7			11	5	13			18
17	A15A	6	9			15	9	10			19
26	A22	9	2			11	13	6			19
58	M24	5	4			9	12	8			20
68	M34	4	14			18	9	12			21
6	L6A1	6	-2	-1	5	8	8	-1	5	11	23
21	A18	4	5	4		13	8	8	7		23
24	A21A	-3	5	4		6	1	13	10		24
37	M5	7	-13	4	8	6	10	0	4	10	24
56	M22	8	0	10		18	11	3	11		25
65	M31	11	5			16	18	10			28
62	M28	15	8			23	20	10			30
***	Total	***									
		***	***	***	-58	-921	***	***	***	-60	-847

TABLE 4 POLYGRAPH GRANDSCORE WITH
ZONE 4 LISTED BY RANK SCORES

NUM	CASE	CONF	CONC	C13	C23	C33	C43	GS23
43	M11	DI	DI	-9	-17	-19		-45
87	M53	DI	DI	-1	-17	-9	-18	-45
118	M70A	DI	DI	-15	-13	-5	-11	-44
7	L7A2	DI	DI	-18	-11	-9		-38
57	M23	DI	DI	-10	-14	-13		-37
47	M13B	DI	DI	-11	-11	-14		-36
1	A1A	DI	DI	-10	-12	-13		-35
112	M67A	DI	DI	-8	-15	-12		-35
60	M26	DI	DI	-8	-10	-5	-11	-34
114	M68A	DI	DI	-13	-7	-14		-34
75	M41	DI	DI	-10	-11	-12		-33
14	A12A	DI	DI	-3	-17	-12		-32
93	M56	DI	DI	-12	-11	-9		-32
15	A13A	DI	DI	-17	-14			-31
92	M55B	DI	DI	-9	-3	-12	-7	-31
107	M64A	DI	DI	-13	-11	-7		-31
72	M38	DI	DI	-5	-3	-10	-12	-30
89	M54B	DI	DI	-9	-12	-9		-30
98	M59A	DI	DI	-10	-1	-19		-30
113	M67B	DI	DI	-9	-8	-13		-30
119	M70B	DI	DI	-9	-9	-12		-30
61	M27	DI	DI	-4	-9	0	-16	-29
34	M2	DI	DI	-12	-13	-2	-1	-28
111	M66	DI	DI	-12	-7	-9		-28
91	M55A	DI	DI	-9	-11	-5	-2	-27
95	M57B	DI	DI	-15	-12			-27
40	M8	DI	DI	-15	-11			-26
77	M43	DI	DI	-4	-11	-11		-26
121	M71B	DI	DI	-9	-17			-26
46	M13A	DI	DI	-6	-10	-9		-25
110	M65B	DI	DI	-10	-8	-7		-25
41	M9	DI	DI	-12	-12			-24
115	M68B	DI	DI	-2	-9	-13		-24
32	A26B	DI	DI	-12	-11			-23
103	M62A	DI	DI	-10	-13			-23
106	M63B	DI	DI	-9	-14			-23
117	M69B	DI	DI	-7	-6	-10		-23
122	M71C	DI	DI	-16	-7			-23
73	M39	DI	DI	-11	-11			-22
88	M54A	DI	DI	0	-12	-10		-22
99	M59B	DI	DI	-9	-13			-22
100	M60	DI	DI	-4	-8	-10		-22
30	A25	DI	DI	-6	-15			-21
104	M62B	DI	DI	-9	-12			-21
105	M63A	DI	DI	-11	-10			-21
120	M71A	DI	DI	-3	-12	-6		-21
31	A26A	DI	DI	-10	-9	-1		-20
33	M1	DI	DI	-1	-4	-10	-5	-20
90	M54C	DI	DI	-9	-11			-20
94	M57A	DI	DI	-7	-6	-7		-20

TABLE 4 POLYGRAPH GRANDSCORE WITH ZONE 4 LISTED BY RANK SCORES

NUM	CASE	CONF	CONC	C13	C23	C33	C43	GS23
101	M61A	DI	DI	2	-10	-11		-19
109	M65A	DI	DI	-6	-7	-6		-19
11	A10B	DI	DI	-3	-15			-18
16	A14A	DI	DI	-8	-6	-4		-18
20	A17	DI	DI	-8	-10			-18
108	M64B	DI	DI	-7	-11			-18
5	A5A2	DI	DI	-8	2	-9		-15
8	L8A3	NDI	INC	-8	-4	0	-3	-15
10	A10A	DI	DI	-4	1	-12		-15
28	A23B	DI	DI	-4	-4	-7		-15
42	M10	DI	DI	-7	-8			-15
96	M58A	DI	DI	-5	-8			-13
102	M61B	DI	DI	-5	-8			-13
13	A11B	DI	INC	-7	2	-5		-10
97	M58B	NDI	INC	3	-3			0
116	M69A	DI	INC	5	-2	-1		2
74	M40	NDI	INC	-4	3	4		3
86	M52	NDI	INC	3	2			5
9	A9A	NDI	INC	3	-1	4		6
18	A15B	NDI	NDI	-1	9			8
25	A21B	NDI	NDI	6	2			8
29	A24	NDI	NDI	7	1			8
35	M3	NDI	NDI	4	4			8
36	M4	NDI	NDI	4	4			8
39	M7	NDI	NDI	4	4			8
49	M15	NDI	NDI	6	2			8
50	M16	NDI	NDI	0	8			8
53	M19	NDI	NDI	3	5			8
55	M21	NDI	NDI	6	2			8
71	M37	NDI	NDI	-2	10			8
84	M50	NDI	NDI	8	0			8
59	M25	NDI	NDI	12	-3			9
82	M48	NDI	NDI	2	7			9
4	A4A1	NDI	NDI	8	3			11
12	A11A	NDI	NDI	5	6			11
63	M29	NDI	NDI	8	3			11
66	M32	NDI	NDI	11	0			11
83	M49	NDI	NDI	8	3			11
52	M18	NDI	NDI	7	5			12
79	M45	NDI	NDI	2	-5	15		12
80	M46	NDI	NDI	6	6			12
2	A2A1	NDI	NDI	4	4	5		13
3	A3A2	NDI	NDI	10	3			13
22	A19	NDI	NDI	0	7	6		13
48	M14	NDI	NDI	3	0	5	5	13
81	M47	NDI	NDI	6	7			13
38	M6	NDI	NDI	10	4			14
64	M30	NDI	NDI	1	13			14
69	M35	NDI	NDI	7	7			14
70	M36	NDI	NDI	9	5			14

TABLE 4 POLYGRAPH GRANDSCORE WITH ZONE 4 LISTED BY RANK SCORES

NUM	CASE	CONF	CONC	C13	C23	C33	C43	GS23
78	M44	NDI	NDI	7	7			14
51	M17	NDI	NDI	7	8			15
76	M42	NDI	NDI	2	13			15
54	M20	NDI	NDI	7	9			16
85	M51	NDI	NDI	8	8			16
27	A23A	NDI	NDI	6	11			17
44	M12A	NDI	NDI	-2	7	12		17
45	M12B	NDI	NDI	7	10			17
19	A16	NDI	NDI	14	4			18
23	A20	NDI	NDI	12	6			18
67	M33	NDI	NDI	5	13			18
17	A15A	NDI	NDI	9	10			19
26	A22	NDI	NDI	13	6			19
58	M24	NDI	NDI	12	8			20
68	M34	NDI	NDI	9	12			21
6	L6A1	NDI	NDI	8	-1	5	11	23
21	A18	NDI	NDI	8	8	7		23
24	A21A	NDI	NDI	1	13	10		24
37	M5	NDI	NDI	10	0	4	10	24
56	M22	NDI	NDI	11	3	11		25
65	M31	NDI	NDI	18	10			28
62	M28	NDI	NDI	20	10			30
*** Total ***								
				***	***	***	-60	-847

TABLE 5 POLYGRAPH SCORES WITHOUT ZONE 4 LISTED BY RANK SCORES

NUM	CASE	CONF	CONC	C10	C20	C30	C40	TSWO
87	M53	DI	DI	-2	-15	-11	-13	-41
7	L7A2	DI	DI	-15	-10	-9		-34
118	M70A	DI	DI	-13	-9	-3	-9	-34
43	M11	DI	DI	-6	-12	-14		-32
47	M13B	DI	DI	-8	-10	-14		-32
57	M23	DI	DI	-9	-11	-12		-32
1	A1A	DI	DI	-10	-9	-11		-30
114	M68A	DI	DI	-11	-7	-12		-30
8	L8A3	NDI	INC	-9	-9	-5	-6	-29
60	M26	DI	DI	-7	-9	-2	-10	-28
112	M67A	DI	DI	-5	-11	-12		-28
14	A12A	DI	DI	-4	-13	-8		-25
34	M2	DI	DI	-12	-9	-2	-2	-25
119	M70B	DI	DI	-7	-8	-10		-25
75	M41	DI	DI	-10	-6	-8		-24
40	M8	DI	DI	-12	-11			-23
89	M54B	DI	DI	-8	-7	-8		-23
93	M56	DI	DI	-10	-7	-6		-23
107	M64A	DI	DI	-8	-10	-5		-23
111	M66	DI	DI	-9	-7	-7		-23
95	M57B	DI	DI	-12	-10			-22
98	M59A	DI	DI	-8	-2	-12		-22
110	M65B	DI	DI	-9	-7	-6		-22
32	A26B	DI	DI	-9	-12			-21
92	M55B	DI	DI	-6	-3	-9	-3	-21
11	A10B	DI	DI	-5	-15			-20
46	M13A	DI	DI	-6	-8	-6		-20
61	M27	DI	DI	-2	-5	0	-13	-20
99	M59B	DI	DI	-9	-11			-20
72	M38	DI	DI	-4	-1	-5	-9	-19
77	M43	DI	DI	-2	-9	-8		-19
100	M60	DI	DI	-3	-8	-8		-19
115	M68B	DI	DI	-4	-7	-8		-19
121	M71B	DI	DI	-6	-13			-19
15	A13A	DI	DI	-12	-6			-18
31	A26A	DI	DI	-6	-6	-6		-18
41	M9	DI	DI	-9	-9			-18
96	M58A	DI	DI	-7	-11			-18
103	M62A	DI	DI	-8	-10			-18
105	M63A	DI	DI	-9	-9			-18
122	M71C	DI	DI	-12	-6			-18
88	M54A	DI	DI	1	-10	-8		-17
90	M54C	DI	DI	-7	-10			-17
113	M67B	DI	DI	-4	-5	-8		-17
120	M71A	DI	DI	-1	-10	-6		-17
30	A25	DI	DI	-6	-10			-16
73	M39	DI	DI	-8	-8			-16
94	M57A	DI	DI	-9	-4	-3		-16
106	M63B	DI	DI	-6	-10			-16
117	M69B	DI	DI	-8	-5	-3		-16

TABLE 5 POLYGRAPH SCORES WITHOUT ZONE 4 LISTED BY RANK SCORES

NUM	CASE	CONF	CONC	C10	C20	C30	C40	TSWO
20	A17	DI	DI	-6	-9			-15
33	M1	DI	DI	3	-4	-9	-5	-15
42	M10	DI	DI	-5	-10			-15
91	M55A	DI	DI	-4	-6	-1	-4	-15
10	A10A	DI	DI	-4	-2	-8		-14
104	M62B	DI	DI	-5	-9			-14
16	A14A	DI	DI	-6	-6	-1		-13
101	M61A	DI	DI	2	-10	-5		-13
5	A5A2	DI	DI	-8	5	-9		-12
28	A23B	DI	DI	-4	-6	-2		-12
108	M64B	DI	DI	-4	-8			-12
109	M65A	DI	DI	-4	-5	-3		-12
13	A11B	DI	INC	-6	3	-8		-11
97	M58B	NDI	INC	-3	-8			-11
86	M52	NDI	INC	-5	-5			-10
102	M61B	DI	DI	-3	-6			-9
9	A9A	NDI	INC	1	-5	2		-2
50	M16	NDI	NDI	-3	1			-2
71	M37	NDI	NDI	-7	5			-2
74	M40	NDI	INC	-4	0	2		-2
82	M48	NDI	NDI	-2	0			-2
18	A15B	NDI	NDI	-5	5			0
35	M3	NDI	NDI	0	0			0
48	M14	NDI	NDI	0	-3	0	3	0
55	M21	NDI	NDI	0	0			0
22	A19	NDI	NDI	-3	1	3		1
79	M45	NDI	NDI	-1	-7	9		1
29	A24	NDI	NDI	0	2			2
49	M15	NDI	NDI	3	-1			2
36	M4	NDI	NDI	2	1			3
84	M50	NDI	NDI	6	-3			3
25	A21B	NDI	NDI	4	0			4
59	M25	NDI	NDI	8	-4			4
39	M7	NDI	NDI	3	2			5
53	M19	NDI	NDI	-1	6			5
83	M49	NDI	NDI	5	0			5
23	A20	NDI	NDI	7	-1			6
24	A21A	NDI	NDI	-3	5	4		6
37	M5	NDI	NDI	7	-13	4	8	6
54	M20	NDI	NDI	0	6			6
70	M36	NDI	NDI	3	3			6
2	A2A1	NDI	NDI	2	1	4		7
52	M18	NDI	NDI	5	2			7
63	M29	NDI	NDI	6	1			7
6	L6A1	NDI	NDI	6	-2	-1	5	8
51	M17	NDI	NDI	2	6			8
85	M51	NDI	NDI	5	3			8
38	M6	NDI	NDI	6	3			9
45	M12B	NDI	NDI	4	5			9
58	M24	NDI	NDI	5	4			9

TABLE 5 POLYGRAPH SCORES WITHOUT ZONE 4 LISTED BY RANK SCORES

NUM	CASE	CONF	CONC	C10	C20	C30	C40	TSWO
76	M42	NDI	NDI	2	7			9
44	M12A	NDI	NDI	-3	3	10		10
64	M30	NDI	NDI	0	10			10
66	M32	NDI	NDI	10	0			10
80	M46	NDI	NDI	6	4			10
4	A4A1	NDI	NDI	7	4			11
12	A11A	NDI	NDI	5	6			11
19	A16	NDI	NDI	7	4			11
26	A22	NDI	NDI	9	2			11
67	M33	NDI	NDI	4	7			11
69	M35	NDI	NDI	4	7			11
78	M44	NDI	NDI	6	5			11
81	M47	NDI	NDI	4	7			11
3	A3A2	NDI	NDI	8	4			12
27	A23A	NDI	NDI	4	8			12
116	M69A	DI	INC	8	5	-1		12
21	A18	NDI	NDI	4	5	4		13
17	A15A	NDI	NDI	6	9			15
65	M31	NDI	NDI	11	5			16
56	M22	NDI	NDI	8	0	10		18
68	M34	NDI	NDI	4	14			18
62	M28	NDI	NDI	15	8			23
*** Total ***								
				***	***	***	-58	-921

TABLE 6 - NUMBER OF CHARTS NEEDED FOR EACH CASE TO REACH DECISION

	NUMBER	PERCENT
2 CHARTS	16 A	50%
	50 M	56%
TOTAL	66	54%
3 CHARTS	14 A	44%
	30 M	33%
TOTAL	44	36%
4 CHARTS	2 A	6%
	10 M	11%
TOTAL	12	10%

3 CASES ADJUSTED: STIM TEST - OVER STIMULATES
(4 CHARTS EACH WERE REDUCED TO 3 CHARTS)

TABLE 7 - SCORING GUIDES USED TO GENERATE TABLES 13-47 (M,B,F)

TABLE 13 (M-1), 14 (M-2)

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

TABLE 21 (B-1), 22 (B-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

TABLE 29 (F-1), 30 (F-2)

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

Canadian system requires 3 charts with a minimum
+6, or -6 to confirm:

TABLE 8 OVERALL TABLE LISTING OFFENSE, CONCLUSION, MOST PRODUCTIVE TRACES, SEX, RACE, AGE, AND EDUCATION

NUM	CASE	OFFENSE	CONF	CONC	MOST PROD PNEUMO	MOST PROD TRACE OVERALL	SEX	RACE	AGE	EDUC YEAR
1	A1A	LARCENY	DI	DI	LOWER	CARDIO	F	BLAC	27	12
2	A2A1	ATTHOMOCID	NDI	NDI	LOWER	CARDIO	M	CAUC	27	12
3	A3A2	ATTHOMOCID	NDI	NDI	LOWER	GSR	M	CAUC	47	12
4	A4A1	LARCENY	NDI	NDI	LOWER	PNEUMO	M	CAUC	50	8
5	A5A2	LARCENY	DI	DI	LOWER	CARDIO	M	CAUC	22	16
6	L6A1	LARCENY	NDI	NDI	LOWER	PNEUMO	M	CAUC	22	12
7	L7A2	LARCENY	DI	DI	LOWER	PNEUMO	M	CAUC	31	13
8	L8A3	LARCENY	NDI	INC	LOWER	GSR	F	CAUC	22	12
9	A9A	HOMOCIDE	NDI	INC	LOWER	PNEUMO	M	BLAC	22	9
10	A10A	HOMICIDE	DI	DI	EQUAL	PNEUMO	F	BLAC	21	12
11	A10B	HOMOCIDE	DI	DI	EQUAL	PNEUMO	F	BLAC	21	12
12	A11A	LARCENY	NDI	NDI	EQUAL	PNEUMO	M	CAUC	24	12
13	A11B	LARCENY	DI	INC	EQUAL	PNEUMO	M	CAUC	29	12
14	A12A	SEXCHIDMOL	DI	DI	LOWER	PNEUMO	M	BLAC	27	12
15	A13A	HOMOCIDE	DI	DI	LOWER	PNEUMO	F	BLAC	23	11
16	A14A	LARCENY	DI	DI	LOWER	CARDIO	M	CAUC	43	12
17	A15A	INFORMANT	NDI	NDI	LOWER	PNEUMO	M	CAUC	30	10
18	A15B	INFORMANT	NDI	NDI	LOWER	CARDIO	M	CAUC	30	10
19	A16	LARCENY	NDI	NDI	UPPER	PNEUMO	F	INDI	31	13
20	A17	LARCENY	DI	DI	LOWER	CARDIO	M	CAUC	27	12
21	A18	LARCENY	NDI	NDI	LOWER	PNEUMO	M	CAUC	43	12
22	A19	ARSON	NDI	NDI	LOWER	PNEUMO	M	CAUC	34	10
23	A20	ASSAULT	NDI	NDI	LOWER	PNEUMO	F	CAUC	16	9
24	A21A	LARCENY	NDI	NDI	LOWER	PNEUMO	M	CAUC	44	14
25	A21B	LARCENY	NDI	NDI	LOWER	CARDIO	M	CAUC	44	14
26	A22	FRAUD	NDI	NDI	EQUAL	PNEUMO	F	CAUC	51	10
27	A23A	HOMOCIDE	NDI	NDI	EQUAL	PNEUMO	M	CAUC	46	12
28	A23B	HOMOCIDE	DI	DI	EQUAL	EQUALL	M	CAUC	46	12
29	A24	DRUGS	NDI	NDI	LOWER	CARDIO	M	BLAC	30	10
30	A25	ARSON	DI	DI	LOWER	PNEUMO	M	CAUC	20	11
31	A26A	LARCENY	DI	DI	LOWER	PNEUMO	M	BLAC	35	16
32	A26B	LARCENY	DI	DI	LOWER	PNEUMO	M	BLAC	35	16
33	M1	LARCENY	DI	DI	EQUAL	GSR	F	CAUC	38	13
34	M2	LARCENY	DI	DI	UPPER	CARDIO	F	BLAC	25	16
35	M3	LARCENY	NDI	NDI	UPPER	GSR	F	CAUC	25	16
36	M4	LARCENY	NDI	NDI	EQUAL	CARDIO	F	CAUC	20	12
37	M5	LARCENY	NDI	NDI	LOWER	CARDIO	F	BLAC	20	13
38	M6	LARCENY	NDI	NDI	UPPER	GSR	F	CAUC	21	12
39	M7	LARCENY	NDI	NDI	EQUAL	GSR	F	CAUC	49	12
40	M8	ESPIONAGE	DI	DI	LOWER	PNEUMO	M	CAUC	32	14
41	M9	ESPIONAGE	DI	DI	LOWER	PNEUMO	M	CAUC	26	12
42	M10	LARCENY	DI	DI	LOWER	CARDIO	M	CAUC	21	15
43	M11	LARCENY	DI	DI	LOWER	CARDIO	F	CAUC	19	13
44	M12A	LARCENY	NDI	NDI	EQUAL	PNEUMO	F	BLAC	22	12
45	M12B	LARCENY	NDI	NDI	EQUAL	PNEUMO	F	BLAC	22	12
46	M13A	LARCENY	DI	DI	EQUAL	PNEUMO	F	BLAC	24	13
47	M13B	LARCENY	DI	DI	EQUAL	CARDIO	F	BLAC	24	13

TABLE 8 OVERALL TABLE LISTING OFFENSE, CONCLUSION, MOST PRODUCTIVE TRACES, SEX, RACE, AGE, AND EDUCATION

NUM	CASE	OFFENSE	CONF	CONC	MOST PROD PNEUMO	MOST PROD TRACE OVERALL	SEX	RACE	AGE	EDUC YEAR
48	M14	LARCENY	NDI	NDI	LOWER	PNEUMO	F	CAUC	22	12
49	M15	LARCENY	NDI	NDI	UPPER	PNEUMO	F	CAUC	28	16
50	M16	LARCENY	NDI	NDI	UPPER	PNEUMO	F	CAUC	57	13
51	M17	LARCENY	NDI	NDI	LOWER	PNEUMO	M	CAUC	60	16
52	M18	LARCENY	NDI	NDI	EQUAL	PNEGSR	F	CAUC	57	13
53	M19	LARCENY	NDI	NDI	LOWER	CARDIO	F	BLAC	21	12
54	M20	LARCENY	NDI	NDI	UPPER	GSR	F	CAUC	47	12
55	M21	LARCENY	NDI	NDI	UPPER	GSR	F	CAUC	50	12
56	M22	LARCENY	NDI	NDI	EQUAL	CARDIO	F	CAUC	27	13
57	M23	LARCENY	DI	DI	LOWER	CARDIO	M	BLAC	24	12
58	M24	LARCENY	NDI	NDI	EQUAL	GSR	F	CAUC	21	12
59	M25	LARCENY	NDI	NDI	UPPER	PNEUMO	F	CAUC	52	12
60	M26	LARCENY	DI	DI	EQUAL	GSR	F	BLAC	26	14
61	M27	LARCENY	DI	DI	LOWER	PNEUMO	F	BLAC	26	14
62	M28	LARCENY	NDI	NDI	LOWER	GSR	F	BLAC	32	12
63	M29	LARCENY	NDI	NDI	UPPER	CARDIO	F	CAUC	40	12
64	M30	LARCENY	NDI	NDI	UPPER	PNEUMO	F	CAUC	21	13
65	M31	LARCENY	NDI	NDI	EQUAL	PNEUMO	F	CAUC	23	13
66	M32	LARCENY	NDI	NDI	UPPER	PNEUMO	F	BLAC	41	12
67	M33	LARCENY	NDI	NDI	LOWER	GSR	F	CAUC	37	14
68	M34	LARCENY	NDI	NDI	EQUAL	CARDIO	F	CAUC	25	12
69	M35	LARCENY	NDI	NDI	LOWER	PNEUMO	M	CAUC	32	14
70	M36	LARCENY	NDI	NDI	EQUAL	GSR	F	CAUC	40	12
71	M37	LARCENY	NDI	NDI	UPPER	GSR	F	BLAC	29	16
72	M38	LARCENY	DI	DI	EQUAL	PNEUMO	F	CAUC	24	12
73	M39	LARCENY	DI	DI	UPPER	GSR	F	CAUC	27	12
74	M40	LARCENY	NDI	INC	UPPER	PNEUMO	F	CAUC	31	12
75	M41	LARCENY	DI	DI	LOWER	CARDIO	F	BLAC	30	14
76	M42	LARCENY	NDI	NDI	UPPER	GSR	F	CAUC	51	12
77	M43	LARCENY	DI	DI	UPPER	PNEUMO	F	CAUC	21	14
78	M44	LARCENY	NDI	NDI	LOWER	GSR	F	CAUC	46	12
79	M45	LARCENY	NDI	NDI	UPPER	GSR	F	CAUC	32	12
80	M46	LARCENY	NDI	NDI	LOWER	PNEUMO	F	CAUC	36	12
81	M47	LARCENY	NDI	NDI	EQUAL	CARDIO	F	BLAC	22	14
82	M48	LARCENY	NDI	NDI	LOWER	GSR	M	BLAC	28	16
83	M49	LARCENY	NDI	NDI	EQUAL	GSR	F	BLAC	36	13
84	M50	LARCENY	NDI	NDI	UPPER	PNEUMO	F	CAUC	57	12
85	M51	LARCENY	NDI	NDI	EQUAL	GSR	F	BLAC	25	12
86	M52	LARCENY	NDI	INC	LOWER	GSR	F	BLAC	27	16
87	M53	HOMOCIDE	DI	DI	LOWER	GSR	M	CAUC	18	11
88	M54A	ATTHOMOCID	DI	DI	LOWER	PNEUMO	M	BLAC	35	10
89	M54B	ATTHOMOCID	DI	DI	LOWER	GSR	M	BLAC	35	10
90	M54C	ATTHOMOCID	DI	DI	LOWER	GSR	M	BLAC	35	10
91	M55A	SEXOFFENSE	DI	DI	LOWER	CARDIO	M	CAUC	25	16
92	M55B	LARCENY	DI	DI	LOWER	PNEUMO	M	CAUC	25	16
93	M56	SMUGGDRUGS	DI	DI	EQUAL	CARDIO	F	CAUC	24	12
94	M57A	FRAUD	DI	DI	EQUAL	GSR	M	CAUC	45	12

TABLE 8 OVERALL TABLE LISTING OFFENSE, CONCLUSION, MOST PRODUCTIVE TRACES, SEX, RACE, AGE, AND EDUCATION

NUM	CASE	OFFENSE	CONF	CONC	MOST PROD PNEUMO	MOST PROD TRACE OVERALL	SEX	RACE	AGE	EDUC YEAR
95	M57B	LARCENY	DI	DI	EQUAL	CARDIO	M	CAUC	45	12
96	M58A	LARCENY	DI	DI	EQUAL	CARDIO	M	CAUC	45	12
97	M58B	LARCENY	NDI	INC	EQUAL	PNEUMO	M	CAUC	45	12
98	M59A	OBSCEPHONE	DI	DI	EQUAL	CARDIO	M	CAUC	40	12
99	M59B	OBSCEPHONE	DI	DI	EQUAL	PNEUMO	M	CAUC	40	12
100	M60	OBSCENITY	DI	DI	EQUAL	GSR	M	CAUC	37	16
101	M61A	LARCENY	DI	DI	LOWER	CARDIO	M	CAUC	32	12
102	M61B	FRAUD	DI	DI	LOWER	CARDIO	M	CAUC	32	12
103	M62A	ASSAULT	DI	DI	EQUAL	CARDIO	M	BLAC	23	12
104	M62B	ASSAULT	DI	DI	EQUAL	CARDIO	M	BLAC	23	12
105	M63A	RAPE	DI	DI	LOWER	CARDIO	M	BLAC	40	16
106	M63B	SODOMY	DI	DI	LOWER	CARDIO	M	BLAC	40	16
107	M64A	SODOMY	DI	DI	LOWER	PNEUMO	M	CAUC	42	12
108	M64B	RAPE	DI	DI	LOWER	CARDIO	M	CAUC	42	12
109	M65A	POLUTION	DI	DI	LOWER	PNEUMO	M	CAUC	52	12
110	M65B	POLUTION	DI	DI	LOWER	PNEUMO	M	CAUC	52	12
111	M66	ARSON	DI	DI	EQUAL	PNEUMO	M	CAUC	27	15
112	M67A	SODOMY	DI	DI	EQUAL	GSR	M	CAUC	31	13
113	M67B	CHILDMOLES	DI	DI	EQUAL	PNEUMO	M	CAUC	31	13
114	M68A	CHILDMOLES	DI	DI	LOWER	CARDIO	M	CAUC	24	14
115	M68B	CHILDMOLES	DI	DI	LOWER	CARDIO	M	CAUC	24	14
116	M69A	CHILDMOLES	DI	INC	LOWER	CARDIO	M	CAUC	19	12
117	M69B	CHILDMOLES	DI	DI	LOWER	PNEUMO	M	CAUC	19	12
118	M70A	LARCENY	DI	DI	EQUAL	PNEUMO	F	BLAC	22	13
119	M70B	LARCENY	DI	DI	EQUAL	CARDIO	F	BLAC	22	13
120	M71A	RAPE	DI	DI	LOWER	CARDIO	M	CAUC	31	12
121	M71B	SODOMY	DI	DI	LOWER	CARDIO	M	CAUC	31	12
122	M71C	ASSAULT	DI	DI	LOWER	GSR	M	CAUC	31	12
*** Total ***										
									***	1542

TABLE 9

SOURCE OF GROUND TRUTH

CASE NR	DECISION	SOURCE OF GROUND TRUTH	DEF ATTY CASE	VERIFIED BY ATTY
A1A	DI	Confession		
A2A1	NDI	Confession fr 3rd Party		
A3A2	NDI	Confession fr 3rd Party		
A4A1	NDI	Confession		
A5A2	DI	Confession		
L6A1	NDI	Confession & Restitution		
L7A2	DI	Confession & Restitution		
L8A3	NDI-INC	Confession & Restitution		
A9A	NDI	Another Confess & Convict.		
A10A	DI	Confession & Conviction		
A10B	DI	Confession & Conviction		
A11A	NDI	Confirmed by A11B		
A11B	DI-INC	Confession & Loot returned		
A12A	DI	Plead Guilty & Convicted		
A13A	DI	Conviction		
A14A	DI	Confession & Restitution		
A15A	NDI	Subject of allegation tried		
A15B	NDI	and convicted.		
A16	NDI	Another person confessed.		
A17	DI	Confession & Items returned.		
A18	NDI	Conviction of another suspect.		
A19	NDI	Conviction of other person.		
A20	NDI	Conviction of other person.		
A21A	NDI	Confession of guilty persons.		
A21B	NDI	Confession of guilty persons.		
A22	NDI	Confession & conviction of other person.		

CASE NR	DECISION	SOURCE OF GROUND TRUTH	DEF ATTY CASE	VERIFIED BY ATTY
A23A	NDI	Confession & Conviction		
A23B	DI	Confession & Conviction		
A24	NDI	Case resolved by Int Aff against Arresting Officer.		
A25	DI	Confession & Conviction		
A26A	DI	Confession & Conviction		
A26B	DI	Confession & Conviction		
M-1	DI	Confession		
M-2	DI	Confession		
M-3	NDI	Confession		
M-4	NDI	Confession		
M-5	NDI	Confession		
M-6	NDI	Investigation		
M-7	NDI	Investigation		
M-8	DI	Confession		
M-9	DI	Confession		
M-10	DI	Confession		
M-11	DI	Confession		
M-12A	NDI	Investigation		
M-12B	NDI	Investigation		
M-13A	DI	Confession & Investigation		
M-13B	DI	Confession & Investigation		
M-14	NDI	Confession & Investigation		
M-15	NDI	Confession & Investigation		
M-16	NDI	Confession & Investigation		
M-17	NDI	Confession & Investigation		
M-18	NDI	Confession & Investigation		
M-19	NDI	Confession & Investigation		
M-20	NDI	Confession & Investigation		
M-21	NDI	Confession & Investigation		
M-22	NDI	Investigation		
M-23	DI	Confession & Restitution		
M-24	NDI	Confession & Restitution		
M-25	NDI	Confession & Restitution		
M-26	DI	Confession & Restitution		

CASE NR	DECISION	SOURCE OF GROUND TRUTH	DEF ATTY CASE	VERIFIED BY ATTY
M-27	DI	Dir Security Investigat		
M-28	NDI	Dir Security Investigat		
M-29	NDI	Dir Security Investigat		
M-30	NDI	Dir Security Investigat		
M-31	NDI	Dir Security Investigat		
M-32	NDI	Dir Security Investigat		
M-33	NDI	Dir Security Investigat		
M-34	NDI	Dir Security Investigat		
M-35	NDI	Dir Security Investigat		
M-36	NDI	Dir Security Investigat		
M-37	NDI	Dir Security Investigat		
M-38	DI	Confession		
M-39	DI	Confession		
M-40	NDI-INC	Confession		
M-41	DI	Confession		
M-42	NDI	Confession		
M-43	DI	Confession		
M-44	NDI	Confession		
M-45	NDI	Dir Security Investigat		
M-46	NDI	Dir Security Investigat		
M-47	NDI	Dir Security Investigat		
M-48	NDI	Dir Security Investigat		
M-49	NDI	Dir Security Investigat		
M-50	NDI	Dir Security Investigat		
M-51	NDI	Dir Security Investigat		
M-52	NDI-INC	Dir Security Investigat		
M-53	DI	Confession	Yes	
M-54A	DI	Confession	Yes	
M-54B	DI	Confession	Yes	
M-54C	DI	Confession	Yes	
M-55A	DI	Plead Guilty - Convicted	Yes	
M-55B	DI	Plead Guilty - Convicted	Yes	
M-56	DI	Conviction	Yes	Yes
M-57A	DI	Confession	Yes	Yes
M-57B	DI	Confession	Yes	Yes
M-58A	DI	Confession	Yes	Yes
M-58B	NDI-INC	Confession	Yes	Yes

CASE NR	DECISION	SOURCE OF GROUND TRUTH	DEF ATTY CASE	VERIFIED BY ATTY
M-59A	DI	Confession	Yes	
M-59B	DI	Confession	Yes	
M-60	DI	Conviction & Eyewitness	Yes	
M-61A	DI	Confession	Yes	
M-61B	DI	Confession	Yes	
M-62A	DI	Conviction	Yes	
M-62B	DI	Conviction	Yes	
M-63A	DI	Confession	Yes	
M-63B	DI	Confession	Yes	
M-64A	DI	Confession	Yes	
M-64B	DI	Confession	Yes	
M-65A	DI	Confession	Yes	
M-65B	DI	Confession	Yes	
M-66	DI	Confession	Yes	
M-67A	DI	Post Test Confession to	Yes	
M-67B	DI	Attorney		
M-68A	DI	Confession	Yes	
M-68B	DI	Confession	Yes	
M-69A	DI-INC	Confession	Yes	
M-69B	DI	Confession	Yes	
M-70A	DI	Confession	Yes	
M-70B	DI	Confession	Yes	
M-71A	DI	Confession	Yes	
M-71B	DI	Confession	Yes	
M-71C	DI	Confession	Yes	

During period covered by Matte (Jan 86 thru Apr 87) there were a total of 39 polygraph tests conducted for Defense Attorneys; 36 were verified and included in this study, and 3 were unverified and excluded from this study. All three unverified cases were classified as NDI (No Deception Indicated). All 36 verified cases as shown in above table were classified as DI (Deception Indicated).

TABLE 10 Predictive Table For Estimating Error Rates

Table 10a-1. For Scores Obtained Without Using the Quadri-zone Comparison Technique for Innocent Cases

Z-score - based on the scores of the 58 innocent cases without the Quadri-zone adjustment

Probability - that an innocent case will reach a mathematical score that low or lower (weaker) is less than

Percent - of the time an innocent case will score this value or lower than this value (weaker score)

Potential Error (False Negative) - based on the probability that a guilty case will score this value or higher

AVERAGE SCORE	SCORE FOR NUMBER OF CHARTS 2	3	4	Z-SCORE	PROBABILITY	PERCENT	POTENTIAL ERROR
14	28	42	56	3.317	1.000	100%	0.0%
13.5	27	41	54	3.169	.999	99.9	0.0
13	26	39	52	3.020	.999	99.9	0.0
12.5	25	38	50	2.872	.998	99.8	0.0
12	24	36	48	2.724	.997	99.7	0.0
11.5	23	35	46	2.575	.995	99.5	0.0
11	22	33	44	2.427	.992	99.2	0.0
10.5	21	32	42	2.279	.989	98.9	0.0
10	20	30	40	2.130	.983	98.3	0.0
9.5	19	29	38	1.982	.976	97.6	0.0
9	18	27	36	1.834	.967	96.7	0.0
8.5	17	26	34	1.685	.954	95.4	0.0
8	16	24	32	1.537	.938	93.8	0.0
7.5	15	23	30	1.388	.917	91.7	0.0
7	14	21	28	1.240	.893	89.3	0.0
6.5	13	20	26	1.092	.863	86.3	0.0
6	12	18	24	.943	.827	82.7	0.0
5.5	11	17	22	.796	.787	78.7	0.0
5	10	15	20	.647	.741	74.1	0.0
4.5	9	14	18	.498	.691	69.1	0.0
4	8	12	16	.350	.637	63.7	0.0
3.5	7	11	14	.201	.580	58.0	0.0
3	6	9	12	.053	.521	52.1	0.0
2.5	5	8	10	-.095	.462	46.2	0.0
2	4	6	8	-.244	.404	40.4	0.0
1.5	3	5	6	-.392	.348	34.8	0.0
1	2	3	4	-.540	.295	29.5	0.1
0.5	1	2	2	-.689	.245	24.5	0.1
0	0	0	0	-.837	.201	20.1	0.2
-0.5	-1	-2	-2	-.985	.162	16.2	0.4
-1	-2	-3	-4	-1.134	.128	12.8	0.8
-1.5	-3	-5	-6	-1.282	.099	9.9	1.3
-2	-4	-6	-8	-1.431	.076	7.6	2.1
-2.5	-5	-8	-10	-1.579	.057	5.7	3.2
-3	-6	-9	-12	-1.727	.042	4.2	4.9
-3.5	-7	-11	-14	-1.876	.030	3.0	8.1
-4	-8	-12	-16	-2.024	.022	2.2	10.1
-4.5	-9	-14	-18	-2.172	.015	1.5	14.0
-5	-10	-15	-20	-2.321	.010	1.0	18.6
-5.5	-11	-17	-22	-2.469	.007	0.7	24.2
-6	-12	-18	-24	-2.618	.004	0.4	30.6
-6.5	-13	-20	-26	-2.766	.003	0.3	37.7
-7	-14	-21	-28	-2.914	.002	0.2	45.1
-7.5	-15	-23	-30	-3.063	.001	0.1	52.7
-8	-16	-24	-32	-3.211	.000	0.0	60.2

TABLE 10 Predictive Table For Estimating Error Rates

Table 10a-2. For Scores Obtained With the Quadri-zone Comparison Technique for Innocent Cases

Z-score - based on the scores of the 58 innocent cases with the Quadri-zone adjustment

Probability - that an innocent case will reach a mathematical score that low or lower (weaker) is less than

Percent - of the time an innocent case will score this value or lower than this value (weaker score)

Potential Error (False Negative) - based on the probability that a guilty case will score this value or higher

AVERAGE SCORE	SCORE FOR NUMBER OF CHARTS 2	3	4	Z-SCORE	PROBABILITY	PERCENT	POTENTIAL ERROR
16.5	33	50	66	3.392	1.000	100%	0.0%
16.0	32	48	64	3.231	1.000	100	0.0
15.5	31	47	62	3.069	.999	99.9	0.0
15.0	30	45	60	2.908	.998	99.8	0.0
14.5	29	44	58	2.747	.997	99.7	0.0
14	28	42	56	2.585	.995	99.5	0.0
13.5	27	41	54	2.424	.992	99.2	0.0
13	26	39	52	2.263	.988	98.8	0.0
12.5	25	38	50	2.101	.982	98.2	0.0
12	24	36	48	1.940	.974	97.4	0.0
11.5	23	35	46	1.779	.962	96.2	0.0
11	22	33	44	1.617	.947	94.2	0.0
10.5	21	32	42	1.456	.927	92.7	0.0
10	20	30	40	1.295	.902	90.2	0.0
9.5	19	29	38	1.133	.871	87.1	0.0
9	18	27	36	.972	.835	83.5	0.0
8.5	17	26	34	.811	.791	79.1	0.0
8	16	24	32	.649	.742	74.2	0.0
7.5	15	23	30	.488	.687	68.7	0.0
7	14	21	28	.327	.628	62.8	0.0
6.5	13	20	26	.165	.566	56.6	0.0
6	12	18	24	.004	.502	50.2	0.0
5.5	11	17	22	-.157	.438	43.8	0.0
5	10	15	20	-.319	.375	37.5	0.0
4.5	9	14	18	-.480	.316	31.6	0.0
4	8	12	16	-.641	.261	26.1	0.0
3.5	7	11	14	-.803	.211	21.1	0.0
3	6	9	12	-.964	.167	16.7	0.0
2.5	5	8	10	-1.125	.130	13.0	0.0
2	4	6	8	-1.287	.090	9.0	0.0
1.5	3	5	6	-1.448	.074	7.4	0.0
1	2	3	4	-1.609	.054	5.4	0.0
0.5	1	2	2	-1.771	.038	3.8	0.0
0	0	0	0	-1.932	.027	2.7	0.0
-0.5	-1	-2	-2	-2.093	.018	1.8	0.1
-1	-2	-3	-4	-2.255	.012	1.2	0.2
-1.5	-3	-5	-6	-2.416	.008	1.0	0.4
-2	-4	-6	-8	-2.578	.005	1.0	0.6
-2.5	-5	-8	-10	-2.739	.003	0.3	1.0
-3	-6	-9	-12	-2.900	.002	0.2	1.5
-3.5	-7	-11	-14	-3.062	.001	0.1	2.3
-4	-8	-12	-16	-3.223	.001	0.1	3.5
-4.5	-9	-14	-18	-3.384	.001	0.1	5.1
-5	-10	-15	-20	-3.546	.000	0.0	7.1

TABLE 10 Predictive Table for Estimating Error Rates

Table 10b-1. For Scores Obtained Without Using the Quadri-zone Comparison Technique for Guilty Cases

Z-score - based on the scores of the 64 guilty cases without the Quadri-zone adjustment
Probability - that an guilty case will reach a mathematical score this high or higher (weaker) is less than.
Percent - of the time a Guilty case will score this value or lower than this value (stronger score)
Potential Error (False Positive) - based on the probability that an innocent case will score this value or lower

AVERAGE SCORE	SCORE FOR NUMBER OF CHARTS 2	3	4	Z-SCORE	PROBABILITY	PERCENT	POTENTIAL ERROR
5	10	15	20	4.722	.000	100%	74.1%
4.5	9	14	18	4.530	.000	100	69.1
4	8	12	16	4.339	.000	100	63.7
3.5	7	11	14	4.147	.000	100	58.0
3	6	9	12	3.956	.000	100	52.1
2.5	5	8	10	3.764	.000	100	46.2
2	4	6	8	3.573	.000	100	40.4
1.5	3	5	6	3.381	.000	100	34.8
1	2	3	4	3.189	.001	99.9	29.5
0.5	1	2	2	2.998	.001	99.9	24.5
0	0	0	0	2.806	.002	99.8	20.1
-0.5	-1	-2	-2	2.615	.004	99.6	16.2
-1	-2	-3	-4	2.423	.008	99.2	12.8
-1.5	-3	-5	-6	2.232	.013	98.7	9.9
-2	-4	-6	-8	2.040	.021	97.9	7.6
-2.5	-5	-8	-10	1.848	.032	96.8	5.7
-3	-6	-9	-12	1.657	.049	95.1	4.2
-3.5	-7	-11	-14	1.465	.071	92.9	3.0
-4	-8	-12	-16	1.274	.101	89.9	2.2
-4.5	-9	-14	-18	1.082	.140	86.0	1.5
-5	-10	-15	-20	.891	.186	81.4	1.0
-5.5	-11	-17	-22	.699	.242	75.8	0.7
-6	-12	-18	-24	.507	.306	69.4	0.4
-6.5	-13	-20	-26	.316	.377	62.3	0.3
-7	-14	-21	-28	.124	.451	54.9	0.2
-7.5	-15	-23	-30	-.067	.527	47.3	0.1
-8	-16	-24	-32	-.259	.602	39.8	0.0
-8.5	-17	-26	-34	-.450	.674	32.6	0.0
-9	-18	-27	-36	-.642	.739	26.1	0.0
-9.5	-19	-29	-38	-.834	.798	20.2	0.0
-10	-20	-30	-40	-1.025	.847	15.3	0.0
-10.5	-21	-32	-42	-1.217	.888	11.2	0.0
-11	-22	-33	-44	-1.408	.920	8.0	0.0
-11.5	-23	-35	-46	-1.600	.945	5.5	0.0
-12	-24	-36	-48	-1.791	.963	3.7	0.0
-12.5	-25	-38	-50	-1.983	.976	2.4	0.0
-13	-26	-39	-52	-2.175	.985	1.5	0.0
-13.5	-27	-41	-54	-2.366	.991	0.9	0.0
-14	-28	-42	-56	-2.558	.995	0.5	0.0
-14.5	-29	-44	-58	-2.749	.997	0.3	0.0
-15	-30	-45	-60	-2.941	.998	0.2	0.0
-15.5	-31	-47	-62	-3.132	.999	0.1	0.0
-16	-32	-48	-64	-3.324	.999	0.1	0.0
-16.5	-33	-50	-66	-3.516	1.000	0.0	0.0

TABLE 10 Predictive Table for Estimating Error Rates

Table 10b-2. For Scores Obtained With the Quadri-zone Comparison Technique for Guilty Cases

Z-score - based on the scores of the 64 guilty cases with the Quadri-zone adjustment

Probability - that an guilty case will reach a mathematical score this high or higher (weaker) is less than

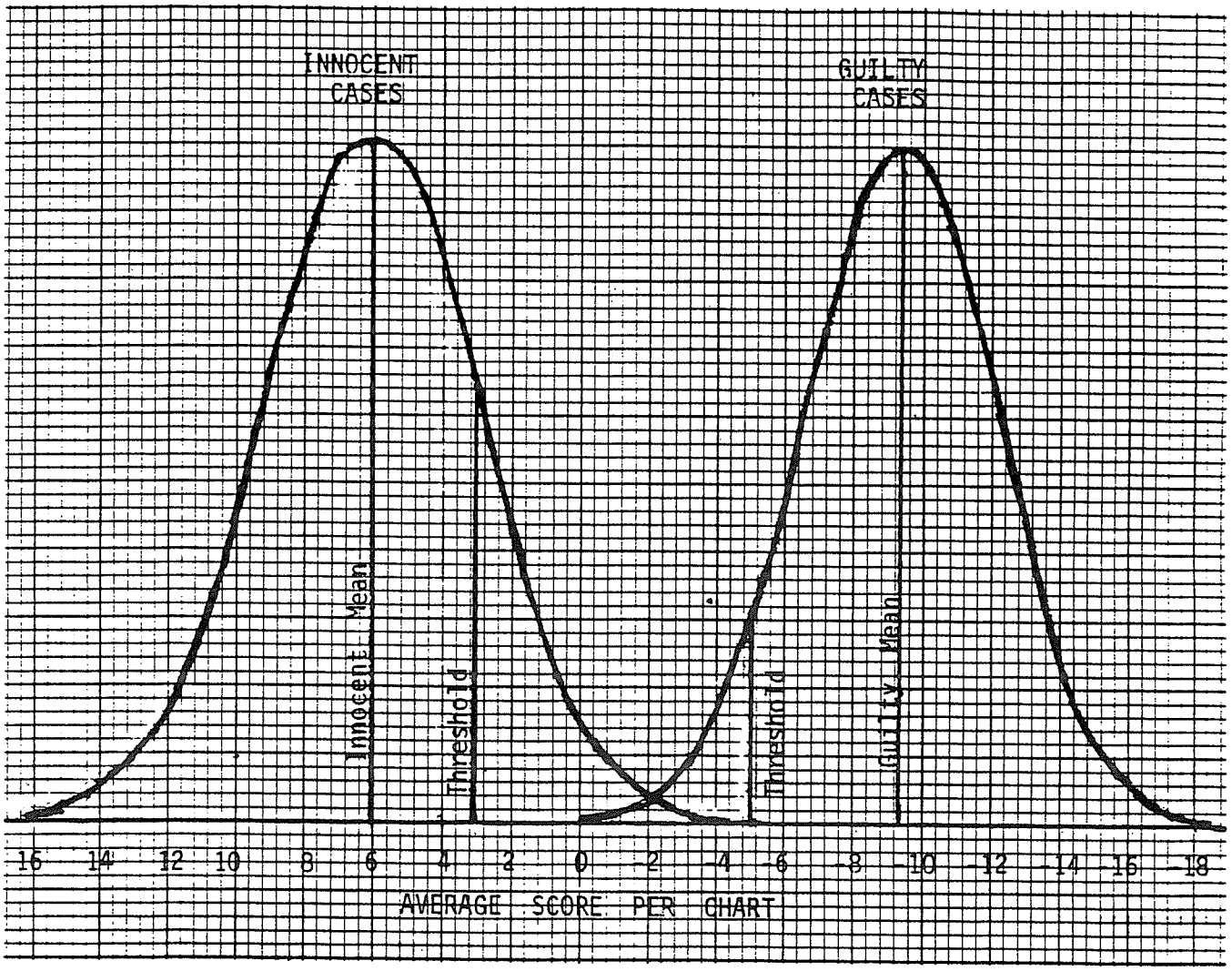
Percent - of the time a Guilty case will score this value or lower than this value (stronger score)

Potential Error (False Positive) - based on the probability that an innocent case will score this value or lower

SCORE FOR NUMBER OF CHARTS							
AVERAGE SCORE	2	3	4	Z-SCORE	PROBABILITY	PERCENT	POTENTIAL ERROR
3	6	9	12	4.277	.000	100%	16.7%
2.5	5	8	10	4.101	.000	100	13.0
2	4	6	8	3.925	.000	100	9.0
1.5	3	5	6	3.750	.000	100	7.4
1	2	3	4	3.574	.000	100	5.4
0.5	1	2	2	3.398	.000	100	3.8
0	0	0	0	3.222	.001	100	2.7
-0.5	-1	-2	-2	3.046	.001	99.9	1.8
-1	-2	-3	-4	2.870	.002	99.8	1.2
-1.5	-3	-5	-6	2.694	.004	99.6	1.0
-2	-4	-6	-8	2.519	.006	99.4	1.0
-2.5	-5	-8	-10	2.343	.010	99.0	0.3
-3	-6	-9	-12	2.167	.015	98.5	0.2
-3.5	-7	-11	-14	1.991	.023	97.7	0.1
-4	-8	-12	-16	1.815	.035	96.5	0.1
-4.5	-9	-14	-18	1.639	.051	94.9	0.1
-5	-10	-15	-20	1.464	.071	92.9	0.0
-5.5	-11	-17	-22	1.288	.100	90.0	0.0
-6	-12	-18	-24	1.112	.133	86.7	0.0
-6.5	-13	-20	-26	.936	.175	82.5	0.0
-7	-14	-21	-28	.760	.224	77.6	0.0
-7.5	-15	-23	-30	.584	.280	72.0	0.0
-8	-16	-24	-32	.408	.342	65.8	0.0
-8.5	-17	-26	-34	.233	.408	59.2	0.0
-9	-18	-27	-36	.057	.477	52.3	0.0
-9.5	-19	-29	-38	-.119	.547	45.3	0.0
-10	-20	-30	-40	-.295	.616	38.4	0.0
-10.5	-21	-32	-42	-.471	.681	31.9	0.0
-11	-22	-33	-44	-.647	.741	25.9	0.0
-11.5	-23	-35	-46	-.823	.795	20.5	0.0
-12	-24	-36	-48	-.998	.841	15.9	0.0
-12.5	-25	-38	-50	-1.174	.880	12.0	0.0
-13	-26	-39	-52	-1.350	.912	8.8	0.0
-13.5	-27	-41	-54	-1.526	.937	6.3	0.0
-14	-28	-42	-56	-1.702	.956	4.4	0.0
-14.5	-29	-44	-58	-1.878	.970	3.0	0.0
-15	-30	-45	-60	-2.054	.980	2.0	0.0
-15.5	-31	-47	-62	-2.229	.987	1.3	0.0
-16	-32	-48	-64	-2.405	.992	0.8	0.0
-16.5	-33	-50	-66	-2.581	.995	0.5	0.0
-17	-34	-51	-68	-2.757	.997	0.3	0.0
-17.5	-35	-53	-70	-2.933	.998	0.2	0.0
-18	-36	-54	-72	-3.109	.999	0.1	0.0
-18.5	-37	-56	-74	-3.284	1.000	0.0	0.0
-19	-38	-57	-76	-3.460	1.000	0.0	0.0

TABLE 10-C GRAPH OF THE PREDICTIVE TABLE DATA WITH ZONE 4

This graph shows the relation between the Polygraph Score and the distribution of scores for the Innocent and Guilty cases. The graph is based on the averge score per chart from Tables 10a-2 and 10b-2. The graph can be used for a given case by dividing the Total Score with Zone 4 by the number of charts scored to get the average score, or by referring to Tables 10a-2 or 10b-2, as appropriate, and then noting the location of the average score on the distribution.



INNOCENT CASES Per Chart	
Threshold	+3
Mean	6.0017
S.D.	3.099

GUILTY CASES Per Chart	
Threshold	-5
Mean	-9.1484
S.D.	2.8433

TABLE 11 BLIND SCORE TABLE

Results of the blind scores compared to the original score. The scores were compared by simple linear correlation to determine a Pearson Correlation Coefficent.

Blind Scorers
1. Matte on Armitage Cases
2. Armitage on Matte Cases
3. LaCorte on Armitage and Matte Cases

Original Scores
A. Armitage
M. Matte

Scorer	Total	Mean	Standard Deviation	Correlation Coefficient
Grand Score with Zone 4				
A. (32)	-72	-2.25	19.8	
1.	-72	-2.25	19.6	.999
3.	-53	-1.66	19.6	.995
M. (90)	-775	-8.61	20.9	
2.	-748	-8.31	20.6	.999
3.	-711	-7.90	20.4	.997
Total Score without Zone 4				
A. (32)	-160	-5.00	14.9	
1.	-161	-5.03	14.7	.998
3.	-150	-4.69	14.6	.993
M. (90)	-761	-8.46	15.0	
2.	-734	-8.16	14.8	.999
3.	-707	-7.86	14.5	.995
Chart 1 without Zone 4				
A. (32)	-51	-1.59	6.6	
1.	-49	-1.53	6.5	.992
3.	-46	-1.44	6.1	.973
M. (90)	-192	-2.13	6.2	
2.	-182	-2.02	6.1	.997
3.	-178	-1.98	6.0	.990
Chart 2 without Zone 4				
A. (32)	-57	-1.78	6.7	
1.	-63	-1.97	6.6	.993
2.	-52	-1.62	6.4	.956
M. (90)	-312	-3.47	6.5	
2.	-302	-3.36	6.5	.999
3.	-285	-3.17	6.2	.989

Scorer	Total	Mean	S.D.	Correlation
Chart 3 without Zone 4				
A. (16)	-51	-3.19	5.4	
1.	-49	-3.06	5.3	.994
3.	-51	-3.19	5.1	.980
M. (39)	-200	-5.13	6.0	
2.	-198	-5.08	6.0	.996
3.	-190	-4.87	5.6	.980
Chart 4 without Zone 4				
A. (2)	-1	-.50	7.8	
1.	0	0.00	7.1	1.0
3.	0	0.00	7.1	1.0
M. (11)	-57	-5.18	6.6	
2.	-53	-4.82	6.3	.995
3.	-52	-4.73	6.1	.987
Chart 1 with Zone 4				
A. (32)	-13	-.41	8.8	
1.	-10	-.31	8.7	.995
3.	4	.13	8.5	.985
M. (90)	-152	-1.69	8.5	
2.	-144	-1.60	8.3	.998
3.	-139	-1.54	8.2	.993
Chart 2 with Zone 4				
A. (32)	-32	-1.00	8.6	
1.	-37	-1.16	8.5	.996
3.	-33	-1.03	8.5	.976
M. (90)	-285	-3.17	8.6	
2.	-274	-3.04	8.5	.999
3.	-254	-2.82	8.4	.993
Chart 3 with Zone 4				
A. (16)	-35	-2.19	7.7	
1.	-33	-2.06	7.6	.998
3.	-35	-2.19	7.4	.982
M. (39)	-270	-6.92	7.8	
2.	-265	-6.79	7.8	.998
3.	-254	-6.51	7.2	.984
Chart 4 with Zone 4				
A. (2)	8	4.00	9.9	
1.	8	4.00	9.9	1.0
3.	11	5.50	7.8	1.0
M. (11)	-68	-6.18	8.7	
2.	-67	-6.09	8.7	.994
3.	-64	-5.82	8.2	.990

TABLE 1 - COUNTERTREND SCORES
INNOCENT CASES

NUM	CASE	CONF	CONC	STIM TEST	COUNTER TREND	GS23
8	L8A3	NDI	INC	2A	-4 *	-15
97	M58B	NDI	INC	1A	-1 *	0
74	M40	NDI	INC	2A	-11	3
86	M52	NDI	INC	NO	- 1 *	5
9	A9A	NDI	INC	2A	-10	6
18	A15B	NDI	NDI	1A	-8	8
25	A21B	NDI	NDI	NO	-6	8
29	A24	NDI	NDI	2A	-8	8
35	M3	NDI	NDI	NO	-6	8
36	M4	NDI	NDI	NO	-5	8
39	M7	NDI	NDI	NO	-3	8
49	M15	NDI	NDI	NO	-8	8
50	M16	NDI	NDI	NO	-8	8
53	M19	NDI	NDI	NO	-7	8
55	M21	NDI	NDI	NO	-8	8
71	M37	NDI	NDI	NO	-10	8
84	M50	NDI	NDI	NO	-4	8
59	M25	NDI	NDI	NO	-8	9
82	M48	NDI	NDI	NO	-9	9
4	A4A1	NDI	NDI	AF1A	-2	11
12	A11A	NDI	NDI	2A	-3	11
63	M29	NDI	NDI	NO	-5	11
66	M32	NDI	NDI	NO	-3	11
83	M49	NDI	NDI	NO	-4	11
52	M18	NDI	NDI	NO	-4	12
79	M45	NDI	NDI	2A	-12	12
80	M46	NDI	NDI	2A	-2	12
2	A2A1	NDI	NDI	AF1A	-2	13
3	A3A2	NDI	NDI	AF1A	-1	13
22	A19	NDI	NDI	1A	-7	13
48	M14	NDI	NDI	2A	-17	13
81	M47	NDI	NDI	2A	-3	13
38	M6	NDI	NDI	NO	-3	14
64	M30	NDI	NDI	NO	-4	14
69	M35	NDI	NDI	NO	-1	14
70	M36	NDI	NDI	NO	-6	14
78	M44	NDI	NDI	NO	0	14
51	M17	NDI	NDI	NO	-3	15
76	M42	NDI	NDI	NO	-1	15
54	M20	NDI	NDI	NO	-5	16
85	M51	NDI	NDI	NO	-4	16
27	A23A	NDI	NDI	2A	-4	17
44	M12A	NDI	NDI	2A	-8	17
45	M12B	NDI	NDI	NO	-1	17
19	A16	NDI	NDI	1A	-1	18
23	A20	NDI	NDI	1A	-8	18
67	M33	NDI	NDI	NO	-3	18
17	A15A	NDI	NDI	2A	-1	19
26	A22	NDI	NDI	2A	-3	19

TABLE 1 - COUNTERTREND SCORES
INNOCENT CASES

NUM	CASE	CONF	CONC	STIM TEST	COUNTER TREND	GS23
58	M24	NDI	NDI	NO	-6	20
68	M34	NDI	NDI	NO	-2	21
6	L6A1	NDI	NDI	2A	-12	23
21	A18	NDI	NDI	1A	-4	23
24	A21A	NDI	NDI	2A	-10	24
37	M5	NDI	NDI	2A	-17	24
56	M22	NDI	NDI	2A	-3	25
65	M31	NDI	NDI	NO	-3	28
62	M28	NDI	NDI	NO	-1	30
*** Total ***					-295 *	762

(37%) magnitude of scores.

*Asterisk after a countertrend score indicates that a correction has been made subsequent to original publication due to error in data entry/transfer.

Above Table 1 is from Matte, J. A., Reuss, R. M. (1989) Validation Study on the Polygraph Quadri-Zone Comparison Technique. Research Abstract, LD 01452, Vol. 1502, 1989, University Microfilm International.

TABLE 12B - COUNTERTREND SCORES
GUILTY CASES

NUM	CASE	CONF	CONC	STIM TEST	COUNTER TREND	GS23
43	M11	DI	DI	2A	2	-45
87	M53	DI	DI	2A	4	-45
118	M70A	DI	DI	2A	6	-44
7	L7A2	DI	DI	2A	1	-38
57	M23	DI	DI	2A	0	-37
47	M13B	DI	DI	1A	0	-36
1	A1A	DI	DI	AF1A	1	-35
112	M67A	DI	DI	2A	2	-35
60	M26	DI	DI	2A	2	-34
114	M68A	DI	DI	2A	0	-34
75	M41	DI	DI	2A	0	-33
14	A12A	DI	DI	2A	2	-32
93	M56	DI	DI	2A	1	-32
15	A13A	DI	DI	2A	2	-31
92	M55B	DI	DI	NO	3	-31
107	M64A	DI	DI	2A	1	-31
72	M38	DI	DI	2A	5	-30
89	M54B	DI	DI	NO	0	-30
98	M59A	DI	DI	2A	2	-30
113	M67B	DI	DI	1A	5	-30
119	M70B	DI	DI	1A	0	-30
61	M27	DI	DI	1A	3	-29
34	M2	DI	DI	2A	7	-28
111	M66	DI	DI	2A	2	-28
91	M55A	DI	DI	2A	6	-27
95	M57B	DI	DI	NO	0	-27
40	M8	DI	DI	2A	0	-26
77	M43	DI	DI	2A	3	-26
121	M71B	DI	DI	1A	3	-26
46	M13A	DI	DI	2A	0	-25
110	M65B	DI	DI	1A	1	-25
41	M9	DI	DI	2A	1	-24
115	M68B	DI	DI	1A	2	-24
32	A26B	DI	DI	2A	2	-23
103	M62A	DI	DI	2A	0	-23
106	M63B	DI	DI	1A	0	-23
117	M69B	DI	DI	1A	2	-23
122	M71C	DI	DI	1A	0	-23
73	M39	DI	DI	1A	3	-22
88	M54A	DI	DI	2A	4	-22
99	M59B	DI	DI	1A	1	-22
100	M60	DI	DI	2A	6	-22
30	A25	DI	DI	2A	0	-21
104	M62B	DI	DI	1A	0	-21
105	M63A	DI	DI	2A	1	-21
120	M71A	DI	DI	2A	5	-21
31	A26A	DI	DI	2A	1	-20
33	M1	DI	DI	2A	5	-20
90	M54C	DI	DI	NO	1	-20

TABLE 12B - COUNTERTREND SCORES
GUILTY CASES

NUM	CASE	CONF	CONC	STIM TEST	COUNTER TREND	GS23
94	M57A	DI	DI	1A	3	-20
101	M61A	DI	DI	2A	5	-19
109	M65A	DI	DI	2A	2	-19
11	A10B	DI	DI	1B	3	-18
16	A14A	DI	DI	2A	4	-18
20	A17	DI	DI	1A	2	-18
108	M64B	DI	DI	1A	1	-18
5	A5A2	DI	DI	2A	7	-15
10	A10A	DI	DI	2A	10	-15
28	A23B	DI	DI	1A	8	-15
42	M10	DI	DI	2A	0	-15
96	M58A	DI	DI	1A	0	-13
102	M61B	DI	DI	1A	2	-13
13	A11B	DI	INC	2A	8	-10
116	M69A	DI	INC	2A	-7	2
*** Total ***				(-7 omitted)	149	-1609

(9%)magnitude of Scores

TABLE 13 M - 1

With 23-24

POLYGRAPH OUTCOME COMPARED TO GROUND TRUTH

TABLE M. Matte Scoring Guide

The Polygraph Decisions for Innocent and Guilty Subjects are compared for known confirmed cases.

Number of Cases
- Armitage 32 cases
- Matte 90 cases
- Total 122 cases

Confirmed Ground Truth
- Innocent 58 cases
- Guilty 64 cases
- Total 122 cases

Polygraph Outcome

Ground Truth	Truthful NDI	Deceptive DI	Inconclusives INC	TOTALS
Innocent NDI	A 16	A 0	A 2	A 18
	M 37	M 0	M 3	M 40
	--	--	--	--
	53	0	5	58
Guilty DI	A 0	A 13	A 1	A 14
	M 0	M 49	M 1	M 50
	--	--	--	--
	0	62	2	64
TOTALS	NDI	DI	INC	
	A 16	A 13	A 3	A 32
	M 37	M 49	M 4	M 90
	--	--	--	--
	53	62	7	122

TABLE 14 M - 2

Without 23-24

POLYGRAPH OUTCOME COMPARED TO GROUND TRUTH

TABLE M. Matte Scoring Guide

The Polygraph Decisions for Innocent and Guilty Subjects are compared for known confirmed cases.

Number of Cases
- Armitage 32 cases
- Matte 90 cases
- Total 122 cases

Confirmed Ground Truth
- Innocent 58 cases
- Guilty 64 cases
- Total 122 cases

Polygraph Outcome

Ground Truth	Truthful NDI	Deceptive DI	Inconclusives INC	TOTALS
Innocent NDI	A 8	A 1	A 9	A 18
	M 17	M 2	M 21	M 40
	--	--	--	--
	25	3	30	58
Guilty DI	A 0	A 9	A 5	A 14
	M 1	M 43	M 6	M 50
	--	--	--	--
	1	52	11	64
TOTALS	NDI	DI	INC	
	A 8	A 10	A 14	A 32
	M 18	M 45	M 27	M 90
	--	--	--	--
	26	55	41	122

TABLE 15 1M-1

With 23-24

POLYGRAPH OUTCOME COMPARED TO GROUND TRUTH

TABLE M. Matte Scoring Guide

Percent outcome for the Polygraph Decisions for Innocent and Guilty Subjects compared to known confirmed cases.

Number of Cases
- Armitage 32 cases
- Matte 90 cases
- Total 122 cases

Confirmed Ground Truth
- Innocent 58 cases
- Guilty 64 cases
- Total 122 cases

Polygraph Outcome

Ground Truth		Truthful NDI	Deceptive DI	Inconclusives INC	Totals
Innocent NDI	A	16 50%	0 0%	2 6%	18 56%
	M	37 41%	0 0%	3 3%	40 44%
	Total	43%	0%	4%	47%
Guilty DI	A	0 0%	13 41%	1 3%	14 44%
	M	0 0%	49 54%	1 1%	50 55%
	Total	0%	51%	2%	53%

TOTALS		NDI %	DI %	INC %	TOTAL CASES
Total	A	16 50%	13 41%	3 9%	32 A 26%
Total	M	37 41%	49 54%	4 4%	90 M 74%

TOTAL CASES		53 43%	62 51%	7 6%	122 100%

TABLE 16 1M-2

Without 23-24

POLYGRAPH OUTCOME COMPARED TO GROUND TRUTH

TABLE M. Matte Scoring Guide

Percent outcome for the Polygraph Decisions for Innocent and Guilty Subjects compared to known confirmed cases.

Number of Cases		Confirmed Ground Truth	
Armitage	32 cases	Innocent	58 cases
Matte	90 cases	Guilty	64 cases
Total	122 cases	Total	122 cases

Polygraph Outcome

Ground Truth		Truthful NDI	Deceptive DI	Inconclusives INC	Totals
Innocent NDI	A	8 25%	1 3%	9 28%	18 56%
	M	17 19%	2 2%	21 23%	40 44%
	Total	20%	2%	25%	47%
Guilty DI	A	0 0%	9 28%	5 16%	14 44%
	M	1 1%	43 48%	6 7%	50 56%
	Total	1%	43%	9%	53%

TOTALS		NDI	DI	INC	TOTAL CASES
Total	A	8 25%	10 31%	14 44%	32 A 26%
Total	M	18 20%	45 50%	27 30%	90 M 74%
TOTAL CASES		26 21%	55 45%	41 34%	122 100%

TABLE 17 2M-1 With 23-24

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.

<u>TABLE M. 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%
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 18 2M-2 Without 23-24

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.

<u>TABLE M. Matte Scoring Guide</u>

Ground Truth		Polygraph Outcome: Truthful NDI	Deceptive DI	Inconclusives INC	TOTALS
Innocent NDI	A	8 44%	1 6%	9 50%	18 100%
	M	17 43%	2 5%	21 52%	40 100%
	Total	25 43%	3 5%	30 52%	58 100%
Guilty DI	A	0 0%	9 64%	5 36%	14 100%
	M	1 2%	43 86%	6 12%	50 100%
	Total	1 2%	52 81%	11 17%	64 100%

Summary Totals

Accuracy of Decisions:

Total cases	122
Correct	77
% Correct	63%
Error	4
% Error	3%
Inconclusives	41
% Inconclusives	34%

TABLE 19 3M-1 With 23-24

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.

TABLE M. 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%

TABLE 20 3M-2 Without 23-24

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.

TABLE M. Matte Scoring Guide

Ground Truth		Polygraph Outcome: Truthful NDI	Deceptive DI	Inconclusives INC	TOTAL DECISIONS
Innocent NDI	A	8 89%	1 11%	9 50%	9 100%
	M	17 89%	2 11%	21 52%	19 100%
	Total	25 89%	3 11%	30 52%	28 100%
Guilty DI	A	0 0%	9 100%	5 36%	9 100%
	M	1 0%	43 100%	6 14%	44 98%
	Total	1 2%	52 98%	11 17%	53 100%

Summary Totals

Accuracy of Decisions:

Total cases	122
Total decisions	81
Correct Decisions	77
% Correct	95%
Error	4
% Error	5%
Inconclusives	41
% Inconclusives	34%

TABLE 21 B - 1

With 23-24

POLYGRAPH OUTCOME COMPARED TO GROUND TRUTH

TABLE B. Backster Scoring Guide

The Polygraph Decisions for Innocent and Guilty Subjects are compared for known confirmed cases.

Number of Cases
- Armitage 32 cases
- Matte 90 cases
- Total 122 cases

Confirmed Ground Truth
- Innocent 58 cases
- Guilty 64 cases
- Total 122 cases

Polygraph Outcome

Ground Truth		Truthful NDI	Deceptive DI	Inconclusives INC	TOTALS
Innocent NDI	A	16	0	2	18
	M	38	0	2	40
		54	0	4	58
Guilty DI	A	0	13	1	14
	M	0	49	1	50
		0	62	2	64
TOTALS		NDI	DI	INC	
	A	16	13	3	32
	M	38	49	3	90
		54	62	6	122

TABLE 22 B - 2

Without 23-24

POLYGRAPH OUTCOME COMPARED TO GROUND TRUTH

TABLE B. Backster Scoring Guide

The Polygraph Decisions for Innocent and Guilty Subjects are compared for known confirmed cases.

Number of Cases
- Armitage 32 cases
- Matte 90 cases
- Total 122 cases

Confirmed Ground Truth
- Innocent 58 cases
- Guilty 64 cases
- Total 122 cases

Polygraph Outcome

Ground Truth	Truthful NDI	Deceptive DI	Inconclusives INC	TOTALS
Innocent NDI	A 10	A 1	A 7	A 18
	M 25	M 2	M 13	M 40
	--	--	--	--
	35	3	20	58
Guilty DI	A 0	A 11	A 3	A 14
	M 1	M 47	M 2	M 50
	--	--	--	--
	1	58	5	64

TOTALS	NDI	DI	INC	
	A 10	A 12	A 10	A 32
	M 26	M 49	M 15	M 90
	--	--	--	--
	36	61	25	122

TABLE 23 1B-1

With 23-24

POLYGRAPH OUTCOME COMPARED TO GROUND TRUTH

TABLE B. Backster Scoring Guide

Percent outcome for the Polygraph Decisions for Innocent and Guilty Subjects compared to known confirmed cases.

Number of Cases		Confirmed Ground Truth	
Armitage	32 cases	Innocent	58 cases
Matte	90 cases	Guilty	64 cases
Total	122 cases	Total	122 cases

Polygraph Outcome

Ground Truth		Truthful NDI	Deceptive DI	Inconclusives INC	Totals
Innocent NDI	A	16 50%	0 0%	2 6%	18 56%
	M	38 42%	0 0%	2 2%	40 44%
	Total	44%	0%	3%	47%
Guilty DI	A	0 0%	13 41%	1 3%	14 44%
	M	0 0%	49 54%	1 1%	50 55%
	Total	0%	51%	2%	53%

TOTALS		NDI	DI	INC	TOTAL CASES
Total	A	16 50%	13 41%	3 9%	32 A 26%
	M	38 42%	49 54%	3 3%	90 M 74%
TOTAL CASES		54 44%	62 51%	6 5%	122 100%

TABLE 24 1B-2

Without 23-24

POLYGRAPH OUTCOME COMPARED TO GROUND TRUTH

TABLE B. Backster Scoring Guide

Percent outcome for the Polygraph Decisions for Innocent and Guilty Subjects compared to known confirmed cases.

Number of Cases
- Armitage 32 cases
- Matte 90 cases
- Total 122 cases

Confirmed Ground Truth
- Innocent 58 cases
- Guilty 64 cases
- Total 122 cases

Polygraph Outcome

Ground Truth		Truthful NDI	Deceptive DI	Inconclusives INC	Totals
Innocent NDI	A	10 31%	1 3%	7 22%	18 56%
	M	25 28%	2 2%	13 14%	40 44%
	Total	29%	2%	16%	47%
Guilty DI	A	0 0%	11 34%	3 9%	14 43%
	M	1 1%	47 52%	2 2%	50 55%
	Total	1%	48%	4%	53%

TOTALS		NDI	DI	INC	TOTAL CASES
Total	A	10 31%	12 37%	10 31%	32 A 26%
Total	M	26 29%	49 54%	15 16%	90 M 74%
TOTAL CASES		36 30%	61 50%	25 20%	122 100 %

TABLE 25 2B-1 With 23-24

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.

<u>TABLE B. Backster 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	38 95%	0 0%	2 5%	40 100%
	Total	54 93%	0 0%	4 7%	58 100%
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	116
% Correct	95%
Error	0
% Error	0%
Inconclusives	6
% Inconclusives	5%

TABLE 26 2B-2 Without 23-24

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.

<u>TABLE B. Backster Scoring Guide</u>

Ground Truth		Polygraph Outcome: Truthful NDI	Deceptive DI	Inconclusives INC	TOTALS
Innocent NDI	A	10 56%	1 5%	7 39%	18 100%
	M	25 63%	2 5%	13 32%	40 100%
	Total	35 60%	3 5%	20 34%	58 100%
Guilty DI	A	0 0%	11 79%	3 21%	14 100%
	M	1 2%	47 94%	2 4%	50 100%
	Total	1 2%	58 91%	5 8%	64 100%

Summary Totals

Accuracy of Decisions:	
Total cases	122
Correct	93
% Correct	76%
Error	4
% Error	3%
Inconclusives	25
% Inconclusives	20%

TABLE 27 3B-1 With 23-24

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.

TABLE B. Backster Scoring Guide

		Polygraph Outcome: Truthful NDI	Deceptive DI	Inconclusives INC	TOTAL DECISIONS
Ground Truth: Innocent NDI	A	16 100%	0 0%	2 11%	16 100%
	M	38 100%	0 0%	2 5%	38 100%
	Total	54 100%	0 0%	4 7%	54 100%
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	116
Correct Decisions	116
% Correct	100%
Error	0
% Error	0%
Inconclusives	6
% Inconclusives	5%

TABLE 28 3B-2 Without 23-24

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.

TABLE B. Backster Scoring Guide

Ground Truth		Polygraph Outcome: Truthful NDI	Deceptive DI	Inconclusives INC	TOTAL DECISIONS
Innocent NDI	A	10 91%	1 9%	7 39%	11 100%
	M	25 93%	2 7%	13 32%	27 100%
	Total	35 92%	3 8%	20 34%	38 100%
Guilty DI	A	0 0%	11 100%	3 21%	11 100%
	M	1 2%	47 98%	2 4%	48 100%
	Total	1 2%	58 98%	5 8%	59 100%

Summary Totals

Accuracy of Decisions:

Total cases	122
Total decisions	97
Correct Decisions	93
% Correct	96%
Error	4
% Error	4%
Inconclusives	25
% Inconclusives	20%

TABLE 29 F - 1

With 23-24

POLYGRAPH OUTCOME COMPARED TO GROUND TRUTH

TABLE F. Federal (Barland) Scoring Guide

The Polygraph Decisions for Innocent and Guilty Subjects are compared for known confirmed cases.

Number of Cases		Confirmed Ground Truth	
Armitage	32 cases	Innocent	58 cases
Matte	90 cases	Guilty	64 cases
Total	122 cases	Total	122 cases

Ground Truth		Polygraph Outcome: Truthful NDI	Deceptive DI	Inconclusives INC	TOTALS
Innocent NDI	A	17	1	0	18
	M	37	0	3	40
		54	1	3	58
Guilty DI	A	0	14	0	14
	M	0	49	1	50
		0	63	1	64
TOTALS		NDI	DI	INC	
	A	17	15	0	32
	M	37	49	4	90
		54	64	4	122

TABLE 30 F - 2

Without 23-24

POLYGRAPH OUTCOME COMPARED TO GROUND TRUTH

TABLE F. Federal (Barland) Scoring Guide

The Polygraph Decisions for Innocent and Guilty Subjects are compared for known confirmed cases.

Number of Cases
- Armitage 32 cases
- Matte 90 cases
- Total 122 cases

Confirmed Ground Truth
- Innocent 58 cases
- Guilty 64 cases
- Total 122 cases

Polygraph Outcome

Ground Truth		Truthful NDI	Deceptive DI	Inconclusives INC	TOTALS
Innocent NDI	A	12	1	5	18
	M	23	2	15	40
		35	3	20	58
Guilty DI	A	0	14	0	14
	M	1	49	0	50
		1	63	0	64
TOTALS		NDI	DI	INC	
	A	12	15	5	32
	M	24	51	15	90
		36	66	20	122

TABLE 31 1F-1

With 23-24

POLYGRAPH OUTCOME COMPARED TO GROUND TRUTH

TABLE F. Federal (Barland) Scoring Guide

Percent outcome for the Polygraph Decisions for Innocent and Guilty Subjects compared to known confirmed cases.

Number of Cases		Confirmed Ground Truth	
Armitage	32 cases	Innocent	58 cases
Matte	90 cases	Guilty	64 cases
Total	122 cases	Total	122 cases

Ground Truth		Polygraph Outcome: Truthful NDI	Deceptive DI	Inconclusives INC	Totals
Innocent NDI	A	17 53%	1 3%	0 0%	18 56%
	M	37 41%	0 0%	3 3%	40 44%
	Total	44%	1%	2%	47%
Guilty DI	A	0 0%	14 41%	0 3%	14 44%
	M	0 0%	49 54%	1 1%	50 55%
	Total	0%	52%	1%	53%

TOTALS		NDI	DI	INC	TOTAL CASES
Total	A	17 53%	15 17%	0 0%	32 A 26%
Total	M	37 41%	49 54%	4 4%	90 M 74%
TOTAL CASES		54 44%	64 52%	4 3%	122 100%

TABLE 32 1F-2

Without 23-24

POLYGRAPH OUTCOME COMPARED TO GROUND TRUTH

TABLE F. Federal (Barland) Scoring Guide

Percent outcome for the Polygraph Decisions for Innocent and Guilty Subjects compared to known confirmed cases.

Number of Cases		Confirmed Ground Truth	
Armitage	32 cases	Innocent	58 cases
Matte	90 cases	Guilty	64 cases
Total	122 cases	Total	122 cases

Ground Truth		Polygraph Outcome: Truthful NDI	Deceptive DI	Inconclusives INC	Totals
Innocent NDI	A	12 38%	1 3%	5 16%	18 57%
	M	23 26%	2 2%	15 17%	40 45%
	Total	29%	2%	16%	47%
Guilty DI	A	0 0%	14 44%	0 0%	14 44%
	M	1 1%	49 54%	0 0%	50 55%
	Total	1%	52%	0%	53%

TOTALS		NDI	DI	INC	TOTAL CASES
Total	A	12 38%	15 47%	5 16%	32 A 26%
Total	M	24 27%	51 56%	15 17%	90 M 74%
TOTAL CASES		36 30%	66 54%	20 16%	122 100%

TABLE 33 2F-1 With 23-24

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.

<u>TABLE F. Federal (Barland) Scoring Guide</u>

		Polygraph Outcome: Truthful NDI	Deceptive DI	Inconclusives INC	TOTALS
Ground Truth: Innocent NDI	A	17 94%	1 6%	0 0%	18 100%
	M	37 93%	0 0%	3 7%	40 100%
	Total	54 93%	1 2%	3 5%	58 100%
Guilty DI	A	0 0%	14 100%	0 0%	14 100%
	M	0 0%	49 98%	1 2%	50 100%
	Total	0 0%	63 98%	1 2%	64 100%

Summary Totals

Accuracy of Decisions:

Total cases	122
Correct	117
% Correct	96%
Error	1
% Error	1%
Inconclusives	4
% Inconclusives	3%

TABLE 34 2F-2 Without 23-24

ACCURACY OF POLYGRAPH OUTCOME COMPARED TO GROUND TRUTH

Percent outcome for the Polygraph Decisions separately for Innocent Cases and Guilty Cases including Inconclusives compared to known confirmed cases.

TABLE F. Federal (Barland) Scoring Guide

		Polygraph Outcome: Truthful NDI	Deceptive DI	Inconclusives INC	TOTALS
Ground Truth: Innocent NDI	A	12 67%	1 5%	5 28%	18 100%
	M	23 58%	2 5%	15 37%	40 100%
	Total	35 60%	3 5%	20 34%	58 100%
Guilty DI	A	0 0%	14 100%	0 0%	14 100%
	M	1 2%	49 98%	0 0%	50 100%
	Total	1 2%	63 98%	0 0%	64 100%

Summary Totals

Accuracy of Decisions:

Total cases	122
Correct	98
% Correct	80%
Error	4
% Error	3%
Inconclusives	20
% Inconclusives	16%

TABLE 35 3F-1 With 23-24

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.

TABLE F. Federal (Barland) Scoring Guide

		Polygraph Outcome: Truthful NDI	Deceptive DI	Inconclusives INC	TOTAL DECISIONS
Ground Truth: Innocent NDI	A	17 94%	1 6%	0 0%	18 100%
	M	37 100%	0 0%	3 7%	37 100%
	Total	54 98%	1 2%	3 5%	55 100%
Guilty DI	A	0 0%	14 100%	0 0%	14 100%
	M	0 0%	49 100%	1 2%	49 100%
	Total	0 0%	63 100%	1 2%	63 100%

Summary Totals

Accuracy of Decisions:

Total cases	122
Total decisions	117
Correct Decisions	116
% Correct	99%
Error	1
% Error	1%
Inconclusives	4
% Inconclusives	3%

TABLE 36 3F-2 Without 23-24

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.

TABLE F. Federal (Barland) Scoring Guide

		Polygraph Outcome: Truthful NDI	Deceptive DI	Inconclusives INC	TOTAL DECISIONS
Ground Truth: Innocent NDI	A	12 92%	1 8%	5 28%	13 100%
	M	23 92%	2 8%	15 37%	25 100%
	Total	35 92%	3 8%	20 34%	38 100%
Guilty DI	A	0 0%	14 100%	0 0%	14 100%
	M	1 2%	49 98%	0 0%	50 100%
	Total	1 2%	63 98%	0 0%	64 100%

Summary Totals

Accuracy of Decisions:

Total cases	122
Total decisions	102
Correct Decisions	98
% Correct	96%
Error	4
% Error	4%
Inconclusives	20
% Inconclusives	16%

TABLE 37 - GOF -1 GOODNESS OF FIT - CHI SQUARE TESTS

Uses the Goodness of Fit with the Chi-Square test to test for the presense of any significant differences in the distribution of decisions (observed) compared to ground truth (expected). Some differences were found to be significant at the $p < .05$. The Degrees of Freedom was (D.F. = 1) for all cases.

TABLE MM-1 BASED ON TABLE 13 M-1

	Innocent O / E	Guilty O / E	CHI-SQ	PROBABILITY
A	16 / 18	13 / 14	.29	.59
M	37 / 40	49 / 50	.24	.62
TOTAL	53 / 58	62 / 64	.49	.48

TABLE BB-1 BASED ON TABLE 21 B-1

	Innocent O / E	Guilty O / E	CHI-SQ	PROBABILITY
A	16 / 18	13 / 14	.29	.59
M	38 / 40	49 / 50	.12	.73
TOTAL	54 / 58	62 / 64	.34	.56

TABLE FF-1 BASED ON TABLE 29 F-1

	Innocent O / E	Guilty O / E	CHI-SQ	PROBABILITY
A	17 / 18	14 / 14	.06	.81
M	37 / 40	49 / 50	.24	.62
TOTAL	54 / 58	62 / 64	.34	.56

TABLE MM-2 BASED ON TABLE 14 M-2

	Innocent O / E	Guilty O / E	CHI-SQ	PROBABILITY
A	8 / 18	9 / 14	7.3	.0067
M	17 / 40	43 / 50	14.2	.00016
TOTAL	25 / 58	52 / 64	21.0	.0000043

TABLE BB-2 BASED ON TABLE 22 B-2

	Innocent O / E	Guilty O / E	CHI-SQ	PROBABILITY
A	10 / 18	11 / 14	4.2	.04
M	25 / 40	47 / 50	5.8	.016
TOTAL	35 / 58	58 / 64	9.7	.0018

TABLE FF-2 BASED ON TABLE 30 F-2

	Innocent O / E	Guilty O / E	CHI-SQ	PROBABILITY
A	12 / 18	14 / 14	2.	.16
M	23 / 40	49 / 50	7.3	.0071
TOTAL	35 / 58	63 / 64	9.1	.0025

TABLE 38 GOF-2 GOODNESS OF FIT - CHI SQUARE TESTS
To test whether there are any significant differences in the data for Overall Most Productive Tracing and Most Productive Pneumograph Tracing for Males and Females Based on data for Tables 48 A-F - MOST PRODUCTIVE PNEUMOGRAPH AND Tables 49 A-F MOST PRODUCTIVE OVERALL

TABLE 48A MMP-A MOST PRODUCTIVE PNEUMOGRAPH - OVERALL

1. ASSUMING THEY SHOULD BE THE SAME

DF=0	DF=1	M 36 F 19.9
Chi-Sq= 55.11	Chi-Sq (M&F)= 55.9	
P = .0000013	P= .0000011	

2. ASSUMING THERE SHOULD BE EQUAL RANDOM DISTRIBUTION

Table 48A TOTALS - MOST PRODUCTIVE PNEUMO

	UPPER	LOWER	SAME
DF=2	11.8	11.8	.024
Chi-Sq= 23.63			
P = .0000073			

Table 48A MALES - MOST PRODUCTIVE PNEUMO

DF=2	21.	34.7	1.19
Chi-Sq= 56.9			
P = .0000015			

Table 48A FEMALES - MOST PRODUCTIVE PNEUMO

DF=2	0	.84	1.3
Chi-Sq= 2.16			
P = .339			

TABLE 48B MMP-B MOST PRODUCTIVE PNEUMOGRAPH - INNOCENT

1. ASSUMING THEY SHOULD BE THE SAME

DF=0	DF=0	DF=0
Chi-Sq= 28.98	Chi-Sq(M)= 12.5	Chi-Sq(F)= 16.9
P = .00000023	P = .0000000238	P = .0000

2. ASSUMING THERE SHOULD BE EQUAL RANDOM DISTRIBUTION

Table 48B TOTALS - MOST PRODUCTIVE PNEUMO OVERALL - Innocent

	UPPER	LOWER	SAME
DF=2	.47	1.89	.21
Chi-Sq= 2.58			
P = .275			

Table 48B MALES - MOST PRODUCTIVE PNEUMO - Innocent

DF=2	6.	13.5	1.5
Chi-Sq= 21.			
P = .000027			

Table 48B FEMALES - MOST PRODUCTIVE PNEUMO - Innocent

DF=2	.69	.69	7.6
Chi-Sq= 1.46			
P = .48			

TABLE 39 11MBF

SUMMARY COMPARISON OF THE THREE DIFFERENT POLYGRAPH SYSTEMS FOR SCORE AND ACCURACY OF DECISIONS
Based on Tables 40 and 41

Total Cases 122

Polygraph Outcome for INNOCENT CASES

	Correct Score	%Correct Decisions	Accuracy %Correct
Matte	53	91%	100%
Backster	35	60%	92%
Federal	35	60%	92%

Polygraph Outcome for GUILTY CASES

	Correct Score	%Correct Decisions	Accuracy %Correct
Matte	62	97%	100%
Backster	58	91%	98%
Federal	63	98%	98%

Polygraph Outcome - INCONCLUSIVE

	Inconclusive Scores		%Inconclusive Scores			
	Innocent	%	Guilty	%	Total	%
Matte	5	9%	2	3%	7	6%
Backster	20	34%	5	8%	25	20%
Federal	20	34%	0	0%	20	16%

Polygraph Outcome - TOTALS

	Correct Score	%Correct Decisions	Accuracy %Correct
Matte	115	94%	100%
Backster	93	76%	96%
Federal	98	80%	96%

	Error Score	%Decision Error	%Accuracy Error
Matte	0	0%	0%
Backster	4	3%	4%
Federal	4	3%	4%

TABLE 40 12MBF
COMPARISON OF THE ABILITY OF EACH POLYGRAPH SYSTEM IN REACHING ACCURATE DECISIONS

Percent outcome for the Polygraph Decisions separately for Innocent Cases and Guilty Cases **including** Inconclusives compared to known confirmed cases.

TABLE M. Matte Scoring Guide - TABLE 17 2M-1 With 23-24

Ground Truth	Truthful NDI	Deceptive DI	Inconclusives INC	TOTALS 122 Cases
	Polygraph Outcome			
Innocent NDI	53	0	5	58
% Innocent	91%	0%	9%	
Guilty DI	0	62	2	64
% Guilty	0%	97%	3%	

Accuracy of the Matte Polygraph system in reaching decisions:

Correct	115	% Correct	94%
Error	0	% Error	0%
Inconclusives	7	% Inconclusives	6%

TABLE B. Backster Scoring Guide - TABLE 26 2B-2 Without 23-24

Ground Truth	Truthful NDI	Deceptive DI	Inconclusives INC	TOTALS 122 Cases
	Polygraph Outcome			
Innocent NDI	35	3	20	58
% Innocent	60%	5%	34%	
Guilty DI	1	58	5	64
% Guilty	2%	91%	8%	

Accuracy of the Backster System in reaching decisions:

Correct	93	% Correct	76%
Error	4	% Error	3%
Inconclusives	25	% Inconclusives	20%

TABLE F. Federal Scoring Guide - TABLE 34 2F-2 Without 23-24

Ground Truth	Truthful NDI	Deceptive DI	Inconclusives INC	TOTALS 122 Cases
	Polygraph Outcome			
Innocent NDI	35	3	20	58
% Innocent	60%	5%	34%	
Guilty DI	1	63	0	64
% Guilty	2%	98%	0%	

Accuracy of the Federal System in reaching decisions:

Correct	98	% Correct	80%
Error	4	% Error	3%
Inconclusives	20	% Inconclusives	16%

TABLE 41 13MBF
COMPARISON OF THE ACCURACY OF THE DECISIONS REACHED FOR EACH POLYGRAPH SYSTEM

Percent outcome for the Polygraph Decisions separately for Innocent Cases and Guilty Cases **excluding** Inconclusives compared to known confirmed cases.

TABLE M. Matte Scoring Guide - TABLE 19 3M-1 With 23-24

Ground Truth	Polygraph Outcome: Truthful NDI	Deceptive DI	Inconclusives INC	TOTAL DECISIONS
Innocent NDI	53	0	5	53
% Innocent	100%	0%	9%	
Guilty DI	0	62	2	62
% Guilty	0%	100%	3%	

Accuracy of Matte System Decisions:			122 Cases
Correct	115	% Correct	100%
Error	0	% Error	0%
Inconclusives	7	% Inconclusives	6%

TABLE B. Backster Scoring Guide - TABLE 28 3B-2 Without 23-24

Ground Truth	Polygraph Outcome: Truthful NDI	Deceptive DI	Inconclusives INC	TOTAL DECISIONS
Innocent NDI	35	3	20	38
% Innocent	92%	8%	34%	
Guilty DI	1	58	5	59
% Guilty	2%	98%	8%	

Accuracy of Backster System Decisions:			122 Cases
Correct	93	% Correct	96%
Error	4	% Error	4%
Inconclusives	25	% Inconclusives	20%

TABLE F. Federal Scoring Guide - TABLE 36 3F-2 Without 23-24

Ground Truth	Polygraph Outcome: Truthful NDI	Deceptive DI	Inconclusives INC	TOTAL DECISIONS
Innocent NDI	35	3	20	38
% Innocent	92%	8%	34%	
Guilty DI	1	63	0	64
% Guilty	2%	98%	0%	

Accuracy of Federal System Decisions:			122 Cases
Correct	98	% Correct	96%
Error	4	% Error	4%
Inconclusives	20	% Inconclusives	16%

TABLE 42 X SUMMARY TABLE COMPARING SIMILARITY OF SCORING METHODS TO ARRIVE AT DECISIONS

TABLE 42a- Comparing Scores Adjusted Using the Zone 4 (23-24)

GROUND TRUTH	POLYGRAPH OUTCOME X		
	Truthful	Deceptive	Inconclusives
Innocent Matte- 15 (1M1)	43%	0%	4%
Guilty	0%	51%	2%
Innocent Backster- 23 (1B1)	44%	0%	3%
Guilty	0%	51%	2%
Innocent Federal- 31 (1F1)	44%	1%	2%
Guilty	0%	52%	1%

TABLE 42b- Comparing Scores Without Adjustment Using the Zone 4 (23-24)

GROUND TRUTH	POLYGRAPH OUTCOME X		
	Truthful	Deceptive	Inconclusives
Innocent Matte- 16 (1M2)	20%	2%	25%
Guilty	1%	43%	9%
Innocent Backster- 24 (1B2)	29%	2%	16%
Guilty	1%	48%	4%
Innocent Federal- 32 (1F2)	29%	2%	16%
Guilty	1%	52%	0%

TABLE 43 XX SUMMARY TABLE COMPARING ACCURACY OF SCORING METHODS IN ARRIVING AT DECISIONS

Percent data **including** the Inconclusives.

TABLE 43a- Comparing Scores Adjusted Using the Zone 4 (23-24)

GROUND TRUTH	POLYGRAPH DECISION %		
	Truthful	Deceptive	Inconclusives
Innocent Matte- 17 (2M1)	91%	0%	9%
Guilty	0%	97%	3%
Innocent Backster-25 (2B1)	93%	0%	7%
Guilty	0%	97%	3%
Innocent Federal- 33 (2F1)	93%	2%	5%
Guilty	0%	98%	2%

TABLE 43b-Comparing Scores Without Adjustment Using the Zone 4 (23-24)

GROUND TRUTH	POLYGRAPH DECISION %		
	Truthful	Deceptive	Inconclusives
Innocent Matte- 18 (2M2)	43%	5%	52%
Guilty	2%	81%	17%
Innocent Backster-26 (2B2)	60%	5%	34%
Guilty	2%	91%	8%
Innocent Federal- 34 (2F2)	60%	5%	34%
Guilty	2%	98%	0%

TABLE 44 XXX SUMMARY TABLE COMPARING ACCURACY OF SCORING METHODS IN ARRIVING AT DECISIONS

Percent data **excluding** the Inconclusives.

TABLE 44a-Comparing Scores Adjusted Using the Zone 4 (23-24)

GROUND TRUTH	POLYGRAPH DECISION %		
	Truthful	Deceptive	Inconclusives
Innocent Matte- 19 (3M1)	100%	0%	9%
Guilty	0%	100%	3%
Innocent Backster-27 (3B1)	100%	0%	7%
Guilty	0%	100%	3%
Innocent Federal- 35 (3F1)	98%	2%	5%
Guilty	0%	100%	2%

TABLE 44b-Comparing Scores Without Adjustment Using the Zone 4 (23-24)

GROUND TRUTH	POLYGRAPH DECISION %		
	Truthful	Deceptive	Inconclusives
Innocent Matte- 20 (3M2)	89%	11%	52%
Guilty	2%	98%	17%
Innocent Backster-28 (3B2)	92%	8%	34%
Guilty	2%	98%	8%
Innocent Federal- 36 (3F2)	92%	8%	34%
Guilty	2%	98%	0%

TABLE 45 Y SUMMARY TABLE COMPARING SCORING METHODS FOR VALUE OF THE ZONE 4 TO ARRIVE AT DECISIONS

GROUND TRUTH	POLYGRAPH OUTCOME %		
	Truthful	Deceptive	Inconclusives
TABLE 45a- Comparing Matte Scoring Guide with (WI) Zone 4 and without (WO) Zone 4 (23-24).			
Innocent Matte-15 (1M1-WI)	43%	0%	4%
Guilty	0%	51%	2%
Innocent Matte-16 (1M2-WO)	20%	2%	25%
Guilty	1%	43%	9%
TABLE 45b- Comparing Backster Scoring Guide with (WI) Zone 4 and without (WO) Zone 4 (23-24).			
Innocent Backster-23 (1B1-WI)	44%	0%	3%
Guilty	0%	51%	2%
Innocent Backster-24 (1B2-WO)	29%	2%	16%
Guilty	1%	48%	4%
TABLE 46c- Comparing Federal Scoring Guide with (WI) Zone 4 and without (WO) Zone 4 (23-24).			
Innocent Federal-31 (1F1-WI)	44%	1%	2%
Guilty	0%	52%	1%
Innocent Federal-32 (1F2-WO)	29%	2%	16%
Guilty	1%	52%	0%

TABLE 46 YY SUMMARY TABLE COMPARING AACCURACY OF SCORING METHODS FOR VALUE OF THE ZONE 4 IN ARRIVING AT DECISIONS

Percent data **including** the Inconclusives

GROUND TRUTH	POLYGRAPH DECISION %		
	Truthful	Deceptive	Inconclusives
TABLE 46a- Comparing Matte Scoring Guide with (WI) Zone 4 and without (WO) Zone 4 (23-24).			
Innocent Matte-17 (2M1)	91%	0%	9%
Guilty	0%	97%	3%
Innocent Matte-18 (2M2)	43%	5%	52%
Guilty	2%	81%	17%
TABLE 46b- Comparing Backster Scoring Guide with (WI) Zone 4 and without (WO) Zone 4 (23-24).			
Innocent Backster-25 (2B1)	93%	0%	7%
Guilty	0%	97%	3%
Innocent Backster-26 (2B2)	60%	5%	34%
Guilty	2%	91%	8%
TABLE 46c- Comparing Federal Scoring Guide with (WI) Zone 4 and without (WO) Zone 4 (23-24).			
Innocent Federal-33 (2F1)	93%	2%	5%
Guilty	0%	98%	2%
Innocent Federal-34 (2F2)	60%	5%	34%
Guilty	2%	98%	0%

TABLE 47 YYY SUMMARY TABLE COMPARING ACCURACY OF SCORING METHODS FOR VALUE OF THE ZONE 4 IN ARRIVING AT DECISIONS

Percent data **excluding** the Inconclusives

GROUND TRUTH	POLYGRAPH DECISION %		
	Truthful	Deceptive	Inconclusives
TABLE 47a- Comparing Matte Scoring Guide with (WI) Zone 4 and without (WO) Zone 4 (23-24).			
Innocent	100%	0%	9%
Matte-19 (3M1) Guilty	0%	100%	3%
Innocent	89%	11%	52%
Matte-20 (3M2) Guilty	2%	98%	17%
TABLE 47b- Comparing Backster Scoring Guide with (WI) Zone 4 and without (WO) Zone 4 (23-24).			
Innocent	100%	0%	7%
Backster-27 (3B1) Guilty	0%	100%	3%
Innocent	92%	8%	34%
Backster-28 (3B2) Guilty	2%	98%	8%
TABLE 47c- Comparing Federal Scoring Guide with (WI) Zone 4 and without (WO) Zone 4 (23-24).			
Innocent	98%	2%	5%
Federal-35 (3F1) Guilty	0%	100%	2%
Innocent	92%	8%	34%
Federal-36 (3F2) Guilty	2%	98%	0%

TABLE 48E MMP-E MOST PRODUCTIVE PNEUMOGRAPH - MALE CASES

1. ASSUMING THEY SHOULD BE THE SAME

DF=0	DF=0	DF=0
Chi-Sq= 36.0	Chi-Sq(I)= 12.5	Chi-Sq(G)= 23.7
P = -.000000715	P = .00000023	P = .00000035

2. ASSUMING THERE SHOULD BE EQUAL RANDOM DISTRIBUTION

Table 48E TOTALS - MOST PRODUCTIVE PNEUMO OVERALL - Males

	UPPER	LOWER	SAME
DF=2	21.0	6.9	3.0
Chi-Sq= 30.9			
P = .00000024			

Table 48E - MOST PRODUCTIVE PNEUMO - Innocent

DF=2	6.	13.5	1.5
Chi-Sq= 21.0			
P = .000027			

Table 48E - MOST PRODUCTIVE PNEUMO - Guilty

DF=2	15.0	21.6	27.0
Chi-Sq= 36.9			
P = .00000041			

TABLE 48F MMP-F MOST PRODUCTIVE PNEUMOGRAPH - FEMALE CASES

1. ASSUMING THEY SHOULD BE THE SAME

DF=0	DF=0	DF=0
Chi-Sq= 19.9	Chi-Sq(I)= 16.9	Chi-Sq(G)= 3.56
P = - .0000	P = .0000	P = .0000

2. ASSUMING THERE SHOULD BE EQUAL RANDOM DISTRIBUTION

Table 48F TOTALS - MOST PRODUCTIVE PNEUMO OVERALL - Females

	UPPER	LOWER	SAME
DF=2	.0	.84	1.3
Chi-Sq= 2.16			
P = .339			

Table 48F - MOST PRODUCTIVE PNEUMO - Innocent

DF=2	.69	.69	.077
Chi-Sq= 1.46			
P = .48			

Table 48F - MOST PRODUCTIVE PNEUMO - Guilty

DF=2	1.5	.17	2.67
Chi-Sq= 4.33			
P = .115			

TABLE 48C MMP-C MOST PRODUCTIVE PNEUMOGRAPH - GUILTY

1. ASSUMING THEY SHOULD BE THE SAME

DF=0	DF=0	DF=0
Chi-Sq= 26.3	Chi-Sq(M)= 23.6	Chi-Sq(F)= 3.56
P = .00000012	P = .00000035	P = .0000

2. ASSUMING THERE SHOULD BE EQUAL RANDOM DISTRIBUTION

Table 48C TOTALS - MOST PRODUCTIVE PNEUMO OVERALL - Guilty

	UPPER	LOWER	SAME
DF=2	2.3	.76	5.76
Chi-Sq= 8.86			
P = .0119			

Table 48C MALES - MOST PRODUCTIVE PNEUMO - Guilty

DF=2	2.4	.27	4.27
Chi-Sq= 6.93			
P = .031			

Table 48C FEMALES - MOST PRODUCTIVE PNEUMO - Guilty

DF=2	.17	.67	1.5
Chi-Sq= 2.33			
P = .311			

TABLE 48D MMP-D MOST PRODUCTIVE PNEUMOGRAPH - OVERALL

1. ASSUMING THEY SHOULD BE THE SAME

DF=0
Chi-Sq= 55.11
P = .0000013

2. ASSUMING THERE SHOULD BE EQUAL RANDOM DISTRIBUTION

Table 48D TOTALS - MOST PRODUCTIVE PNEUMO OVERALL -

	UPPER	LOWER	SAME
DF=2	11.8	11.8	.024
Chi-Sq= 23.63			
P = .0000073			

Table 48D MOST PRODUCTIVE PNEUMO - Innocent

DF=2	.47	1.89	.21
Chi-Sq= 2.58			
P = .275			

Table 48D MOST PRODUCTIVE PNEUMO - Guilty

DF=2	2.3	.76	5.76
Chi-Sq= 8.86			
P = .0119			

TABLE 49E MPO-E MOST PRODUCTIVE TRACE - MALE CASES

1. ASSUMING THEY SHOULD BE THE SAME - EQUAL OVERALL

DF=0	DF=0	DF=0
Chi-Sq= 62	Chi-Sq(I)= 18	Chi-Sq(G)= 44
P = .00000018	P = .00000024	P = .00000012

2. ASSUMING THERE SHOULD BE EQUAL RANDOM DISTRIBUTION-OVERALL

Table 49E TOTALS - MOST PRODUCTIVE TRACE

	CARDIO	PNEUMO	GSR
DF=2	.76	3.04	6.85
Chi-Sq= 10.7			
P = .0048			

Table 49E INNOCENT - MOST PRODUCTIVE TRACE

DF=2	.67	6.0	2.67
Chi-Sq= 9.33			
P = .0094			

Table 49E GUILTY - MOST PRODUCTIVE TRACE

DF=2	2.4	.27	4.2
Chi-Sq= 6.93			
P = .031			

TABLE 49F MPO-F MOST PRODUCTIVE TRACE - FEMALE CASES

1. ASSUMING THEY SHOULD BE THE SAME - EQUAL OVERALL

DF=0	DF=0	DF=0
Chi-Sq= 56	Chi-Sq(I)= 38	Chi-Sq(G)= 18
P = -.0000011	P = .00000071	P = .00000024

2. ASSUMING THERE SHOULD BE EQUAL RANDOM DISTRIBUTION-OVERALL

Table 49F TOTALS - MOST PRODUCTIVE TRACE

	CARDIO	PNEUMO	GSR
DF=2	1.3	.84	5.26
Chi-Sq= 2.21			
P = .331			

Table 49F INNOCENT - MOST PRODUCTIVE TRACE

DF=2	2.77	.30	1.23
Chi-Sq= 4.31			
P = .116			

Table 49F GUILTY - MOST PRODUCTIVE TRACE

DF=2	.17	.67	1.5
Chi-Sq= 2.33			
P = .311			

TABLE 49C MPO-C MOST PRODUCTIVE TRACE - GUILTY CASES

1. ASSUMING THEY SHOULD BE THE SAME - EQUAL OVERALL

DF=0	DF=0	DF=0
Chi-Sq= 62	Chi-Sq(M)= 44	Chi-Sq(F)= 18
P = .00000017	P = -.00000011	P = -.00000024

2. ASSUMING THERE SHOULD BE EQUAL RANDOM DISTRIBUTION-OVERALL

Table 49C TOTALS - MOST PRODUCTIVE TRACE

	CARDIO	PNEUMO	GSR
DF=2	2.3	.76	5.76
Chi-Sq= 8.86			
P = .0119			

Table 49C MALES - MOST PRODUCTIVE TRACE

DF=2	2.4	.27	4.27
Chi-Sq= 6.93			
P = .031			

Table 49C FEMALES - MOST PRODUCTIVE TRACE

DF=2	.17	.67	1.5
Chi-Sq= 2.33			
P = .311			

TABLE 49D MPO-D MOST PRODUCTIVE TRACE - OVERALL - 2

1. ASSUMING THEY SHOULD BE THE SAME - EQUAL OVERALL

DF=0
Chi-Sq= 118
P = .0000014

2. ASSUMING THERE SHOULD BE EQUAL RANDOM DISTRIBUTION-OVERALL

Table 49D TOTALS - MOST PRODUCTIVE TRACE

	CARDIO	PNEUMO	GSR
DF=2	.097	2.95	3.51
Chi-Sq= 6.56			
P = .0376			

Table 49D INNOCENT - MOST PRODUCTIVE TRACE

DF=2	3.36	3.36	0.0
Chi-Sq= 6.74			
P = .034			

Table 49D GUILTY - MOST PRODUCTIVE TRACE

DF=2	2.3	.76	5.76
Chi-Sq= 8.86			
P = .0119			

TABLE 49A MPO-A MOST PRODUCTIVE TRACE - OVERALL

1. ASSUMING THEY SHOULD BE THE SAME - EQUAL OVERALL

DF=0	DF=1	M 62 F 56
Chi-Sq= 118.	Chi-Sq= 118	
P = .0000014	P = .0000009	

2. ASSUMING THERE SHOULD BE EQUAL RANDOM DISTRIBUTION-OVERALL

Table 49A TOTALS - MOST PRODUCTIVE TRACE

	CARDIO	PNEUMO	GSR
DF=2	.097	2.95	3.51
Chi-Sq= 6.56			
P = .0376			

Table 49A MALES - MOST PRODUCTIVE TRACE

DF=2	.76	3.04	6.85
Chi-Sq= 10.67			
P = .0048			

Table 49A FEMALES - MOST PRODUCTIVE TRACE

DF=2	1.3	.84	.053
Chi-Sq= 2.21			
P = .33			

TABLE 49B MPO-B MOST PRODUCTIVE TRACE - INNOCENT CASES

1. ASSUMING THEY SHOULD BE THE SAME - EQUAL OVERALL

DF=0	DF=0	DF=0
Chi-Sq= 56	Chi-Sq(M)= 18	Chi-Sq(F)= 38
P = -.0000011	P = -.00000024	P = -.00000072

2. ASSUMING THERE SHOULD BE EQUAL RANDOM DISTRIBUTION-OVERALL

Table 49B TOTALS - MOST PRODUCTIVE TRACE

	CARDIO	PNEUMO	GSR
DF=2	3.36	3.36	0.0
Chi-Sq= 6.74			
P = .034			

Table 49B MALES - MOST PRODUCTIVE TRACE

DF=2	.67	6.0	2.67
Chi-Sq= 9.33			
P = .0094			

Table 49B FEMALES - MOST PRODUCTIVE TRACE

DF=2	2.76	.31	1.2
Chi-Sq= 4.31			
P = .116			

TABLE 50A - ZONE 4 SCORE ADJUSTMENTS -INNOCENT CASES
TOTAL SCORE WITHOUT ZONE 4 - TSWO
TOTAL SCORE WITH ZONE 4 - GS23
ZONE 4 ADJUSTMENT TO SCORES -ZONE 4

NUM	CASE	CONF	CONC	TSWO	GS23	ZONE 4
8	L8A3	NDI	INC	-29	-15	14
97	M58B	NDI	INC	-11	0	11
74	M40	NDI	INC	-2	3	5
86	M52	NDI	INC	-10	5	15
9	A9A	NDI	INC	-2	6	8
18	A15B	NDI	NDI	0	8	8
25	A21B	NDI	NDI	4	8	4
29	A24	NDI	NDI	2	8	6
35	M3	NDI	NDI	0	8	8
36	M4	NDI	NDI	3	8	5
39	M7	NDI	NDI	5	8	3
49	M15	NDI	NDI	2	8	6
50	M16	NDI	NDI	-2	8	10
53	M19	NDI	NDI	5	8	3
55	M21	NDI	NDI	0	8	8
71	M37	NDI	NDI	-2	8	10
84	M50	NDI	NDI	3	8	5
59	M25	NDI	NDI	4	9	5
82	M48	NDI	NDI	-2	9	11
4	A4A1	NDI	NDI	11	11	0
12	A11A	NDI	NDI	11	11	0
63	M29	NDI	NDI	7	11	4
66	M32	NDI	NDI	10	11	1
83	M49	NDI	NDI	5	11	6
52	M18	NDI	NDI	7	12	5
79	M45	NDI	NDI	1	12	11
80	M46	NDI	NDI	10	12	2
2	A2A1	NDI	NDI	7	13	6
3	A3A2	NDI	NDI	12	13	1
22	A19	NDI	NDI	1	13	12
48	M14	NDI	NDI	0	13	13
81	M47	NDI	NDI	11	13	2
38	M6	NDI	NDI	9	14	5
64	M30	NDI	NDI	10	14	4
69	M35	NDI	NDI	11	14	3
70	M36	NDI	NDI	6	14	8
78	M44	NDI	NDI	11	14	3
51	M17	NDI	NDI	8	15	7
76	M42	NDI	NDI	9	15	6
54	M20	NDI	NDI	6	16	10
85	M51	NDI	NDI	8	16	8
27	A23A	NDI	NDI	12	17	5
44	M12A	NDI	NDI	10	17	7
45	M12B	NDI	NDI	9	17	8
19	A16	NDI	NDI	11	18	7
23	A20	NDI	NDI	6	18	12
67	M33	NDI	NDI	11	18	7
17	A15A	NDI	NDI	15	19	4

TABLE 50A - ZONE 4 SCORE ADJUSTMENTS -INNOCENT CASES
TOTAL SCORE WITHOUT ZONE 4 - TSWO
TOTAL SCORE WITH ZONE 4 - GS23
ZONE 4 ADJUSTMENT TO SCORES -ZONE 4

NUM	CASE	CONF	CONC	TSWO	GS23	ZONE 4
26	A22	NDI	NDI	11	19	8
58	M24	NDI	NDI	9	20	11
68	M34	NDI	NDI	18	21	3
6	L6A1	NDI	NDI	8	23	15
21	A18	NDI	NDI	13	23	10
24	A21A	NDI	NDI	6	24	18
37	M5	NDI	NDI	6	24	18
56	M22	NDI	NDI	18	25	7
65	M31	NDI	NDI	16	28	12
62	M28	NDI	NDI	23	30	7
TOTAL	58			341	762	421
MEAN				5.9	13.1	7.26

TABLE 50B - ZONE 4 SCORE ADJUSTMENTS -GUILTY CASES
TOTAL SCORE WITHOUT ZONE 4 - TSWO
TOTAL SCORE WITH ZONE 4 - GS23
ZONE 4 ADJUSTMENT TO SCORES -ZONE 4

NUM	CASE	CONF	CONC	TSWO	GS23	ZONE 4
43	M11	DI	DI	-32	-45	-13
87	M53	DI	DI	-41	-45	-4
118	M70A	DI	DI	-34	-44	-10
7	L7A2	DI	DI	-34	-38	-4
57	M23	DI	DI	-32	-37	-5
47	M13B	DI	DI	-32	-36	-4
1	A1A	DI	DI	-30	-35	-5
112	M67A	DI	DI	-28	-35	-7
60	M26	DI	DI	-28	-34	-6
114	M68A	DI	DI	-30	-34	-4
75	M41	DI	DI	-24	-33	-9
14	A12A	DI	DI	-25	-32	-7
93	M56	DI	DI	-23	-32	-9
15	A13A	DI	DI	-18	-31	-13
92	M55B	DI	DI	-21	-31	-10
107	M64A	DI	DI	-23	-31	-8
72	M38	DI	DI	-19	-30	-11
89	M54B	DI	DI	-23	-30	-7
98	M59A	DI	DI	-22	-30	-8
113	M67B	DI	DI	-17	-30	-13
119	M70B	DI	DI	-25	-30	-5
61	M27	DI	DI	-20	-29	-9
34	M2	DI	DI	-25	-28	-3
111	M66	DI	DI	-23	-28	-5
91	M55A	DI	DI	-15	-27	-12
95	M57B	DI	DI	-22	-27	-5
40	M8	DI	DI	-23	-26	-3
77	M43	DI	DI	-19	-26	-7
121	M71B	DI	DI	-19	-26	-7
46	M13A	DI	DI	-20	-25	-5
110	M65B	DI	DI	-22	-25	-3
41	M9	DI	DI	-18	-24	-6
115	M68B	DI	DI	-19	-24	-5
32	A26B	DI	DI	-21	-23	-2
103	M62A	DI	DI	-18	-23	-5
106	M63B	DI	DI	-16	-23	-7
117	M69B	DI	DI	-16	-23	-7
122	M71C	DI	DI	-18	-23	-5
73	M39	DI	DI	-16	-22	-6
88	M54A	DI	DI	-17	-22	-5
99	M59B	DI	DI	-20	-22	-2
100	M60	DI	DI	-19	-22	-3
30	A25	DI	DI	-16	-21	-5
104	M62B	DI	DI	-14	-21	-7
105	M63A	DI	DI	-18	-21	-3
120	M71A	DI	DI	-17	-21	-4
31	A26A	DI	DI	-18	-20	-2
33	M1	DI	DI	-15	-20	-5

TABLE 50B - ZONE 4 SCORE ADJUSTMENTS -GUILTY CASES
TOTAL SCORE WITHOUT ZONE 4 - TSWO
TOTAL SCORE WITH ZONE 4 - GS23
ZONE 4 ADJUSTMENT TO SCORES -ZONE 4

NUM	CASE	CONF	CONC	TSWO	GS23	ZONE 4
90	M54C	DI	DI	-17	-20	-3
94	M57A	DI	DI	-16	-20	-4
101	M61A	DI	DI	-13	-19	-6
109	M65A	DI	DI	-12	-19	-7
11	A10B	DI	DI	-20	-18	2
16	A14A	DI	DI	-13	-18	-5
20	A17	DI	DI	-15	-18	-3
108	M64B	DI	DI	-12	-18	-6
5	A5A2	DI	DI	-12	-15	-3
10	A10A	DI	DI	-14	-15	-1
28	A23B	DI	DI	-12	-15	-3
42	M10	DI	DI	-15	-15	0
96	M58A	DI	DI	-18	-13	5
102	M61B	DI	DI	-9	-13	-4
13	A11B	DI	INC	-11	-10	1
116	M69A	DI	INC	12	2	-10
TOTAL	64			-1262	-1609	-347
MEAN				-20	-25	-5.42

TABLE 51 MEAN SCORES FOR ATTORNEY, POLICE, COMMERCIAL CASES
Comparison of Mean Scores for the Guilty in
Defense Attorney Cases, Police Cases and Commercial Cases.

Table 51C - Commercial (Matte) Cases

CASE NUMBER		TOTAL SCORE	NUMBER CHARTS	MEAN SCORE
33	M1	-20	4	-5.0
34	M2	-28	4	-7.0
40	M8	-26	2	-13.0
41	M9	-24	2	-12.0
42	M10	-15	2	-7.5
43	M11	-45	3	-15.0
46	M13A	-25	3	-8.3
47	M13B	-36	3	-12.0
57	M23	-37	3	-12.3
60	M26	-34	4	-8.5
61	M27	-32	3	-10.7
72	M38	-30	4	-7.5
73	M39	-22	2	-11.0
75	M41	-33	3	-11.0
77	M43	-26	3	-8.7

NUMBER OF CASES	15
TOTAL OF MEAN SCORES	-149.5
MEAN CHART SCORE	-9.96

TABLE 52 STIMULATION TEST - INFLUENCE ON THE CHARTS

A. INNOCENT CASES

1. GIVEN BEFORE CHART 1 N = 6

	Changes 1 to 2	Chart 1	Countertrend
Sum =	-1	7	-27
Mean =	-.17	1.17	-4.5
S.D. =	6.55	5.46	3.83
Correlation = to Countertrend	-.434	.1	

2. GIVEN BEFORE CHART 2 N = 20

	Changes 1 to 2	Countertrend
Sum =	-53	-125
Mean =	-2.65	-6.25
S.D. =	6.08	5.69
Correlation = to Countertrend	.441	

B. GUILTY CASES

1. GIVEN BEFORE CHART 1 N = 20

	Changes 1 to 2	Chart 1	Countertrend
Sum =	-37	-126	17
Mean =	-1.85	-6.3	.85
S.D. =	3.76	2.49	2.70
Correlation = to Countertrend	-.003	-.179	

2. GIVEN BEFORE CHART 2 N = 40

	Changes 1 to 2	Countertrend
Sum =	-33	103
Mean =	-.82	2.58
S.D. =	5.73	3.01
Correlation = to Countertrend	.108	

TABLE 52-A STIMULATION TEST INFLUENCE ON THE SUBSEQUENT CHART - INNOCENT CASES

NUM	CASE	COUNT TREND	STIM TEST	CHART 1	CHART 2	TOTAL SCORE WITHOUT ZONE 4
2	A2A1	-2	2A	2	1	7
3	A3A2	-1	2A	8	4	12
4	A4A1	-2	2A	7	4	11
6	L6A1	-12	2A	6	-2	8
8	L8A3	4	2A	-9	-9	-29
9	A9A	-10	2A	1	-5	-2
12	A11A	-3	2A	5	6	11
17	A15A	-1	2A	6	9	15
18	A15B	-8	1A	-5	5	0
19	A16	-1	1A	7	4	11
21	A18	-4	1A	4	5	13
22	A19	-7	1A	-3	1	1
23	A20	-8	1A	7	-1	6
24	A21A	-10	2A	-3	5	6
25	A21B	-6	NO	4	0	4
26	A22	-3	2A	9	2	11
27	A23A	-4	2A	4	8	12
29	A24	-8	2A	0	2	2
35	M3	-6	NO	0	0	0
36	M4	-5	NO	2	1	3
37	M5	-17	2A	7	-13	6
38	M6	-3	NO	6	3	9
39	M7	-3	NO	3	2	5
44	M12A	-8	2A	-3	3	10
45	M12B	-1	NO	4	5	9
48	M14	-17	2A	0	-3	0
49	M15	-8	NO	3	-1	2
50	M16	-8	NO	-3	1	-2
51	M17	-3	NO	2	6	8
52	M18	-4	NO	5	2	7
53	M19	-7	NO	-1	6	5
54	M20	-5	NO	0	6	6
55	M21	-8	NO	0	0	0
56	M22	-3	2A	8	0	18
58	M24	-6	NO	5	4	9
59	M25	-8	NO	8	-4	4
62	M28	-1	NO	15	8	23
63	M29	-5	NO	6	1	7
64	M30	-4	NO	0	10	10
65	M31	-3	NO	11	5	16
66	M32	-3	NO	10	0	10
67	M33	-3	NO	4	7	11
68	M34	-2	NO	4	14	18
69	M35	-1	NO	4	7	11
70	M36	-6	NO	3	3	6
71	M37	-10	NO	-7	5	-2
74	M40	-11	2A	-4	0	-2
76	M42	-1	NO	2	7	9
78	M44	0	NO	6	5	11

TABLE 52-A STIMULATION TEST INFLUENCE ON THE SUBSEQUENT CHART - INNOCENT CASES

NUM	CASE	COUNT TREND	STIM TEST	CHART 1	CHART 2	TOTAL SCORE WITHOUT ZONE 4
79	M45	-12	2A	-1	-7	1
80	M46	-2	2A	6	4	10
81	M47	-3	2A	4	7	11
82	M48	-9	NO	-2	0	-2
83	M49	-4	NO	5	0	5
84	M50	-4	NO	6	-3	3
85	M51	-4	NO	5	3	8
86	M52	1	NO	-5	-5	-10
97	M58B	1	1A	-3	-8	-11
*** Total ***		-292		165	120	341

TABLE 52-B STIMULATION TEST INFLUENCE ON THE SUBSEQUENT CHART - GUILTY CASES

NUM	CASE	COUNT TREND	STIM TEST	CHART 1	CHART 2	TOTAL SCORE WITHOUT ZONE 4
1	A1A	1	2A	-10	-9	-30
5	A5A2	7	2A	-8	5	-12
7	L7A2	1	2A	-15	-10	-34
10	A10A	10	2A	-4	-2	-14
11	A10B	3	1A	-5	-15	-20
13	A11B	8	2A	-6	3	-11
14	A12A	2	2A	-4	-13	-25
15	A13A	2	2A	-12	-6	-18
16	A14A	4	2A	-6	-6	-13
20	A17	2	1A	-6	-9	-15
28	A23B	-8	1A	-4	-6	-12
30	A25	0	2A	-6	-10	-16
31	A26A	1	2A	-6	-6	-18
32	A26B	2	2A	-9	-12	-21
33	M1	5	2A	3	-4	-15
34	M2	7	2A	-12	-9	-25
40	M8	0	2A	-12	-11	-23
41	M9	1	2A	-9	-9	-18
42	M10	0	2A	-5	-10	-15
43	M11	2	2A	-6	-12	-32
46	M13A	0	2A	-6	-8	-20
47	M13B	0	1A	-8	-10	-32
57	M23	0	2A	-9	-11	-32
60	M26	2	2A	-7	-9	-28
61	M27	-3	1A	-2	-5	-20
72	M38	5	2A	-4	-1	-19
73	M39	3	1A	-8	-8	-16
75	M41	0	2A	-10	-6	-24
77	M43	3	2A	-2	-9	-19
87	M53	4	2A	-2	-15	-41
88	M54A	4	2A	1	-10	-17
89	M54B	0	NO	-8	-7	-23
90	M54C	1	NO	-7	-10	-17
91	M55A	6	2A	-4	-6	-15
92	M55B	3	NO	-6	-3	-21
93	M56	1	2A	-10	-7	-23
94	M57A	3	1A	-9	-4	-16
95	M57B	0	NO	-12	-10	-22
96	M58A	0	1A	-7	-11	-18
98	M59A	2	2A	-8	-2	-22
99	M59B	1	1A	-9	-11	-20
100	M60	6	2A	-3	-8	-19
101	M61A	5	2A	2	-10	-13
102	M61B	2	1A	-3	-6	-9
103	M62A	0	2A	-8	-10	-18
104	M62B	0	1A	-5	-9	-14
105	M63A	1	2A	-9	-9	-18
106	M63B	0	1A	-6	-10	-16
107	M64A	1	2A	-8	-10	-23

TABLE 52-B STIMULATION TEST INFLUENCE ON THE SUBSEQUENT CHART - GUILTY CASES

NUM	CASE	COUNT TREND	STIM TEST	CHART 1	CHART 2	TOTAL SCORE WITHOUT ZONE 4
108	M64B	1	1A	-4	-8	-12
109	M65A	2	2A	-4	-5	-12
110	M65B	1	1A	-9	-7	-22
111	M66	2	2A	-9	-7	-23
112	M67A	2	2A	-5	-11	-28
113	M67B	5	1A	-4	-5	-17
114	M68A	0	2A	-11	-7	-30
115	M68B	2	1A	-4	-7	-19
116	M69A	-7	2A	8	5	12
117	M69B	2	1A	-8	-5	-16
118	M70A	6	2A	-13	-9	-34
119	M70B	0	1A	-7	-8	-25
120	M71A	5	2A	-1	-10	-17
121	M71B	3	1A	-6	-13	-19
122	M71C	0	1A	-12	-6	-18
*** Total ***		124		-408	-489	-1262

TABLE 53-A1 DATABASE FOR THE PREDICTIVE TABLE 10A-1
INNOCENT CASES WITHOUT ZONE FOUR

NUM	CASE	CONF	TSWO	AVE SCORE
8	L8A3	NDI	-29	-7.3
97	M58B	NDI	-11	-5.5
86	M52	NDI	-10	-5.0
9	A9A	NDI	-2	-1.5
50	M16	NDI	-2	-1.0
71	M37	NDI	-2	-1.0
82	M48	NDI	-2	-1.0
74	M40	NDI	-2	-0.7
18	A15B	NDI	0	0.0
35	M3	NDI	0	0.0
48	M14	NDI	0	0.0
55	M21	NDI	0	0.0
22	A19	NDI	1	0.3
79	M45	NDI	1	0.3
29	A24	NDI	2	1.0
49	M15	NDI	2	1.0
36	M4	NDI	3	1.5
37	M5	NDI	6	1.5
84	M50	NDI	3	1.5
6	L6A1	NDI	8	2.0
24	A21A	NDI	6	2.0
25	A21B	NDI	4	2.0
59	M25	NDI	4	2.0
2	A2A1	NDI	7	2.3
39	M7	NDI	5	2.5
53	M19	NDI	5	2.5
83	M49	NDI	5	2.5
23	A20	NDI	6	3.0
54	M20	NDI	6	3.0
70	M36	NDI	6	3.0
44	M12A	NDI	10	3.3
52	M18	NDI	7	3.5
63	M29	NDI	7	3.5
51	M17	NDI	8	4.0
85	M51	NDI	8	4.0
21	A18	NDI	13	4.3
38	M6	NDI	9	4.5
45	M12B	NDI	9	4.5
58	M24	NDI	9	4.5
76	M42	NDI	9	4.5
64	M30	NDI	10	5.0
66	M32	NDI	10	5.0
80	M46	NDI	10	5.0
4	A4A1	NDI	11	5.5
12	A11A	NDI	11	5.5
19	A16	NDI	11	5.5
26	A22	NDI	11	5.5
67	M33	NDI	11	5.5
69	M35	NDI	11	5.5

TABLE 53-A1 DATABASE FOR THE PREDICTIVE TABLE 10A-1
INNOCENT CASES WITHOUT ZONE FOUR

NUM	CASE	CONF	TSWO	AVE SCORE
78	M44	NDI	11	5.5
81	M47	NDI	11	5.5
3	A3A2	NDI	12	6.0
27	A23A	NDI	12	6.0
56	M22	NDI	18	6.0
17	A15A	NDI	15	7.5
65	M31	NDI	16	8.0
68	M34	NDI	18	9.0
62	M28	NDI	23	11.5
TOTAL	58		341	164.5
MEAN			6	2.8362
STANDARD DEVIATION				3.37
MINIMUM			-29	-7.3
MAXIMUM			23	11.5

TABLE 53-A2 DATABASE FOR THE PREDICTIVE TABLE 10A-2
INNOCENT CASES WITH ZONE FOUR

NUM	CASE	CONF	CONC	GS23	AVE SCORE
8	L8A3	NDI	INC	-15	-3.7
97	M58B	NDI	INC	0	0.0
86	M52	NDI	INC	5	0.5
74	M40	NDI	INC	3	1.0
9	A9A	NDI	INC	6	2.0
18	A15B	NDI	NDI	8	4.0
25	A21B	NDI	NDI	8	4.0
29	A24	NDI	NDI	8	4.0
35	M3	NDI	NDI	8	4.0
36	M4	NDI	NDI	8	4.0
39	M7	NDI	NDI	8	4.0
49	M15	NDI	NDI	8	4.0
50	M16	NDI	NDI	8	4.0
53	M19	NDI	NDI	8	4.0
55	M21	NDI	NDI	8	4.0
71	M37	NDI	NDI	8	4.0
79	M45	NDI	NDI	12	4.0
84	M50	NDI	NDI	8	4.0
2	A2A1	NDI	NDI	13	4.3
22	A19	NDI	NDI	13	4.3
48	M14	NDI	NDI	13	4.3
59	M25	NDI	NDI	9	4.5
82	M48	NDI	NDI	9	4.5
4	A4A1	NDI	NDI	11	5.5
12	A11A	NDI	NDI	11	5.5
63	M29	NDI	NDI	11	5.5
66	M32	NDI	NDI	11	5.5
83	M49	NDI	NDI	11	5.5
6	L6A1	NDI	NDI	23	5.7
44	M12A	NDI	NDI	17	5.7
52	M18	NDI	NDI	12	6.0
80	M46	NDI	NDI	12	6.0
3	A3A2	NDI	NDI	13	6.5
81	M47	NDI	NDI	13	6.5
38	M6	NDI	NDI	14	7.0
64	M30	NDI	NDI	14	7.0
69	M35	NDI	NDI	14	7.0
70	M36	NDI	NDI	14	7.0
78	M44	NDI	NDI	14	7.0
51	M17	NDI	NDI	15	7.5
76	M42	NDI	NDI	15	7.5
21	A18	NDI	NDI	23	7.7
24	A21A	NDI	NDI	24	8.0
37	M5	NDI	NDI	24	8.0
54	M20	NDI	NDI	16	8.0
85	M51	NDI	NDI	16	8.0
56	M22	NDI	NDI	25	8.3
27	A23A	NDI	NDI	17	8.5
45	M12B	NDI	NDI	17	8.5

TABLE 53-A2 DATABASE FOR THE PREDICTIVE TABLE 10A-2
INNOCENT CASES WITH ZONE FOUR

NUM	CASE	CONF	CONC	GS23	AVE SCORE
19	A16	NDI	NDI	18	9.0
23	A20	NDI	NDI	18	9.0
67	M33	NDI	NDI	18	9.0
17	A15A	NDI	NDI	19	9.5
26	A22	NDI	NDI	19	9.5
58	M24	NDI	NDI	20	10.0
68	M34	NDI	NDI	21	10.5
65	M31	NDI	NDI	28	14.0
62	M28	NDI	NDI	30	15.0
TOTAL	58			762	348.1
MEAN				13	6.0017
STANDARD DEVIATION					3.099
MINIMUM					-3.7
MAXIMUM					15.0

TABLE 53B-1 DATABASE FOR THE PREDICTIVE TABLE 10B-1
GUILTY CASES WITHOUT ZONE FOUR

NUM	CASE	CONF	TSWO	AVE SCORE
40	M8	DI	-23	-11.5
7	L7A2	DI	-34	-11.3
95	M57B	DI	-22	-11.0
43	M11	DI	-32	-10.7
47	M13B	DI	-32	-10.7
57	M23	DI	-32	-10.7
32	A26B	DI	-21	-10.5
87	M53	DI	-41	-10.3
1	A1A	DI	-30	-10.0
11	A10B	DI	-20	-10.0
99	M59B	DI	-20	-10.0
114	M68A	DI	-30	-10.0
121	M71B	DI	-19	-9.5
112	M67A	DI	-28	-9.3
15	A13A	DI	-18	-9.0
31	A26A	DI	-18	-9.0
41	M9	DI	-18	-9.0
96	M58A	DI	-18	-9.0
103	M62A	DI	-18	-9.0
105	M63A	DI	-18	-9.0
122	M71C	DI	-18	-9.0
90	M54C	DI	-17	-8.5
118	M70A	DI	-34	-8.5
14	A12A	DI	-25	-8.3
119	M70B	DI	-25	-8.3
30	A25	DI	-16	-8.0
73	M39	DI	-16	-8.0
75	M41	DI	-24	-8.0
106	M63B	DI	-16	-8.0
89	M54B	DI	-23	-7.7
93	M56	DI	-23	-7.7
107	M64A	DI	-23	-7.7
111	M66	DI	-23	-7.7
20	A17	DI	-15	-7.5
42	M10	DI	-15	-7.5
98	M59A	DI	-22	-7.3
110	M65B	DI	-22	-7.3
60	M26	DI	-28	-7.0
104	M62B	DI	-14	-7.0
46	M13A	DI	-20	-6.7
61	M27	DI	-20	-6.7
34	M2	DI	-25	-6.3
77	M43	DI	-19	-6.3
100	M60	DI	-19	-6.3
115	M68B	DI	-19	-6.3
108	M64B	DI	-12	-6.0
88	M54A	DI	-17	-5.7
113	M67B	DI	-17	-5.7
120	M71A	DI	-17	-5.7

TABLE 53B-1 DATABASE FOR THE PREDICTIVE TABLE 10B-1
GUILTY CASES WITHOUT ZONE FOUR

NUM	CASE	CONF	TSWO	AVE SCORE
92	M55B	DI	-21	-5.3
94	M57A	DI	-16	-5.3
117	M69B	DI	-16	-5.3
72	M38	DI	-19	-4.8
10	A10A	DI	-14	-4.7
102	M61B	DI	-9	-4.5
16	A14A	DI	-13	-4.3
101	M61A	DI	-13	-4.3
5	A5A2	DI	-12	-4.0
28	A23B	DI	-12	-4.0
109	M65A	DI	-12	-4.0
33	M1	DI	-15	-3.8
91	M55A	DI	-15	-3.8
13	A11B	DI	-11	-3.7
116	M69A	DI	12	4.0
TOTAL	64		-1262	-468
MEAN			-20	-7.3125
STANDARD DEVIATION				2.6125
MINIMUM				-11.5
MAXIMUM				4.0

TABLE 53-B2 DATABASE FOR THE PREDICTIVE TABLE 10B-2
GUILTY CASES WITH ZONE FOUR

NUM	CASE	CONF	CONC	GS23	AVE SCORE
15	A13A	DI	DI	-31	-15.5
43	M11	DI	DI	-45	-15.0
95	M57B	DI	DI	-27	-13.5
40	M8	DI	DI	-26	-13.0
121	M71B	DI	DI	-26	-13.0
57	M23	DI	DI	-37	-12.3
41	M9	DI	DI	-24	-12.0
47	M13B	DI	DI	-36	-12.0
1	A1A	DI	DI	-35	-11.7
112	M67A	DI	DI	-35	-11.7
32	A26B	DI	DI	-23	-11.5
103	M62A	DI	DI	-23	-11.5
106	M63B	DI	DI	-23	-11.5
122	M71C	DI	DI	-23	-11.5
87	M53	DI	DI	-45	-11.3
114	M68A	DI	DI	-34	-11.3
73	M39	DI	DI	-22	-11.0
75	M41	DI	DI	-33	-11.0
99	M59B	DI	DI	-22	-11.0
118	M70A	DI	DI	-44	-11.0
14	A12A	DI	DI	-32	-10.7
93	M56	DI	DI	-32	-10.6
30	A25	DI	DI	-21	-10.5
104	M62B	DI	DI	-21	-10.5
105	M63A	DI	DI	-21	-10.5
107	M64A	DI	DI	-31	-10.3
89	M54B	DI	DI	-30	-10.0
90	M54C	DI	DI	-20	-10.0
98	M59A	DI	DI	-30	-10.0
113	M67B	DI	DI	-30	-10.0
119	M70B	DI	DI	-30	-10.0
61	M27	DI	DI	-29	-9.6
111	M66	DI	DI	-28	-9.3
11	A10B	DI	DI	-18	-9.0
20	A17	DI	DI	-18	-9.0
108	M64B	DI	DI	-18	-9.0
7	L7A2	DI	DI	-38	-8.9
77	M43	DI	DI	-26	-8.7
60	M26	DI	DI	-34	-8.5
46	M13A	DI	DI	-25	-8.3
110	M65B	DI	DI	-25	-8.3
115	M68B	DI	DI	-24	-8.0
92	M55B	DI	DI	-31	-7.8
117	M69B	DI	DI	-23	-7.7
42	M10	DI	DI	-15	-7.5
72	M38	DI	DI	-30	-7.5
88	M54A	DI	DI	-22	-7.3
100	M60	DI	DI	-22	-7.3
34	M2	DI	DI	-28	-7.0

TABLE 53-B2 DATABASE FOR THE PREDICTIVE TABLE 10B-2
GUILTY CASES WITH ZONE FOUR

NUM	CASE	CONF	CONC	GS23	AVE SCORE
120	M71A	DI	DI	-21	-7.0
91	M55A	DI	DI	-27	-6.8
31	A26A	DI	DI	-20	-6.7
94	M57A	DI	DI	-20	-6.7
96	M58A	DI	DI	-13	-6.5
102	M61B	DI	DI	-13	-6.5
101	M61A	DI	DI	-19	-6.3
109	M65A	DI	DI	-19	-6.3
16	A14A	DI	DI	-18	-6.0
5	A5A2	DI	DI	-15	-5.0
10	A10A	DI	DI	-15	-5.0
28	A23B	DI	DI	-15	-5.0
33	M1	DI	DI	-20	-5.0
13	A11B	DI	INC	-10	-3.3
116	M69A	DI	INC	2	0.7
TOTAL	64			-1609	-585.5
MEAN				-25	-9.1484
STANDARD DEVIATION					2.8433
MINIMUM					-15.5
MAXIMUM					0.7

TABLE 54 - QUADRI-ZONE VALIDATION DATA

TOTAL: 122 CONFIRMED CASES: 97 SUBJECTS

ARMITAGE 32 CONFIRMED CASES 26 SUBJECTS
MATTE 90 CONFIRMED CASES 71 SUBJECTS

AVOIDED: 38 INCONCLUSIVES
AVOIDED: 3 FALSE POSITIVES
AVOIDED: 5 NEAR FALSE POSITIVES
AVOIDED: 3 FALSE POSITIVE TREND
AVOIDED: 1 FALSE NEGATIVE

ADDITIONAL DATA:
7 STIM TESTS CAUSED A COUNTER TREND WHEN ADMINISTERED AFTER FIRST CHART (5 ARMITAGE , 2 MATTE)
1 SAT (SILENT ANSWER TEST)- MATTE
ONLY ONE ADMINISTERED IN STUDY, PROVED EFFECTIVE

	GROUND TRUTH (CONFIRMED)		POLYGRAPH DECISIONS		
	INNOCENT	GUILTY	TRUTHFUL	DECEPTIVE	INCONCLUSIVE
	NDI	DI	NDI	DI	INC
ARMITAGE	18	14	16	13	3
MATTE	40	50	37	49	4
TOTALS	58	64	53	62	7

A. MATTE:

Period covered by Matte: January 1986 through April 1987
Number of Quadri-Zone Tests conducted during that period: 145
Number of Inconclusive decisions: 7
4 from confirmed cases- 2 avoided false positives
1 avoided false negative
3 from unconfirmed cases
Number of Confirmed Tests: 90
Number of Unconfirmed Tests: 55
Number of avoided confirmed False Positives: M-52, M-58B 2
Number of avoided confirmed Near False Positives: M-16,37,40,48 4
Number of avoided False Positive Trend: M-5,14,45 3
Number of avoided confirmed False Negative: M- 69A 1
Number of avoided Inclusives (confirmed cases): 26
Number of Stim Tests causing Counter Trend when administered after the first chart: M-5, M-14 2
SAT stim test: Only one used in the study, M-27; proved effective 1

B. ARMITAGE

Period covered by Armitage: January 1985 through Dec. 1987
Number of Quadri-Zone tests
conducted during that period: 113
Number of Inconclusive decisions: 5
3 confirmed- 1 avoided false positive,
1 avoided near False Pos.
2 from unconfirmed cases
Number of Confirmed Tests: 32
Number of Unconfirmed Tests: 79
Number of avoided confirmed False Positives:L8A3 1
Number of avoided confirmed Near False Positives:
A9A 1
Number of avoided confirmed False Positive Trend: 0
Number of avoided confirmed False Negatives: 0
Number of avoided Inconclusives(confirmed cases): 12
Number of Stim Tests causing Counter Trend
when administered after the first chart:
L6A-1, A9A, A11B, A20, A21 5
No SAT used in Armitage Group.

23-24 Reaction Guide - note the values:
Trend- avoid confirmed false positive trend; reviewed just the countertrend questions; result it reversed the trend

Stim-Test: the Question- Which effect happened due to the STIM:
rectified an erroneous countertrend
increased true trend
caused erroneous countertrend

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

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

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

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

Canadian system requires 3 charts +6, or -6 to confirm:

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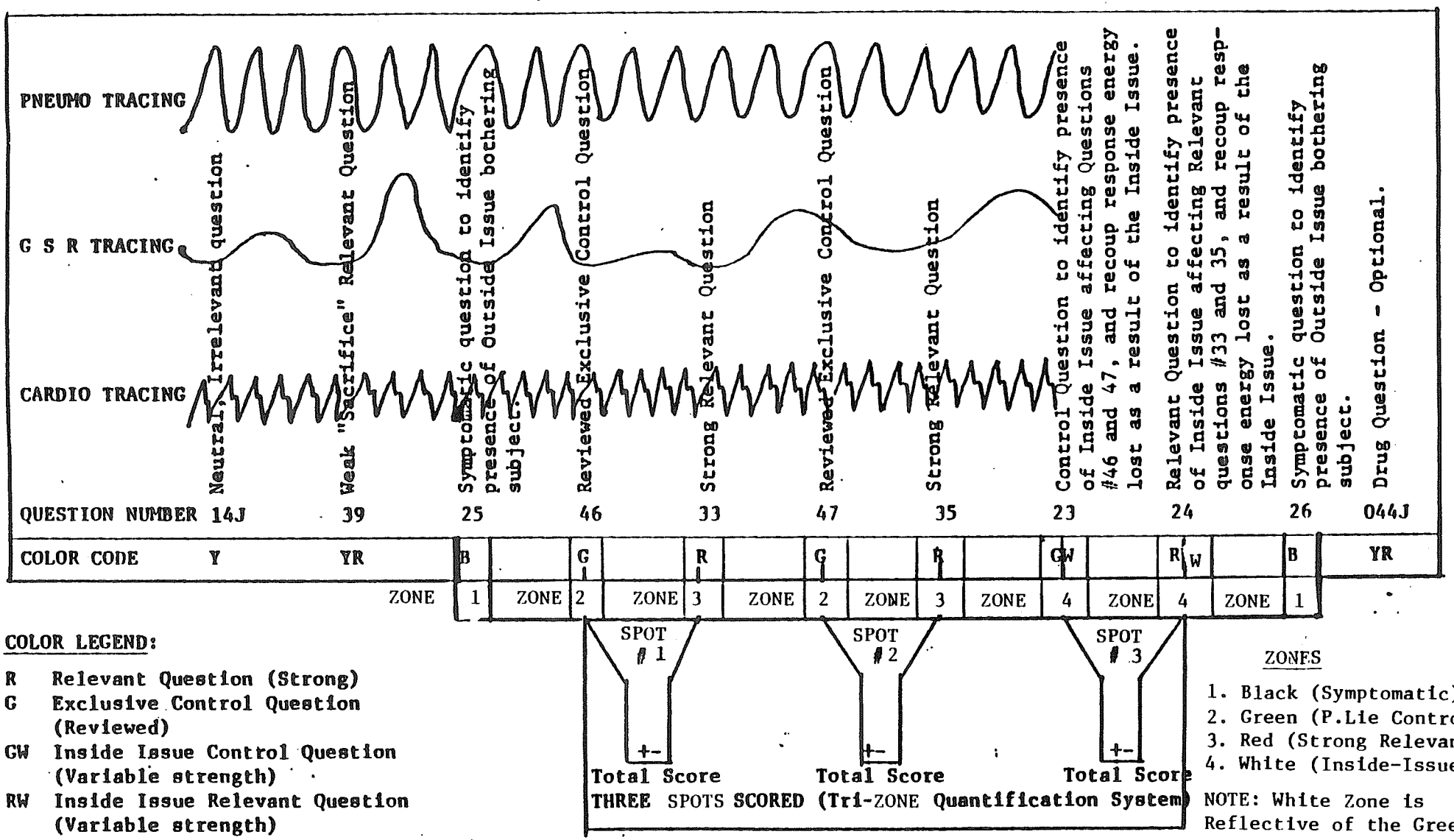
APPENDIX A

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

APPENDIX B

QUADRI-ZONE SCORE SHEET AND CONCLUSION TABLE

STIMULATION TEST DATA: NUMBER SELECTED: CHART NUMBER:

MCQV-1	TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP	
PNE (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (
GSR (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (
CAR (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (
MCQV-2	TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP	
PNE (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (
GSR (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (
CAR (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (

TOTAL: ( ) TOTAL: ( ) TOTAL: (

GRAND TOTAL: ( )

RESULTS FOR 1 CHART - MCQV TEST

RESULTS FOR 2 CHARTS - MCQV TEST

CONCLUSION TABLE

CIRCLE APPROPRIATE NUMBER BELOW		
+12 to +4	+3 to -4	-5 to -12
TRUTH	INDEFINITE	DECEPTION
CIRCLE APPROPRIATE NUMBER BELOW		
+24 to +8	+7 to -9	-10 to -24

TRI-ZONE QUANTIFICATION SYSTEM SCORE TABLE

SPEC-1	TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP	
PNE (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (
GSR (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (
CAR (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (
SPEC-2	TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP	
PNE (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (
GSR (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (
CAR (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (
SPEC-3	TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP	
PNE (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (
GSR (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (
CAR (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (
SPEC-4	TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP			TRUTH	INDEF	DECEP	
PNE (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (
GSR (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (
CAR (33)	+3 +2	+1 0 -1	-2 -3	= ( )	(35)	+3 +2	+1 0 -1	-2 -3	= ( )	(24)	+3 +2	+1 0 -1	-2 -3	= (

TARGET ( ) TOTAL: ( ) TOTAL: ( ) TOTAL: ( )

GRAND TOTAL: ( )

FOR ( ) CHARTS.

CONCLUSION TABLE

RESULTS FOR 1 CHART -

CIRCLE APPROPRIATE NUMBER BELOW		
+27 to +4	+3 to -4	-5 to -27
TRUTH	INDEFINITE	DECEPTION

RESULTS FOR 2 CHARTS -

CIRCLE APPROPRIATE NUMBER BELOW		
+54 to +8	+7 to -9	-10 to -54
TRUTH	INDEFINITE	DECEPTION

RESULTS FOR 3 CHARTS -

CIRCLE APPROPRIATE NUMBER BELOW		
+81 to +12	+11 to -14	-15 to -81
TRUTH	INDEFINITE	DECEPTION

RESULTS FOR 4 CHARTS -

CIRCLE APPROPRIATE NUMBER BELOW		
+108to +16	+15 to -19	-20 to -108
TRUTH	INDEFINITE	DECEPTION

APPENDIX C

MATTE INSTITUTE OF POLYGRAPH SCIENCE

EXAMINATION RELIABILITY RATING TABLE

Target Information "Adequacy" Rating

Inadequate	1	2	3	4	5	Adequate
Score	=7	=14	=21	=28	=35	:

Target "Intensity" Rating

Trivial	1	2	3	4	5	Serious
Score	=7	=14	=21	=28	=35	:

"Distinctness of Issue" Rating

Cloudy	1	2	3	4	5	Clear
Score	=6	=12	=18	=24	=30	:

EXAMINATION RELIABILITY RATING TOTAL: _____

The highest reliability estimate would be a score of 100, lowest would be 20.

APPENDIX D

POLYGRAPH QUADRI-ZONE REACTION COMBINATION GUIDE

By

James Allan Matte

The Quadri-Zone Reaction Combination Guide is designed to provide users of the Polygraph Quadri-Zone Comparison Technique with a chart analysis guide in twenty-three (23) possible reaction combinations within the zones of comparison.

The enclosed chart reflects the test structure of the Polygraph Quadri-Zone Comparison Technique[1] which will enable those readers who are not familiar with the Quadri-Zone Comparison Technique to relate the question numbers and their color code to the particular type of test question each represents.

In reviewing the Quadri-Zone Reaction Combination Guide, the reader will note that, excluding the Black Zone (questions 25 & 26) which are not scored, each zone contains a maximum score allowable under the circumstances shown. These scores are attained with the elimination of the weakest score or the score that does not follow the general trend.[2] The Quadri-Zone Comparison Technique has four (4) zones for comparison, as depicted in the enclosed test structure, but only zones #2, #3 and #4 are scored for a determination of truthfulness, deception, or inconclusive.

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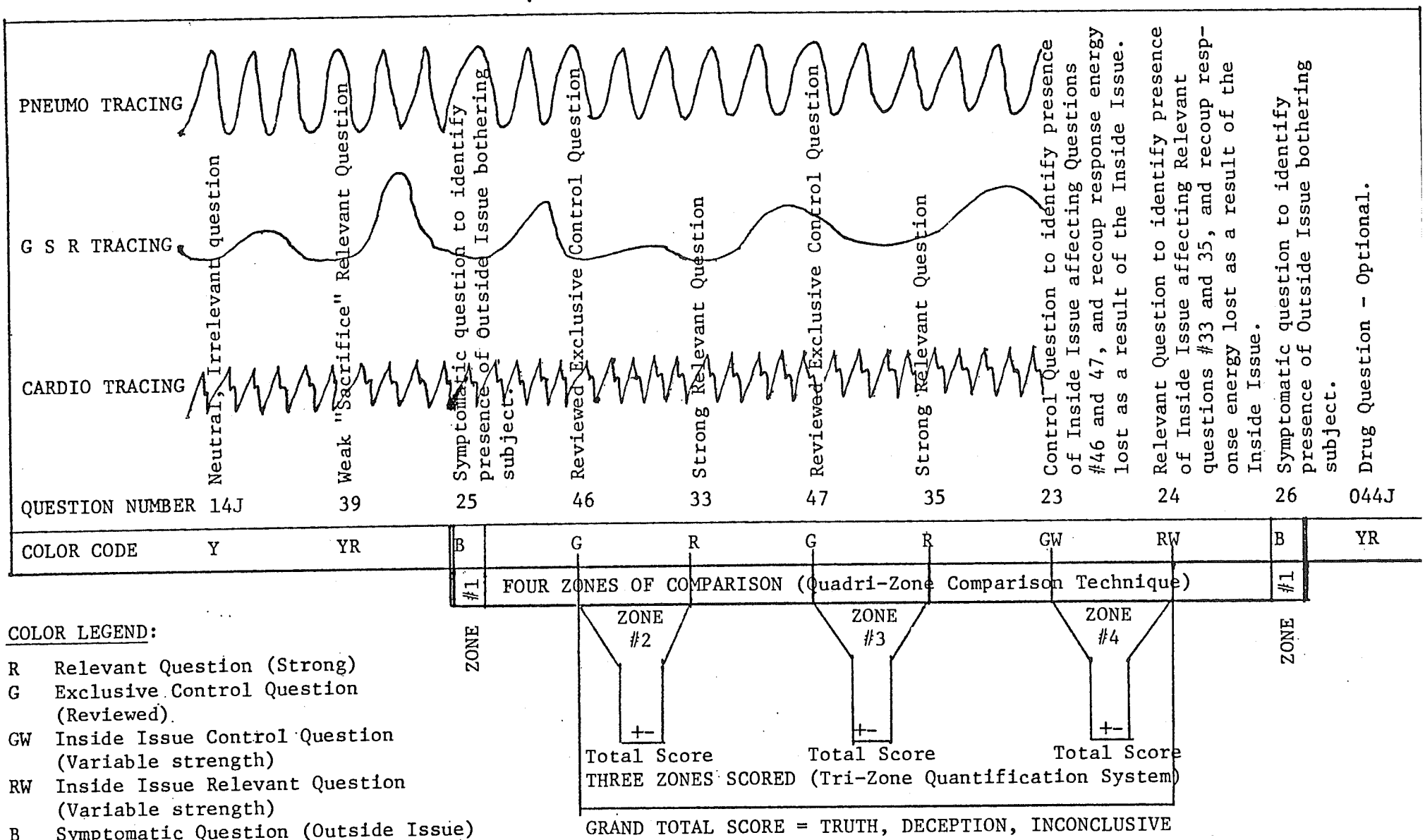
1. For detailed discussion of the Polygraph Quadri-Zone Comparison Technique, and the Inside Issue Factor (Test questions 23 and 24), see Polygraph 7(4)(December 1978): 266-280; or The Art and Science of the Polygraph Technique by Matte, J.A., Publishers: Charles C. Thomas, Springfield, Illinois, 1980.

2. Many polygraphists are using the older Backster scoring method of eliminating the weakest score or the score that does not follow the general score trend within each zone compared and scored, while other polygraphists tally all scores obtained. Both scoring methods are scientifically sound; the latter is easier to defend. For detailed discussion of the numerical scoring system consult above mentioned publications.

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)

QUADRI-ZONE REACTION COMBINATION

COMBO	ZONES OF COMPARISON		COLOR CODE		PRESENCE OF REACTION		SCORE		INDICATION		REMEDY
A	46	33	G	R		33	-1 to -9	A1	RESPONSE TO RED ZONE QUESTION (33) AND LACK OF RESPONSE TO GREEN ZONE (46) INDICATES DECEPTION TO RELEVANT QUESTION.	A1	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED: FUNCTIONING AS DESIGNED.
	47	35	G	R		35	-1 to -9	A2	RESPONSE TO RED ZONE QUESTION (35) AND LACK OF RESPONSE TO GREEN ZONE (47) INDICATES DECEPTION TO RELEVANT QUESTION.	A2	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; FUNCTIONING AS DESIGNED.
	23	24	G/W	R/W			0	A3	LACK OF RESPONSE TO GREEN/WHITE (23) AND RED/WHITE (24) ZONE INDICATES NO FEAR OF ERROR IS DAMPENING GREEN ZONE (46 & 47) AND FEAR OF DETECTION TO RED ZONE (33&35) NOT RECHANNELED INTO HOPE OF ERROR (24).	A3	NO REMEDY REQUIRED. NO EVIDENCE OF INSIDE ISSUE DAMPENING GREEN OR RED ZONES.
	25	26	B	B			NA	A4	LACK OF RESPONSE TO BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES NO OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	A4	NO REMEDY REQUIRED. SUBJECT APPEARS CONVINCED POLYGRAPHIST WILL NOT ASK UNREVIEWED QUESTION DURING EXAMINATION.
B	46	33	G	R	46		+1 to +9	B1	RESPONSE TO GREEN ZONE QUESTION (46) AND LACK OF RESPONSE TO RED ZONE (33) INDICATES TRUTHFULNESS TO RELEVANT QUESTION.	B1	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; GREEN ZONE FUNCTIONING AS DESIGNED.
	47	35	G	R	47		+1 to +9	B2	RESPONSE TO GREEN ZONE QUESTION (46) AND LACK OF RESPONSE TO RED ZONE (33) INDICATES TRUTHFULNESS TO RELEVANT QUESTION.	B2	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; GREEN ZONE FUNCTIONING AS DESIGNED.
	23	24	G/W	R/W			0	B3	LACK OF RESPONSE TO GREEN/WHITE (23) AND RED/WHITE (24) ZONE INDICATES NO FEAR OF ERROR IS DAMPENING GREEN ZONE (46 & 47) AND FEAR OF DETECTION TO RED ZONE (33&35) NOT RECHANNELED INTO HOPE OF ERROR (24).	B3	NO REMEDY REQUIRED. NO EVIDENCE OF INSIDE ISSUE DAMPENING GREEN OR RED ZONES.
	25	26	B	B			NA	B4	LACK OF RESPONSE TO BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES NO OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	B4	NO REMEDY REQUIRED. SUBJECT APPEARS CONVINCED POLYGRAPHIST WILL NOT ASK UNREVIEWED QUESTION DURING EXAMINATION.
C	46	33	G	R	46	33	-1 to -3	C1	STRONG RESPONSE TO RED ZONE QUESTION (33) AND EQUAL STRONG RESPONSE TO GREEN ZONE (46) INDICATES SERIOUS GREEN ZONE DEFECT.	C1	ADMINISTER STIMULATION TEST TO REASSURE SUBJECT OF ACCURACY OF TEST. IF ALREADY GIVEN, REDUCE GREEN ZONE QUESTION INTENSITY BY ALTERING SUBJECT AGE CATEGORY OR CHANGING SCOPE OF GREEN ZONE.
	47	35	G	R	47	35	-1 to -3	C2	STRONG RESPONSE TO RED ZONE QUESTION (33) AND EQUAL STRONG RESPONSE TO GREEN ZONE (46) INDICATES SERIOUS GREEN ZONE DEFECT.	C2	REMEDY THE SAME AS C1 ABOVE.
	23	24	G/W	R/W			0	C3	LACK OF RESPONSE TO GREEN/WHITE (23) AND RED/WHITE (24) ZONE INDICATES NO FEAR OF ERROR IS DAMPENING GREEN ZONE (46 & 47) AND FEAR OF DETECTION TO RED ZONE (33&35) NOT RECHANNELED INTO HOPE OF ERROR (24).	C3	NO REMEDY REQUIRED. NO EVIDENCE OF INSIDE ISSUE DAMPENING GREEN OR RED ZONES.
	25	26	B	B			NA	C4	LACK OF RESPONSE TO BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES NO OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	C4	NO REMEDY REQUIRED. SUBJECT APPEARS CONVINCED POLYGRAPHIST WILL NOT ASK UNREVIEWED QUESTION DURING EXAMINATION.
D	46	33	G	R			0	D1	LACK OF RESPONSE TO RED ZONE QUESTION (33) AND GREEN ZONE QUESTION (46) USUALLY INDICATES INEFFECTIVE GREEN ZONE QUESTION; THIS RULE NULLIFIED BY BLACK ZONE RESPONSE.	D1	NO REMEDY REQUIRED. RED ZONE AND GREEN ZONE QUESTIONS WILL BE FUNCTIONING AS DESIGNED AFTER BLACK ZONE QUESTION RESPONSE SUBSIDES.
	47	35	G	R			0	D2	LACK OF RESPONSE TO RED ZONE QUESTION (33) AND GREEN ZONE QUESTION (46) USUALLY INDICATES INEFFECTIVE GREEN ZONE QUESTION; THIS RULE NULLIFIED BY BLACK ZONE RESPONSE.	D2	NO REMEDY REQUIRED. RED ZONE AND GREEN ZONE QUESTIONS WILL BE FUNCTIONING AS DESIGNED AFTER BLACK ZONE QUESTION RESPONSE SUBSIDES.
	23	24	G/W	R/W			0	D3	LACK OF RESPONSE TO GREEN/WHITE (23) AND RED/WHITE (24) ZONE INDICATES NO FEAR OF ERROR IS DAMPENING GREEN ZONE (46 & 47) AND FEAR OF DETECTION TO RED ZONE (33&35) NOT RECHANNELED INTO HOPE OF ERROR (24).	D3	NO REMEDY REQUIRED. NO EVIDENCE OF INSIDE ISSUE DAMPENING GREEN OR RED ZONES.
	25	26	B	B	25	26	NA	D4	RESPONSE TO ONE OR BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	D4	POLYGRAPHIST MUST GAIN SUBJECT'S CONFIDENCE REGARDING AVOIDANCE OF UNREVIEWED QUESTIONS EMBRACING OUTSIDE ISSUE.
E	46	33	G	R		33	-1 to -9	E1	RESPONSE TO RED ZONE QUESTION (33) AND LACK OF RESPONSE TO GREEN ZONE (46) INDICATES DECEPTION TO RELEVANT QUESTION.	E1	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; FUNCTIONING AS DESIGNED.
	47	35	G	R		35	-1 to -9	E2	RESPONSE TO RED ZONE QUESTION (35) AND LACK OF RESPONSE TO GREEN ZONE (47) INDICATES DECEPTION TO RELEVANT QUESTION.	E2	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; FUNCTIONING AS DESIGNED.
	23	24	G/W	R/W			0	E3	LACK OF RESPONSE TO GREEN/WHITE (23) AND RED/WHITE (24) ZONE INDICATES NO FEAR OF ERROR IS DAMPENING GREEN ZONE (46 & 47) AND FEAR OF DETECTION TO RED ZONE (33&35) NOT RECHANNELED INTO HOPE OF ERROR (24).	E3	NO REMEDY REQUIRED. NO EVIDENCE OF INSIDE ISSUE DAMPENING GREEN OR RED ZONES.
	25	26	B	B	25	26	NA	E4	RESPONSE TO ONE OR BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	E4	POLYGRAPHIST MUST GAIN SUBJECT'S CONFIDENCE REGARDING AVOIDANCE OF UNREVIEWED QUESTIONS EMBRACING OUTSIDE ISSUE.

QUADRI-ZONE REACTION COMBINATION

COMBO	ZONES - OF COMPARISON		COLOR CODE		PRESENCE OF REACTION		SCORE		INDICATION		REMEDY
F	46	33	G	R	46		+1 to +9	F1	RESPONSE TO GREEN ZONE QUESTION (46) AND LACK OF RESPONSE TO RED ZONE (33) INDICATES TRUTHFULNESS TO RELEVANT QUESTION.	F1	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; GREEN ZONE FUNCTIONING AS DESIGNED.
	47	35	G	R	47		+1 to +9	F2	RESPONSE TO GREEN ZONE QUESTION (47) AND LACK OF RESPONSE TO RED ZONE (35) INDICATES TRUTHFULNESS TO RELEVANT QUESTION.	F2	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; GREEN ZONE FUNCTIONING AS DESIGNED.
	23	24	G/W	R/W			0	F3	LACK OF RESPONSE TO GREEN/WHITE (23) AND RED/WHITE (24) ZONE INDICATES NO FEAR OF ERROR IS DAMPENING GREEN ZONE (46&47) AND FEAR OF DETECTION TO RED ZONE (33&35) NOT RECHANNELED INTO HOPE OF ERROR (24).	F3	NO REMEDY REQUIRED. NO EVIDENCE OF INSIDE ISSUE DAMPENING GREEN OR RED ZONES.
	25	26	B	B	25	26	NA	F4	RESPONSE TO ONE OR BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	F4	POLYGRAPHIST MUST GAIN SUBJECT'S CONFIDENCE REGARDING AVOIDANCE OF UNREVIEWED QUESTIONS EMBRACING OUTSIDE ISSUE.
G	46	33	G	R	46	33	-1 to -3	G1	STRONG RESPONSE TO RED ZONE QUESTION (33) AND EQUAL STRONG RESPONSE TO GREEN ZONE (46) INDICATES SERIOUS GREEN ZONE DEFECT.	G1	REDUCE GREEN ZONE QUESTION INTENSITY BY ALTERING SUBJECT AGE CATEGORY OR CHANGING SCOPE OF GREEN ZONE QUESTION.
	47	35	G	R	47	35	-1 to -3	G2	STRONG RESPONSE TO RED ZONE QUESTION (35) AND EQUAL STRONG RESPONSE TO GREEN ZONE (47) INDICATES SERIOUS GREEN ZONE DEFECT.	G2	REDUCE GREEN ZONE QUESTION INTENSITY BY ALTERING SUBJECT AGE CATEGORY OR CHANING SCOPE OF GREEN ZONE QUESTION.
	23	24	G/W	R/W			0	G3	LACK OF RESPONSE TO GREEN/WHITE (23) AND RED/WHITE (24) ZONE INDICATES NO FEAR OF ERROR IS DAMPENING GREEN ZONE (46 & 47) AND FEAR OF DETECTION TO RED ZONE (33&35) NOT RECHANNELED INTO HOPE OF ERROR (24).	G3	NO REMEDY REQUIRED. NO EVIDENCE OF INSIDE ISSUE DAMPENING GREEN OR RED ZONES.
	25	26	B	B	25	26	NA	G4	RESPONSE TO ONE OR BOTH BLACK ZONE QUESTIONS 25 & 26) INDICATES OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	G4	POLYGRAPHIST MUST GAIN SUBJECT'S CONFIDENCE REGARDING AVOIDANCE OF UNREVIEWED QUESTIONS EMBRACING OUTSIDE ISSUE.
H	46	33	G	R	46	33	-1 to -3	H1	STRONG RESPONSE TO RED ZONE QUESTION (33) AND EQUAL STRONG RESPONSE TO GREEN ZONE (46) USUALLY INDICATES SERIOUS GREEN ZONE DEFECT. THIS RULE NULLIFIED BY GREEN/WHITE ZONE (23) RESPONSE.	H1	ADMINISTER STIMULATION TEST TO REASSURE SUBJECT OF ACCURACY OF TEST. IF ALREADY ADMINISTERED, THEN REVIEW BOTH INSIDE-ISSUE QUESTIONS (23 & 24) WITH SUBJECT TO INSURE UNDERSTANDING AND SUBJECT CONFIDENCE. FURTHER REVIEW GREEN ZONE QUESTIONS (46 & 47) ONLY WITH SUBJECT.
	47	35	G	R	47	35	-1 to -3	H2	STRONG RESPONSE TO RED ZONE QUESTION (35) AND EQUAL STRONG RESPONSE TO GREEN ZONE (47) USUALLY INDICATES SERIOUS GREEN ZONE DEFECT. THIS RULE NULLIFIED BY GREEN/WHITE ZONE (23 RESPONSE.	H1	REMEDY THE SAME AS (H1) ABOVE.
	23	24	G/W	R/W	23		+1 to +9	H3	RESPONSE TO GREEN/WHITE ZONE (23) AND LACK OF RESPONSE TO RED/WHITE ZONE 24) INDICATES FEAR OF ERROR REGARDING RED ZONE QUESTIONS (33&35) MAKING RED ZONE QUESTIONS UNDULY THREATENING.	H3	REMEDY THE SAME AS (H1) ABOVE. BOTH GREEN ZONE AND RED ZONE QUESTIONS HAVE BEEN IDEALLY FORMULATED. IF (H1) REMEDY INEFFECTIVE, CHANGE GREEN ZONE QUESTIONS.
	25	26	B	B			NA	H4	LACK OF RESPONSE TO BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES NO OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	H4	NO REMEDY REQUIRED. SUBJECT APPEARS CONVINCED POLYGRAPHIST WILL NOT ASK UNREVIEWED QUESTION DURING EXAMINATION.
I	46	33	G	R	46	33	-1 to -3	I1	STRONG RESPONSE TO RED ZONE QUESTION (33) AND EQUAL STRONG RESPONSE TO GREEN ZONE (46) USUALLY INDICATES SERIOUS GREEN ZONE DEFECT. THIS RULE NOT NULLIFIED BY RED/WHITE ZONE (24) RESPONSE.	I1	REDUCE GREEN ZONE QUESTION INTENSITY BY ALTERING SUBJECT AGE CATEGORY OR CHANGING SCOPE OF GREEN ZONE QUESTION.
	47	35	G	R	47	35	-1 to -3	I2	STRONG RESPONSE TO RED ZONE QUESTION (35) AND EQUAL STRONG RESPONSE TO GREEN ZONE (47) USUALLY INDICATES SERIOUS GREEN ZONE DEFECT. THIS RULE NOT NULLIFIED BY RED/WHITE ZONE (24) RESPONSE.	I2	REMEDY THE SAME AS (I1) ABOVE.
	23	24	G/W	R/W		24	-1 to -9	I3	RESPONSE TO RED/WHITE ZONE (24) AND LACK OF RESPONSE TO GREEN/WHITE ZONE (23) INDICATES SUBJECT HOPES ERROR WILL BE MADE REGARDING RED ZONE QUESTIONS (33&35) INDICATING DECEPTION REGARDING TARGET ISSUE.	I3	GREEN/WHITE (23) AND RED/WHITE (24) ZONE QUESTIONS FUNCTIONING AS DESIGNED. REMEDY IN (I1) ABOVE SHOULD BE ADMINISTERED WITH THE REVIEW OF BOTH GREEN ZONE AND RED ZONE QUESTIONS.
	25	26	B	B			NA	I4	LACK OF RESPONSE TO BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES NO OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	I4	NO REMEDY REQUIRED. SUBJECT APPEARS CONVINCED POLYGRAPHIST WILL NOT ASK UNREVIEWED QUESTION DURING EXAMINATION.

QUADRI-ZONE REACTION COMBINATION

COMBO	ZONES OF COMPARISON		COLOR CODE		PRESENCE OF REACTION		SCORE		INDICATION		REMEDY
J	46	33	G	R	46	33	-1 to -3	J1	STRONG RESPONSE TO RED ZONE QUESTION (33) AND EQUAL STRONG RESPONSE TO GREEN ZONE (46) USUALLY INDICATES SERIOUS GREEN ZONE DEFECT. THIS RULE NOT NULLIFIED BY RED/WHITE ZONE (24) RESPONSE.	J1	REDUCE GREEN ZONE QUESTION INTENSITY BY ALTERING SUBJECT AGE CATEGORY OR CHANGING SCOPE OF GREEN ZONE QUESTION.
	47	35	G	R	47	35	-1 to -3	J2	STRONG RESPONSE TO RED ZONE QUESTION (35) AND EQUAL STRONG RESPONSE TO GREEN ZONE (47) USUALLY INDICATES SERIOUS GREEN ZONE DEFECT. THIS RULE NOT NULLIFIED BY RED/WHITE ZONE (24) RESPONSE.	J2	REMEDY THE SAME AS (J1) ABOVE.
	23	24	G/W	R/W		24	-1 to -9	J3	RESPONSE TO RED/WHITE ZONE (24) AND LACK OF RESPONSE TO GREEN/WHITE ZONE (23) INDICATES SUBJECT HOPES ERROR WILL BE MADE REGARDING RED ZONE QUESTIONS (33&35) INDICATING DECEPTION REGARDING TARGET ISSUE.	J3	GREEN/WHITE (23) AND RED/WHITE (24) ZONE QUESTIONS FUNCTIONING AS DESIGNED. REMEDY IN (J1) ABOVE SHOULD BE ADMINISTERED WITH THE REVIEW OF BOTH GREEN ZONE AND RED ZONE QUESTIONS.
	25	26	B	B	25	26	NA	J4	RESPONSE TO ONE OR BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	J4	POLYGRAPHIST MUST GAIN SUBJECT'S CONFIDENCE REGARDING AVOIDANCE OF UNREVIEWED QUESTIONS EMBRACING OUTSIDE ISSUE.
K	46	33	G	R	46	33	-1 to -3	K1	STRONG RESPONSE TO RED ZONE QUESTION (33) AND EQUAL STRONG RESPONSE TO GREEN ZONE (46) USUALLY INDICATES SERIOUS GREEN ZONE DEFECT. THIS RULE NULLIFIED BY GREEN/WHITE ZONE (23) RESPONSE.	K1	ADMINISTER STIMULATION TEST TO REASSURE SUBJECT OF ACCURACY OF TEST. IF ALREADY ADMINISTERED, THEN REVIEW BOTH INSIDE-ISSUE QUESTIONS (23 & 24) WITH SUBJECT TO INSURE UNDERSTANDING AND SUBJECT CONFIDENCE. FURTHER REVIEW GREEN ZONE QUESTIONS (46 & 47) ONLY WITH SUBJECT.
	47	35	G	R	47	35	-1 to -3	K2	STRONG RESPONSE TO RED ZONE QUESTION (33) AND EQUAL STRONG RESPONSE TO GREEN ZONE (46) USUALLY INDICATES SERIOUS GREEN ZONE DEFECT. THIS RULE NULLIFIED BY GREEN/WHITE ZONE (23) RESPONSE.	K2	REMEDY THE SAME AS (K1) ABOVE.
	23	24	G/W	R/W	23		+1 to +9	K3	RESPONSE TO GREEN/WHITE ZONE (23) AND LACK OF RESPONSE TO RED/WHITE ZONE (24) INDICATES FEAR OF ERROR REGARDING RED ZONE QUESTIONS (33&35) MAKING RED ZONE QUESTIONS UNDULY THREATENING.	K3	REMEDY THE SAME AS (K1) ABOVE. BOTH GREEN ZONE AND RED ZONE QUESTIONS HAVE BEEN IDEALLY FORMULATED. IF (K1) REMEDY INEFFECTIVE, CHANGE GREEN ZONE QUESTIONS.
	25	26	B	B	25	26	NA	K4	RESPONSE TO ONE OR BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	K4	POLYGRAPHIST MUST GAIN SUBJECT's CONFIDENCE REGARDING AVOIDANCE OF UNREVIEWED QUESTIONS EMBRACING OUTSIDE ISSUE.
L	46	33	G	R	46	33	-1 to -3	L1	STRONG RESPONSE TO RED ZONE QUESTION (33) AND EQUAL STRONG RESPONSE TO GREEN ZONE (46) USUALLY INDICATES SERIOUS GREEN ZONE DEFECT. THIS RULE NULLIFIED BY GREEN/WHITE ZONE (23) AND RED/WHITE ZONE (24) RESPONSES.	L1	ADMINISTER STIMULATION TEST TO REASSURE SUBJECT OF ACCURACY OF TEST. IF ALREADY ADMINISTERED, THEN REVIEW BOTH INSIDE-ISSUE QUESTIONS (23 & 24) WITH SUBJECT TO INSURE UNDERSTANDING AND SUBJECT CONFIDENCE. FURTHER REVIEW GREEN ZONE QUESTIONS (46 & 47) ONLY WITH SUBJECT.
	47	35	G	R	47	35	-1 to -3	L2	STRONG RESPONSE TO RED ZONE QUESTION (35) AND EQUAL STRONG RESPONSE TO GREEN ZONE (47) USUALLY INDICATES SERIOUS GREEN ZONE DEFECT. THIS RULE NULLIFIED BY GREEN/WHITE ZONE (23) AND RED/WHITE ZONE (24) RESPONSES.	L2	REMEDY THE SAME AS (L1) ABOVE.
	23	24	G/W	R/W	23	24	0	L3	EQUAL STRONG RESPONSE TO BOTH RED/WHITE (24) AND GREEN/WHITE (23) ZONE QUESTIONS INDICATES CONFUSION BY SUBJECT REGARDING ONE OR BOTH INSIDE-ISSUE QUESTIONS.	L3	REVIEW WITH SUBJECT BOTH RED/WHITE AND GREEN/WHITE ZONE QUESTIONS TO ASSURE COMPLETE UNDERSTANDING, AND SIMPLIFY WORDING OF QUESTION(S) IF NECESSARY.
	25	26	B	B			NA	L4	LACK OF RESPONSE TO BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES NO OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	L4	NO REMEDY REQUIRED. SUBJECT APPEARS CONVINCED POLYGRAPHIST WILL NOT ASK UNREVIEWED QUESTION DURING EXAMINATION.
M	46	33	G	R	46	33	-1 to -3	M1	STRONG RESPONSE TO RED ZONE QUESTION (33) AND EQUAL STRONG RESPONSE TO GREEN ZONE (46) USUALLY INDICATES SERIOUS GREEN ZONE DEFECT. THIS RULE NULLIFIED BY GREEN/WHITE ZONE (23) AND RED/WHITE ZONE (24) RESPONSES.	M1	ADMINISTER STIMULATION TEST TO REASSURE SUBJECT OF ACCURACY OF TEST. IF ALREADY ADMINISTERED, THEN REVIEW BOTH INSIDE-ISSUE QUESTIONS (23 & 24) WITH SUBJECT TO INSURE UNDERSTANDING AND SUBJECT CONFIDENCE. FURTHER REVIEW GREEN ZONE QUESTIONS (46 & 47) ONLY WITH SUBJECT.
	47	35	G	R	47	35	-1 to -3	M2	STRONG RESPONSE TO RED ZONE QUESTION (35) AND EQUAL STRONG RESPONSE TO GREEN ZONE (47) USUALLY INDICATES SERIOUS GREEN ZONE DEFECT. THIS RULE NULLIFIED BY GREEN/WHITE ZONE (23) AND RED/WHITE ZONE (24) RESPONSES.	M2	REMEDY THE SAME AS (M1) ABOVE.
	23	24	G/W	R/W	23	24	0	M3	EQUAL STRONG RESPONSE TO BOTH RED/WHITE (24) AND GREEN/WHITE (23) ZONE QUESTIONS INDICATES CONFUSION BY SUBJECT REGARDING ONE OR BOTH INSIDE-ISSUE QUESTIONS.	M3	REVIEW WITH SUBJECT BOTH RED/WHITE AND GREEN/WHITE ZONE QUESTIONS TO ASSURE COMPLETE UNDERSTANDING, AND SIMPLIFY WORDING OF QUESTION(S) IF NECESSARY.
	25	26	B	B	25	26	NA	M4	RESPONSE TO ONE OR BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	M4	POLYGRAPHIST MUST GAIN SUBJECT'S CONFIDENCE REGARDING AVOIDANCE OF UNREVIEWED QUESTIONS EMBRACING OUTSIDE ISSUE.

QUADRI-ZONE REACTION COMBINATION

COMBO	ZONES OF COMPARISON		COLOR CODE		PRESENCE OF REACTION		SCORE		INDICATION		REMEDY
N	46	33	G	R		33	-1 to -9	N1	RESPONSE TO RED ZONE QUESTION (33) AND LACK OF RESPONSE TO GREEN ZONE (46) INDICATES DECEPTION TO RELEVANT QUESTION.	N1	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; FUNCTIONING AS DESIGNED.
	47	35	G	R		35	-1 to -9	N2	RESPONSE TO RED ZONE QUESTION (35) AND LACK OF RESPONSE TO GREEN ZONE (47) INDICATES DECEPTION TO RELEVANT QUESTION.	N2	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; FUNCTIONING AS DESIGNED.
	23	24	G/W	R/W	23	24	0	N3	EQUAL STRONG RESPONSE TO BOTH RED/WHITE (24) AND GREEN/WHITE (23) ZONE QUESTIONS INDICATES CONFUSION BY SUBJECT REGARDING ONE OR BOTH INSIDE-ISSUE QUESTIONS.	N3	REVIEW WITH SUBJECT BOTH RED/WHITE AND GREEN/WHITE ZONE QUESTIONS TO ASSURE COMPLETE UNDERSTANDING, AND SIMPLIFY WORDING OF QUESTION(S) IF NECESSARY.
	25	26	B	B			NA	N4	LACK OF RESPONSE TO BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES NO OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	N4	NO REMEDY REQUIRED. SUBJECT APPEARS CONVINCED POLYGRAPHIST WILL NOT ASK UNREVIEWED QUESTION DURING EXAMINATION.
O	46	33	G	R		33	-1 to -9	O1	RESPONSE TO RED ZONE QUESTION (33) AND LACK OF RESPONSE TO GREEN ZONE (46) INDICATES DECEPTION TO RELEVANT QUESTION.	O1	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; FUNCTIONING AS DESIGNED.
	47	35	G	R		35	-1 to -9	O2	RESPONSE TO RED ZONE QUESTION (35) AND LACK OF RESPONSE TO GREEN ZONE (47) INDICATES DECEPTION TO RELEVANT QUESTION.	O2	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; FUNCTIONING AS DESIGNED.
	23	24	G/W	R/W	23	24	0	O3	EQUAL STRONG RESPONSE TO BOTH RED/WHITE (24) AND GREEN/WHITE (23) ZONE QUESTIONS INDICATES CONFUSION BY SUBJECT REGARDING ONE OR BOTH INSIDE-ISSUE QUESTIONS.	O3	REVIEW WITH SUBJECT BOTH RED/WHITE AND GREEN/WHITE ZONE QUESTIONS TO ASSURE COMPLETE UNDERSTANDING, AND SIMPLIFY WORDING OF QUESTION(S) IF NECESSARY.
	25	26	B	B	25	26	NA	O4	RESPONSE TO ONE OR BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	O4	POLYGRAPHIST MUST GAIN SUBJECT'S CONFIDENCE REGARDING AVOIDANCE OF UNREVIEWED QUESTIONS EMBRACING OUTSIDE ISSUE.
P	46	33	G	R	46		+1 to +9	P1	RESPONSE TO GREEN ZONE QUESTION (46) AND LACK OF RESPONSE TO RED ZONE (33) INDICATES TRUTHFULNESS TO RELEVANT QUESTION.	P1	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; GREEN ZONE QUESTION FUNCTIONING AS DESIGNED.
	47	35	G	R	47		+1 to +9	P2	RESPONSE TO GREEN ZONE QUESTION (47) AND LACK OF RESPONSE TO RED ZONE (35) INDICATES TRUTHFULNESS TO RELEVANT QUESTION.	P2	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; GREEN ZONE QUESTION FUNCTIONING AS DESIGNED.
	23	24	G/W	R/W	23	24	0	P3	EQUAL STRONG RESPONSE TO BOTH RED/WHITE (24) AND GREEN/WHITE (23) ZONE QUESTIONS INDICATES CONFUSION BY SUBJECT REGARDING ONE OR BOTH INSIDE-ISSUE QUESTIONS.	P3	REVIEW WITH SUBJECT BOTH RED/WHITE AND GREEN/WHITE ZONE QUESTIONS TO ASSURE COMPLETE UNDERSTANDING, AND SIMPLIFY WORDING OF QUESTION(S) IF NECESSARY.
	25	26	B	B			NA	P4	LACK OF RESPONSE TO BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES NO OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	P4	NO REMEDY REQUIRED. SUBJECT APPEARS CONVINCED POLYGRAPHIST WILL NOT ASK UNREVIEWED QUESTION DURING EXAMINATION.
Q	46	33	G	R	46		+1 to +9	Q1	RESPONSE TO GREEN ZONE QUESTION (46) AND LACK OF RESPONSE TO RED ZONE (33) INDICATES TRUTHFULNESS TO RELEVANT QUESTION.	Q1	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; GREEN ZONE QUESTION FUNCTIONING AS DESIGNED.
	47	35	G	R	47		+1 to +9	Q2	RESPONSE TO GREEN ZONE QUESTION (47) AND LACK OF RESPONSE TO RED ZONE (35) INDICATES TRUTHFULNESS TO RELEVANT QUESTION.	Q2	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; GREEN ZONE QUESTION FUNCTIONING AS DESIGNED.
	23	24	G/W	R/W	23	24	0	Q3	EQUAL STRONG RESPONSE TO BOTH RED/WHITE (24) AND GREEN/WHITE (23) ZONE QUESTIONS INDICATES CONFUSION BY SUBJECT REGARDING ONE OR BOTH INSIDE-ISSUE QUESTIONS.	Q3	REVIEW WITH SUBJECT BOTH RED/WHITE AND GREEN/WHITE ZONE QUESTIONS TO ASSURE COMPLETE UNDERSTANDING, AND SIMPLIFY WORDING OF QUESTION(S) IF NECESSARY.
	25	26	B	B	25	26	NA	Q4	RESPONSE TO ONE OR BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	Q4	POLYGRAPHIST MUST GAIN SUBJECT'S CONFIDENCE REGARDING AVOIDANCE OF UNREVIEWED QUESTIONS EMBRACING OUTSIDE ISSUE.
R	46	33	G	R	46 (mild)	33 (mild)	0	R1	MILD RESPONSE TO RED ZONE QUESTION (33) AND EQUAL MILD RESPONSE TO GREEN ZONE (46) USUALLY INDICATES SERIOUS GREEN ZONE DEFECT; UNLESS THERE IS STRONG RESPONSE TO RED/WHITE ZONE (24), THEN REFER TO REACTION COMBINATION (S).	R1	ADMINISTER STIMULATION TEST. IF ALREADY ADMINISTERED, INCREASE INTENSITY OF GREEN ZONE QUESTION (46) BY REVIEWING GREEN ZONE QUESTIONS ONLY BEFORE NEXT CHART; IF UNPRODUCTIVE, CHANGE GREEN ZONE QUESTION BY ALTERING AGE CATEGORY OR SCOPE OF GREEN ZONE QUESTION.
	47	35	G	R	47 (mild)	35 (mild)	0	R2	MILD RESPONSE TO RED ZONE QUESTION (35 AND EQUAL MILD RESPONSE TO GREEN ZONE (47) USUALLY INDICATES SERIOUS GREEN ZONE DEFECT; UNLESS THERE IS STRONG RESPONSE TO RED/WHITE ZONE (24), THEN REFER TO REACTION COMBINATION (S).	R2	REMEDY THE SAME AS (R1) ABOVE.
	23	24	G/W	R/W			0	R3	LACK OF RESPONSE TO GREEN/WHITE (23) AND RED/WHITE (24) ZONE INDICATES NO FEAR OF ERROR IS DAMPENING GREEN ZONE (46 & 47) AND FEAR OF DETECTION TO RED ZONE (33&35) NOT RECHANNELED INTO HOPE OF ERROR (24).	R3	NO REMEDY REQUIRED. NO EVIDENCE OF INSIDE ISSUE DAMPENING GREEN OR RED ZONES.
	25	26	B	B			NA	R4	LACK OF RESPONSE TO BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES NO OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	R4	NO REMEDY REQUIRED. SUBJECT APPEARS CONVINCED POLYGRAPHIST WILL NOT ASK UNREVIEWED QUESTION DURING EXAMINATION.

QUADRI-ZONE REACTION COMBINATION

COMBO	ZONES OF COMPARISON		COLOR CODE		PRESENCE OF REACTION		SCORE		INDICATION		REMEDY
S	46	33	G	R		33	-1 to -9	S1	RESPONSE TO RED ZONE QUESTION (33) AND LACK OF RESPONSE TO GREEN ZONE (46) INDICATES DECEPTION TO RELEVANT QUESTION.	S1	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; FUNCTIONING AS DESIGNED.
	47	35	G	R		35	-1 to -9	S2	RESPONSE TO RED ZONE QUESTION (35) AND LACK OF RESPONSE TO GREEN ZONE (47) INDICATES DECEPTION TO RELEVANT QUESTION.	S2	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; FUNCTIONING AS DESIGNED.
	23	24	G/W	R/W		24	-1 to -9	S3	RESPONSE TO RED/WHITE ZONE (24) AND LACK OF RESPONSE TO GREEN/WHITE ZONE (23) INDICATES SUBJECT HOPES ERROR WILL BE MADE REGARDING RED ZONE QUESTIONS (33&35) INDICATING DECEPTION REGARDING TARGET ISSUE.	S3	NO REMEDY REQUIRED. RED/WHITE (24) AND GREEN/WHITE (23) QUESTIONS IDEALLY FORMULATED AND FUNCTIONING AS DESIGNED. RESPONSE TO RED/WHITE (24) QUESTION IN ADDITION TO RED ZONE QUESTIONS (33&35) PROVIDES FURTHER PSYCHOPHYSIOLOGICAL EVIDENCE OF DECEPTION REGARDING TARGET ISSUE.
	25	26	B	B			NA	S4	LACK OF RESPONSE TO BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES NO OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	S4	NO REMEDY REQUIRED. SUBJECT APPEARS CONVINCED POLYGRAPHIST WILL NOT ASK UNREVIEWED QUESTION DURING EXAMINATION.
T	46	33	G	R		33	-1 to -9	T1	RESPONSE TO RED ZONE QUESTION (33) AND LACK OF RESPONSE TO GREEN ZONE (46) USUALLY INDICATES DECEPTION TO RELEVANT QUESTION. THIS RULE NULLIFIED BY GREEN/WHITE ZONE (23) RESPONSE INDICATING SUBJECT FEAR OF ERROR REGARDING TARGET ISSUE.	T1	ADMINISTER STIMULATION TEST TO REASSURE SUBJECT OF ACCURACY OF TEST. IF ALREADY ADMINISTERED, THEN REVIEW BOTH INSIDE-ISSUE QUESTIONS (23 & 24) WITH SUBJECT TO INSURE UNDERSTANDING AND SUBJECT CONFIDENCE. FURTHER REVIEW GREEN ZONE QUESTIONS (46 & 47) ONLY WITH SUBJECT.
	47	35	G	R		35	-1 to -9	T2	RESPONSE TO RED ZONE QUESTION (35) AND LACK OF RESPONSE TO GREEN ZONE (47) USUALLY INDICATES DECEPTION TO RELEVANT QUESTION. THIS RULE NULLIFIED BY GREEN/WHITE ZONE (23) RESPONSE INDICATING SUBJECT FEAR OF ERROR REGARDING TARGET ISSUE.	T2	REMEDY THE SAME AS (T1) ABOVE.
	23	24	G/W	R/W	23		+1 to +9	T3	RESPONSE TO GREEN/WHITE ZONE (23) AND LACK OF RESPONSE TO RED/WHITE ZONE (24) INDICATES FEAR OF ERROR REGARDING RED ZONE QUESTIONS (33&35) MAKING RED ZONE QUESTIONS UNDULY THREATENING.	T3	REMEDY THE SAME AS (T1) ABOVE. IF (T1) REMEDY INEFFECTIVE, INCREASE INTENSITY OF GREEN ZONE QUESTIONS (46 & 47) BY ALTERING AGE CATEGORY OR CHANGING SCOPE OF GREEN ZONE QUESTIONS.
	25	26	B	B			NA	T4	LACK OF RESPONSE TO BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES NO OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	T4	NO REMEDY REQUIRED. SUBJECT APPEARS CONVINCED POLYGRAPHIST WILL NOT ASK UNREVIEWED QUESTION DURING EXAMINATION.
U	46	33	G	R	46		+1 to +9	U1	RESPONSE TO GREEN ZONE QUESTION (46) AND LACK OF RESPONSE TO RED ZONE (33) INDICATES TRUTHFULNESS TO RELEVANT QUESTION.	U1	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; GREEN ZONE FUNCTIONING AS DESIGNED.
	47	35	G	R	47		+1 to +9	U2	RESPONSE TO GREEN ZONE QUESTION (47) AND LACK OF RESPONSE TO RED ZONE (35) INDICATES TRUTHFULNESS TO RELEVANT QUESTION.	U2	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; GREEN ZONE FUNCTIONING AS DESIGNED.
	23	24	G/W	R/W		24	-1 to -9	U3	RESPONSE TO RED/WHITE ZONE (24) AND LACK OF RESPONSE TO GREEN/WHITE ZONE (23) USUALLY INDICATES SUBJECT HOPES ERROR WILL BE MADE REGARDING RED ZONE QUESTIONS. BUT PRESENCE OF RESPONSE TO GREEN ZONE QUESTIONS (46 & 47) AND LACK OF RESPONSE TO RED ZONE QUESTIONS (33 & 35) INDICATES SUBJECT MAY BE CONFUSED BY WORDING AND/OR PURPOSE OF RED/WHITE ZONE QUESTION (24).	U3	REVIEW WITH SUBJECT BOTH GREEN/WHITE AND RED/WHITE ZONE QUESTIONS (23 & 24) TO INSURE SUBJECT UNDERSTANDS WORDING AND PURPOSE OF QUESTIONS.
	25	26	B	B			NA	U4	LACK OF RESPONSE TO BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES NO OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	U4	NO REMEDY REQUIRED. SUBJECT APPEARS CONVINCED POLYGRAPHIST WILL NOT ASK UNREVIEWED QUESTION DURING EXAMINATION.
V	46	33	G	R	46		+1 to +9	V1	RESPONSE TO GREEN ZONE QUESTION (46) AND LACK OF RESPONSE TO RED ZONE (33) INDICATES TRUTHFULNESS TO RELEVANT QUESTION.	V1	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; GREEN ZONE FUNCTIONING AS DESIGNED.
	47	35	G	R	47		+1 to +9	V2	RESPONSE TO GREEN ZONE QUESTION (47) AND LACK OF RESPONSE TO RED ZONE (35) INDICATES TRUTHFULNESS TO RELEVANT QUESTION.	V2	NO REMEDY REQUIRED. RED ZONE QUESTION IDEALLY FORMULATED; GREEN ZONE FUNCTIONING AS DESIGNED.
	23	24	G/W	R/W	23		+1 to +9	V3	RESPONSE TO GREEN/WHITE ZONE (23) AND LACK OF RESPONSE TO RED/WHITE ZONE (24) INDICATES FEAR OF ERROR REGARDING TARGET ISSUE; BUT LACK OF RESPONSE TO RED ZONE QUESTIONS (33 & 35) INDICATES FEAR OR ERROR NOT MAKING RED ZONE QUESTIONS (33 & 35) UNDULY THREATENING TO SUBJECT.	V3	ADMINISTER STIMULATION TEST. IF ALREADY ADMINISTERED; NO FURTHER REMEDY REQUIRED. RESPONSE TO GREEN/WHITE ZONE (23) AND LACK OF RESPONSE TO RED/WHITE ZONE (24) IN ADDITION TO RESPONSE TO GREEN ZONE (46 & 47) AND LACK OF RESPONSE TO RED ZONE (33 & 35) QUESTIONS PROVIDES FURTHER PSYCHOPHYSIOLOGICAL EVIDENCE OF TRUTHFULNESS REGARDING TARGET ISSUE.
	25	26	B	B			NA	V4	LACK OF RESPONSE TO BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES NO OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	V4	NO REMEDY REQUIRED. SUBJECT APPEARS CONVINCED POLYGRAPHIST WILL NOT ASK UNREVIEWED QUESTION DURING EXAMINATION.

COMBO	ZONES OF COMPARISON		COLOR CODE		PRESENCE REACTION		SCORE		INDICATION		REMEDY
W	46	33	G	R			0	W1	LACK OF RESPONSE TO RED ZONE QUESTION (33) INDICATES TRUTHFULNESS REGARDING TARGET ISSUE BASED ON ASSUMPTION SUBJECT CAPABLE OF RESPONSE; BUT LACK OF RESPONSE TO GREEN ZONE QUESTION (46) AS WELL, INDICATES SERIOUS GREEN ZONE DEFECT, OR INCAPACITY OF SUBJECT TO RESPOND TO EITHER QUESTION ZONE FOR REASON(S) TO BE DETERMINED BY POLYGRAPHIST.	W1	FIRST, ADMINISTER STIMULATION TEST TO DETERMINE SUBJECT CAPABILITY OF RESPONSE. SECOND, INCREASE INTENSITY OF GREEN ZONE QUESTION (46) BY ALTERING AGE CATEGORY OR CHANGING SCOPE OF GREEN ZONE QUESTION. IF ABOVE REMEDY FAILS TO PRODUCE DESIRED RESPONSE, A URINE SPECIMEN MAY BE OBTAINED FROM SUBJECT TO DETERMINE THE PRESENCE OF ANY DRUG.
	47	35	G	R			0	W2	LACK OF RESPONSE TO RED ZONE QUESTION (35) INDICATES TRUTHFULNESS REGARDING TARGET ISSUE BASED ON ASSUMPTION SUBJECT CAPABLE OF RESPONSE; BUT LACK OF RESPONSE TO GREEN ZONE QUESTION (46) AS WELL, INDICATES SERIOUS GREEN ZONE DEFECT, OR INCAPACITY OF SUBJECT TO RESPOND TO EITHER QUESTION ZONE FOR REASON(S) TO BE DETERMINED BY POLYGRAPHIST.	W2	REMEDY THE SAME AS (W1) ABOVE.
	23	24	G/W	R/W			0	W3	LACK OF RESPONSE TO GREEN/WHITE (23) AND RED/WHITE (24) ZONE INDICATES NO FEAR OF ERROR IS DAMPENING GREEN ZONE (46 & 47) AND FEAR OF DETECTION TO RED ZONE (33 & 35) NOT RECHANNELED INTO HOPE OF ERROR (24).	W3	NO REMEDY REQUIRED. NO EVIDENCE OF INSIDE ISSUE DAMPENING GREEN OR RED ZONE.
	25	26	B	B			NA	W4	LACK OF RESPONSE TO BOTH BLACK ZONE QUESTIONS (25 & 26) INDICATES NO OUTSIDE ISSUE BOTHERING SUBJECT DUE TO MISTRUST OF POLYGRAPHIST.	W4	NO REMEDY REQUIRED. SUBJECT APPEARS CONVINCED POLYGRAPHIST WILL NOT ASK UNREVIEWED QUESTION DURING EXAMINATION.

APPENDIX E

APPENDIX E DESCRIPTIONS FOR TABLES 13- 47
DESCRIPTIVE EXPLANATION OF THE FUNCTION OF EACH TABLE

Table 13 M-1 Matte Scoring Guide with 23-24 (Zone 4) corrections. Basic Study Data used to show the validity of the Polygraph for specific tests in confirmed criminal cases using the Matte Scoring Guide as applied in Polygraph use.

Table 14 M-2 Matte Scoring Guide without 23-24 (Zone 4) corrections. Tests the value of the Matte Scoring Guide to reach the correct decision without the Zone 4 corrections. Compares the value of Matte Scoring Guide to itself to test the value of the Zone 4 (23-24) in reaching correct decisions, reducing errors, and reducing inconclusives (14 M-2 to 13 M-1).

Table 21 B-1 Backster Scoring Guide with 23-24 (Zone 4) corrections. Tests the value of the zone 4 in reaching correct decisions using the Backster Scoring Guide. Compares the value of the Backster Scoring Guide to the Matte Scoring Guide using identical cases (21 B-1 to 13 M-1).

Table 22 B-2 Backster Scoring Guide without 23-24 (Zone 4) corrections. Tests the value of the Backster scoring system to reach the correct decision as developed and applied in Polygraph use for these confirmed cases. Compares the value of the Backster Scoring Guide to the Matte Scoring Guide as each is used in Polygraph common practice (22 B-2 to 13 M-1). Compares the value of the Zone 4 corrections to reach correct decisions using the Backster Scoring Guide (22 B-2 to 21 B-1). Compares the Backster Scoring Guide to the Matte Scoring Guide under the same conditions (22 B-2 to 14 M-2).

Table 29 F-1 Federal (Barland) Scoring Guide with 23-24 (Zone 4) corrections. Tests the value of the zone 4 in reaching correct decisions using the Federal Scoring Guide. Compares the value of the Federal (Barland) Scoring Guide to the Matte Scoring Guide using identical cases (29 F-1 to 13 M-1).

Table 30 F-2 Federal (Barland) Scoring Guide without 23-24 (Zone 4) corrections.
Tests the value of the Federal (Barland) Scoring Guide to reach the correct decision as developed and applied in Polygraph use for these confirmed cases. Compares the value of the Federal Scoring Guide to the Matte Scoring Guide as each is used in Polygraph common practice (30 F-2 to 13 M-1). Compares the value of the Zone 4 corrections to reach correct decisions using the Federal Scoring Guide (30 F-2 to 31 F-1). Compares the Federal Scoring Guide to the Matte Scoring Guide under the same conditions (30 F-2 to 14 M-2). Compares the value of the Federal Scoring Guide to the Backster Scoring Guide under the same conditions (30 F-2 to 22 B-2).

Tab 15 1M-1 with 23-24 -Converts the Table 13 raw scores to percents.
Tab 16 1M-2 wout 23-24 -Converts the Table 14 raw scores to percents.
Tab 23 1B-1 with 23-24 -Converts the Table 21 raw scores to percents.
Tab 24 1B-2 wout 23-24 -Converts the Table 22 raw scores to percents.
Tab 31 1F-1 with 23-24 -Converts the Table 29 raw scores to percents.
Tab 32 1F-2 wout 23-24 -Converts the Table 30 raw scores to percents.

TABLES 17, 18, 25, 26, 33, 34 EFFICIENCY OF DECISION MAKING

17 2M-1, 18 2M-2,
25 2B-1, 26 2B-2,
33 2F-1, 34 2F-2,

These tables test the ability of each scoring system to reach correct decisions for the cases. These tables are generated to show the score and accuracy of the Polygraph Decisions for the Innocent and Guilty cases separately <u>including</u> the Inconclusives. Thus each correct decision made is a percentage of the total cases.

Each percent developed shows the effectiveness of the particular system of scoring to correctly determine the true case from the total number of cases. This expresses the ability of the system to accurately make decisions.

TABLES 19, 20, 27, 28, 35, 36 CORRECTNESS OF THE DECISIONS MADE

19 3M-1, 20 3M-2,
27 3B-1, 28 3B-2,
35 3F-1, 36 3F-2,

These tables test how accurate the decisions of each scoring system are, when compared to the known confirmed truth. These tables are generated to show the score and accuracy of the Polygraph Decisions for the Innocent and Guilty cases separately <u>excluding</u> the Inconclusives. Thus each correct decision made is a percentage of the total decisions.

Each percent developed shows the effectiveness of the particular system of scoring to correctly determine the true case. This expresses the accuracy of the decisions made against ground truth.

TABLE 37 GOF-1 GOODNESS OF FIT - CHI-SQUARE TESTS

Uses the Goodness of Fit with the Chi Square Test to test for the presence of any significant differences in the distribution of decisions (observed) compared to ground truth (expected). This tests each case for this criterion for the data.

MM-1 Based on Table 13 M-1
Tests the value of the Matte Scoring Guide to determine the ground truth by reaching correct decisions.
Shows the Chi-Square value and the probability that there are any significant differences for the data.

MM-2 Based on Table 14 M-2
Tests the value of the Matte Scoring Guide to determine the ground truth by reaching correct decisions without using the Zone 4 correction.
Shows the Chi-Square value and the probability that there are any significant differences for the data.

BB-1 Based on Table 21 B-1
Tests the value of the Backster Scoring Guide to determine the ground truth by reaching correct decisions when using the Zone 4 correction.
Shows the Chi-Square value and the probability that there are any significant differences for the data.

BB-2 Based on Table 22 B-2
Tests the value of the Backster Scoring Guide to determine the ground truth by reaching correct decisions.
Shows the Chi-Square value and the probability that there are any significant differences for the data.

FF-1 Based on Table 29 F-1
Tests the value of the Federal Scoring Guide to determine the ground truth by reaching correct decisions using the Zone 4 correction.
Shows the Chi-Square value and the probability that there are any significant differences for the data.

FF-2 Based on Table 30 F-2
Tests the value of the Federal Scoring Guide to determine the ground truth by reaching correct decisions.
Shows the Chi-Square value and the probability that there are any significant differences for the data.

TABLE 38 GOF - 2 GOODNESS OF FIT - CHI SQUARE TESTS

This tests whether there are any significant differences in the data for overall most productive tracing and most productive pneumograph tracing for males and females.

TABLE 39 (11 MBF) SUMMARY COMPARISON OF THE THREE DIFFERENT POLYGRAPH SYSTEMS FOR SCORE AND ACCURACY OF DECISIONS

This table is based on data from the Tables 40 (12 MBF) and Table 41 (13 MBF) comparing the three scoring systems as they are commonly used in practice. This table compares the decisions that would be made if each type of system were applied to the data. Since the cases are the same for all the systems the comparative results show the value of each system in reaching decisions and the accuracy of the decisions made. The systems are compared for the Innocent cases, Guilty cases, and the Total cases. The Inconclusive rate and error rate are also compared. These data can be compared to previously published data for polygraph accuracy and validity.

TABLE 40 (12 MBF) COMPARISON OF THE POLYGRAPH SYSTEMS IN REACHING ACCURATE DECISIONS

These Tables use data from Tables 17,26,34 (2M-1,2B-2,2F-2) which compares the three systems as they are commonly used in practice. The results show the accuracy of the decisions as a function of the total cases. This compares the three systems for the validity of each to make accurate decisions from the total cases.

TABLE 41 (13 MBF) COMPARISON OF THE POLYGRAPH SYSTEM ACCURACY OF DECISIONS

These Tables use data from Tables 19,28,36 (3M-1,3B-2,3F-2) which compares the three systems as they are commonly used in practice. The results show the accuracy of the decisions as a function of the total decisions. This compares the three systems for the validity of each to make decisions that are accurate.

APPENDIX H

Table 42 X Summary table comparing the similarity of the different Scoring Methods to arrive at decisions using the percent data from Tables 15,16,23,24,31,32 (1M-1 to 1F-2).

Table Xa - Compares scores using the percent data for the Matte Scoring Guide (Table 15 1M-1) when adjusted using the Zone 4 (23-24) correction, to scores for the Backster Scoring Guide (Table 23 1B-1) when adjusted for the Zone 4 and to scores for the Federal Scoring Guide (Table 31 1F-1) when adjusted for the Zone 4. This tests the differences in the ability of the different Scoring Guides to reach the correct decisions on the same cases under the same conditions. This compares the value of the Matte Scoring Guide compared to the Backster Scoring Guide and the Federal Scoring Guide to arrive at the correct decision when the Zone 4 (23-24) corrections are used.

Table Xb - Compares scores using the percent data for the Backster Scoring Guide (Table 24 1B-2) and the Federal Scoring Guide (Table 32 1F-2) to the Matte Scoring Guide (Table 16 1M-2) when not adjusted using the Zone 4 (23-24) correction.
This tests the differences in the ability of the different Scoring Guides to reach the correct decisions on the same cases under the same conditions. This compares the value of the Backster Scoring Guide and the Federal Scoring Guide to the Matte Scoring Guide, without the Zone 4 (23-24) corrections, to the arrive at the correct decision .

TABLE 43 XX - SUMMARY TABLE COMPARING ACCURACY OF SCORING METHODS IN ARRIVING AT DECISIONS, INCLUDING INCONCLUSIVES, WITH ZONE FOUR AND WITHOUT ZONE FOUR

XXa , XXb,
These tables compare the percent using the data from Tables 17,18,25,26,33,34 (2M-1 to 2F-2). These show the comparisons for the ability of each polygraph scoring system to arrive at correct decisions when the Inconclusives are <u>included</u>. This compares the scoring systems for the ability of each system to reach accurate decisions as a function of the total cases. This checks the validity of each system in reaching decisions.

TABLE 44 XXX - SUMMARY TABLE COMPARING ACCURACY OF SCORING METHODS IN ARRIVING AT DECISIONS, EXCLUDING INCONCLUSIVES, WITH ZONE FOUR AND WITHOUT ZONE FOUR

XXXa , XXXb,
These tables compare the percent using the data from Table 19,20,27,28,35,36, (3M-1 to 3F-2). These show the comparisons for the correctness of the decisions for each polygraph scoring system when the Inconclusives are <u>excluded</u>. This compares the scoring systems for the accuracy of the decisions made as a function of the total decisions. This checks the validity of each system for the accuracy of the decisions that are made.

Table 45 Y Summary Table Comparing the Scoring Methods for value of the Zone 4 (23-24) to Arrive at Decisions using the percent data from Tables 15,16,23,24,31,32, (1M-1 to 1F-2).

Table Ya - Compares scores for the Matte Scoring Guide (Table 15 1M-1) when adjusted using the Zone 4 (23-24) correction to scores when not adjusted for the Matte Scoring Guide (Table 16 1M-2) comparing the percent data.
This tests the differences in the ability of the Matte Scoring Guide to reach the correct decisions on the same cases under the same conditions. It tests the value of the Zone 4 in the Matte Scoring Guide in reaching decisions as it is applied to the data.

Table Yb - Compares scores for the Backster Scoring Guide (Table 24 1B-2) to the Backster Scoring Guide (Table 23 1B-1) when adjusted using the Zone 4 (23-24) correction comparing the percent data. This tests the differences in the ability of the Backster Scoring Guide to reach the correct decisions on the same cases under the same conditions. It tests the value of the Zone 4 to adjust the Backster Scoring Guide to reach correct decisions as it is applied to the data.

Table Yc - Compares scores for the Federal Scoring Guide (Table 32 1F-2) to the Federal Scoring Guide (Table 31 1F-1) when adjusted using the Zone 4 (23-24) correction comparing the percent data. This tests the differences in the ability of the Federal Scoring Guide to reach the correct decisions on the same cases under the same conditions. It tests the value of the Zone 4 to adjust the Federal Scoring Guide to reach correct decisions as it is applied to the data.

TABLE 46 YY - SUMMARY COMPARING ACCURACY OF SCORING METHODS FOR VALUE OF THE ZONE 4 IN ARRIVING AT DECISIONS, INCLUDING INCONCLUSIVES

YYa , YYb,
These tables compare the percent using the data from Tables 17,18,25,26,33,34 (2M-1 to 2F-2). These show the comparisons for each scoring system of the value of the Zone 4 (23-24) in reaching correct decisions when the Inconclusives are <u>included</u>. This compares the ability within each system to reach accurate decisions with or without the Zone 4 and as a function of the total cases. This checks the validity of the Zone 4 as applied to each system in reaching decisions.

TABLE 47 YYY - SUMMARY TABLE COMPARING ACCURACY OF SCORING METHODS FOR VALUE OF THE ZONE 4 IN ARRIVING AT DECISIONS, EXCLUDING INCONCLUSIVES

YYYa , YYYb,
These tables compare the percent using the data from Tables 19,20,27,28,35,36 (3M-1 to 3F-2). These show the comparisons for each scoring system of the value of the Zone 4 (23-24) in reaching correct decisions when the Inconclusives are <u>excluded</u>. This compares the ability within each system to reach accurate decisions with or without the Zone 4 and as a function of the total decisions. This checks the validity of the Zone 4 as applied to each system in making accurate decisions.

APPENDIX F

A METHOD FOR ESTIMATING THE ACCURACY OF INDIVIDUAL CONTROL QUESTION TESTS

Gordon H. Barland, Ph.D.

The type of polygraph examination most commonly used in criminal investigations in the U.S. is the control question test. Although many experts agree that it is generally about 90% accurate under optimal conditions, no method has been available to the field examiner to estimate the probability of an error associated with specific control question polygraph examinations. Polygraph charts obtained in laboratory research involving mock crimes were numerically scored using field techniques. Normative tables were derived from the distribution of the scores of the "guilty" and "innocent" subjects. Given any three-chart score from polygraph charts obtained and scored under similar conditions, the probability of false positive and false negative errors can be estimated by reference to the tables. It would be premature to apply this method to criminal investigations until similar tables have been developed from verified real-life cases.

The federal scoring system for evaluating single issue control question tests in the field requires a final test score of +6 or higher for a decision of truthfulness and -6 or lower for a decision of deception. Scores between +/-5, inclusive, are inconclusive. Although many experts agree that numerically scored control question tests are about ninety percent accurate when criminal suspects are examined under appropriate conditions, there exists no method by which the field examiner can estimate the accuracy of individual control question tests. Once the score exceeds the threshold required for a decision, the accuracy

is assumed to be about ninety percent. However, if the scores of the innocent and guilty suspect populations are distributed in anything approaching a normal distribution, it would follow that the more extreme the score is, the more accurate the decision is likely to be. Conversely, the closer the score approaches zero, the greater the possibility of an error if a decision is made.

This study tested that assumption and, using data from mock crimes, developed a table which lists the estimated probability of an error for each polygraph test score irrespective of what the base rates are for truth and deception.

Data from mock crimes were used in order to obtain ground truth about whether the subjects were truthful or deceptive on the relevant questions. Data from three sources were pooled in order to have as large an N as possible. The pooling of data would be expected to increase the variance of the scores, which would make the resulting probabilities more robust, increasing the generalizability of the results. It is better for the probabilities generated by this research to overstate rather than understate the probability of error. The three sources included two mock theft studies (Barland & Raskin, 1975; Dawson, 1977) and a variety of mock crimes committed for the polygraph training course of the Canadian Police College.[1] The data consisted of the numerical scores obtained from the first three charts of the federal zone comparison control question test, in which three physiological measures were scored: respiration, skin resistance and cardiovascular activity as measured by a pressurized arm cuff.

The pooled data included 120 truthful and 74 deceptive subjects. The mean scores were +6.9 for the truthful group and -8.3 for the deceptive group, with standard deviations of 8.65 and 8.78, respectively. As can be seen in Figure 1, 122 (63%) of the examiners' decisions were correct, 10 (5%) were incorrect, and 62 (32%) of the polygraph examinations were inconclusive. Excluding the inconclusive results, 92% of the decisions were correct. There was a 9% false positive error rate and a 5% false negative error rate. Some 96% of the truthful decisions and 88% of the deceptive decisions were correct.

Each of the two frequency distribution curves was separately grouped into intervals of five. The differences between the observed frequencies and the frequencies expected if the distribution were normal were compared using the chi square goodness of fit test (Downie and Heath, 1974). The differences were significant neither for the innocent group

($x^2 = 3.1187$, df = 4) nor for the guilty group ($x^2 = 5.2652$ df = 3). Because neither curve was significantly different from a normal distribution, the raw polygraph scores were converted to standard scores for each group separately, based upon its mean and standard deviation, and the probability associated with each of the standard scores was obtained from standard tables. These are presented in Table 2. Column 3 lists the probabilities that a guilty subject could score as high or higher than the 3-chart polygraph scores in column 1. Column 5 lists the probabilities that an innocent subject could score as low or lower than the scores in column

There are several approaches that can be taken when estimating the probability of errors associated with individual control question tests. One method would be to determine the ratio of the frequencies of the innocent versus the guilty subjects at each polygraph score. For example, if exactly nine times as many guilty subjects obtain any given score as do innocent subjects, then the ratio of 9:1 implies that there is a 10% chance of a false positive error if all subjects with that score were called deceptive.

A related approach would be to compare the ratio of the areas under the two curves which are at or beyond a given score. As in the previous method, if 90% of the areas under the two curves at or beyond a given score are under the guilty curve and 10% is under the innocent curve, then there is a 10% chance of a false positive error if all subjects with that score were called deceptive. There are two problems with these approaches, however. First, they are sensitive to distortions caused whenever the base rate for guilt is different from whatever it is assumed to be, which is customarily assumed to be 50%. Since the base rate for guilt is difficult to estimate in real life situations, techniques which are sensitive to base rate fluctuations are problematic. Second, whenever the polygraph score is so extreme that it falls above or below the bulk of <u>both</u> curves, the probability of error estimated by both methods approaches 50%, which is obviously incorrect.

The approach detailed in this paper is not subject to either problem. The proportion of cases falling at or beyond any given score is essentially the same regardless of the number of subjects in the population. So long as only one curve is selected for use without reference to the other curve, base rate fluctuations cause no problem. As one approaches the appropriate tail of each curve, the estimated probability of an error approaches the infinitesimal. In conceptualizing the problem of estimating errors in polygraph tests, it is important to note the distinction between

reporting "The probability of an error is..." or "The probability that the subject is guilty (or innocent)is ..." versus "The probability that a deceptive subject will score as high or higher than a given score is..." The first two statements are affected by base rates of guilt and innocence; the third is not. When the base rate for innocence is 100%, there is no chance of a false negative error, but that does not affect the accuracy of the third statement. The approach used here is that of estimating the probability of an error if the person is in fact guilty (or innocent).

The probabilities shown in Table 1 are carried out to only one decimal place, except in the tails where two significant figures are shown. To display more detailed probabilities would imply a precision not justified by the size of the data base. Even were the data base much larger, it would seem presumptuous to show more than three significant figures in the extreme tails when estimating the

TABLE 1

POLYGRAPH OUTCOME FOR INNOCENT AND GUILTY SUBJECTS

		Polygraph Outcome			
		T	D	?	Total
Ground Truth	Innocent	70	7	43	120
	Guilty	3	52	19	74
	Total	73	59	62	194

Note: T = truthful; D = deceptive; ? = inconclusive

probability of an error with an individual result due to the vagaries of the human mind.

It is hardly necessary to point out that the table of probabilities published here is generated from subjects in a mock crime paradigm. The psychodynamics of actual criminal suspects undergoing polygraph examinations are no doubt quite different. It would therefore be inappropriate for the probabilities listed in this table to be applied to criminal investigations. In order to develop a table for use in criminal investigations it would be necessary to

use a data base obtained from the examination of criminal suspects. The purpose of this article was not to generate a table for use in criminal investigations, but rather to suggest the methodology by which such a table could be generated.

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Table

for estimating error rates

of control question polygraph tests

3-Chart Polygraph Score	z-Scores from 74 "Guilty" Subjects	Probability that a guilty S will score this high or higher is <	z-Scores from 120 Innocent" Subjects	Probability that an innocent S will score this low or lower is <
36	5.045715	.01	3.363076	1
35	4.931844	.01	3.247407	1
34	4.817973	.01	3.131738	1
33	4.704102	.01	3.016069	1
32	4.590231	.01	2.900400	1
31	4.476360	.01	2.784731	1
30	4.362489	.01	2.669062	1
29	4.248618	.01	2.553393	1
28	4.134747	.01	2.437724	1
27	4.020876	.01	2.322055	1
26	3.907005	.01	2.206386	1
25	3.793134	.01	2.090717	1
24	3.679263	.01	1.975048	1
23	3.565392	.01	1.859379	1
22	3.451521	.01	1.743710	1
21	3.337650	.01	1.628041	.95
20	3.223779	.01	1.512372	.95
19	3.109908	.01	1.396703	.95
18	2.996037	.01	1.281034	.9
17	2.882166	.01	1.165365	.9
16	2.768295	.01	1.049696	.9
15	2.654424	.01	.9340270	.9
14	2.540553	.01	.8183581	.8
13	2.426682	.01	.7026891	.8
12	2.312812	.05	.5870201	.8
11	2.198941	.05	.4713511	.7
10	2.085070	.05	.3556821	.7
9	1.971199	.05	.2400131	.6
8	1.857328	.05	.1243442	.6
7	1.743457	.05	.0086752	.6
6	1.629586	.1	-.106994	.5
5	1.515715	.1	-.222663	.5
4	1.401844	.1	-.338332	.4
3	1.287973	.2	-.454001	.4
2	1.174102	.2	-.569670	.3
1	1.060231	.2	-.685339	.3
0	.9463599	.2	-.801008	.3
-1	.8324890	.3	-.916677	.2
-2	.7186180	.3	-1.03235	.2
-3	.6047471	.3	-1.14801	.2
-4	.4908761	.4	-1.26368	.2
-5	.3770051	.4	-1.37935	.1
-6	.2631342	.4	-1.49502	.1
-7	.1492632	.5	-1.61069	.1
-8	.0353922	.5	-1.72636	.05
-9	-.078479	.6	-1.84203	.05
-10	-.192350	.6	-1.95770	.05
-11	-.306221	.7	-2.07337	.05
-12	-.420092	.7	-2.18904	.05
-13	-.533963	.8	-2.30470	.05
-14	-.647834	.8	-2.42037	.01
-15	-.761705	.8	-2.53604	.01
-16	-.875575	.9	-2.65171	.01
-17	-.989446	.9	-2.76738	.01
-18	-1.10332	.9	-2.88305	.01
-19	-1.21719	.9	-2.99872	.01
-20	-1.33106	.95	-3.11439	.01
-21	-1.44493	.95	-3.23006	.01
-22	-1.55880	.95	-3.34573	.01
-23	-1.67267	1	-3.46139	.01
-24	-1.78654	1	-3.57706	.01

APPENDIX G

APPENDIX G-1 DATA BASE FOR COMPARING MATTE, BACKSTER, AND FEDERAL SYSTEMS WITHOUT ZONE FOUR, FOR TABLES 14,22,30

NUM	CASE	CONF	CONC	C10	C20	C30	C40	TSWO
1	A1A	DI	DI	-10	-9	-11		-30
2	A2A1	NDI	NDI	2	1	4		7
3	A3A2	NDI	NDI	8	4			12
4	A4A1	NDI	NDI	7	4			11
5	A5A2	DI	DI	-8	5	-9		-12
6	L6A1	NDI	NDI	6	-2	-1	5	8
7	L7A2	DI	DI	-15	-10	-9		-34
8	L8A3	NDI	INC	-9	-9	-5	-6	-29
9	A9A	NDI	INC	1	-5	2		-2
10	A10A	DI	DI	-4	-2	-8		-14
11	A10B	DI	DI	-5	-15			-20
12	A11A	NDI	NDI	5	6			11
13	A11B	DI	INC	-6	3	-8		-11
14	A12A	DI	DI	-4	-13	-8		-25
15	A13A	DI	DI	-12	-6			-18
16	A14A	DI	DI	-6	-6	-1		-13
17	A15A	NDI	NDI	6	9			15
18	A15B	NDI	NDI	-5	5			0
19	A16	NDI	NDI	7	4			11
20	A17	DI	DI	-6	-9			-15
21	A18	NDI	NDI	4	5	4		13
22	A19	NDI	NDI	-3	1	3		1
23	A20	NDI	NDI	7	-1			6
24	A21A	NDI	NDI	-3	5	4		6
25	A21B	NDI	NDI	4	0			4
26	A22	NDI	NDI	9	2			11
27	A23A	NDI	NDI	4	8			12
28	A23B	DI	DI	-4	-6	-2		-12
29	A24	NDI	NDI	0	2			2
30	A25	DI	DI	-6	-10			-16
31	A26A	DI	DI	-6	-6	-6		-18
32	A26B	DI	DI	-9	-12			-21
*** Total ***				-51	-57	-51	-1	-160

APPENDIX G-1 DATA BASE FOR COMPARING
MATTE, BACKSTER, AND FEDERAL SYSTEMS
WITHOUT ZONE FOUR, FOR TABLES 14,22,30

NUM	CASE	CONF	CONC	C10	C20	C30	C40	TSWO
33	M1	DI	DI	3	-4	-9	-5	-15
34	M2	DI	DI	-12	-9	-2	-2	-25
35	M3	NDI	NDI	0	0			0
36	M4	NDI	NDI	2	1			3
37	M5	NDI	NDI	7	-13	4	8	6
38	M6	NDI	NDI	6	3			9
39	M7	NDI	NDI	3	2			5
40	M8	DI	DI	-12	-11			-23
41	M9	DI	DI	-9	-9			-18
42	M10	DI	DI	-5	-10			-15
43	M11	DI	DI	-6	-12	-14		-32
44	M12A	NDI	NDI	-3	3	10		10
45	M12B	NDI	NDI	4	5			9
46	M13A	DI	DI	-6	-8	-6		-20
47	M13B	DI	DI	-8	-10	-14		-32
48	M14	NDI	NDI	0	-3	0	3	0
49	M15	NDI	NDI	3	-1			2
50	M16	NDI	NDI	-3	1			-2
51	M17	NDI	NDI	2	6			8
52	M18	NDI	NDI	5	2			7
53	M19	NDI	NDI	-1	6			5
54	M20	NDI	NDI	0	6			6
55	M21	NDI	NDI	0	0			0
56	M22	NDI	NDI	8	0	10		18
57	M23	DI	DI	-9	-11	-12		-32
58	M24	NDI	NDI	5	4			9
59	M25	NDI	NDI	8	-4			4
60	M26	DI	DI	-7	-9	-2	-10	-28
61	M27	DI	DI	-2	-5	0	-13	-20
62	M28	NDI	NDI	15	8			23
63	M29	NDI	NDI	6	1			7
64	M30	NDI	NDI	0	10			10
65	M31	NDI	NDI	11	5			16
66	M32	NDI	NDI	10	0			10
67	M33	NDI	NDI	4	7			11
68	M34	NDI	NDI	4	14			18
69	M35	NDI	NDI	4	7			11
70	M36	NDI	NDI	3	3			6
71	M37	NDI	NDI	-7	5			-2
72	M38	DI	DI	-4	-1	-5	-9	-19
73	M39	DI	DI	-8	-8			-16
74	M40	NDI	INC	-4	0	2		-2
75	M41	DI	DI	-10	-6	-8		-24
76	M42	NDI	NDI	2	7			9
77	M43	DI	DI	-2	-9	-8		-19
78	M44	NDI	NDI	6	5			11
79	M45	NDI	NDI	-1	-7	9		1
80	M46	NDI	NDI	6	4			10
81	M47	NDI	NDI	4	7			11

APPENDIX G-1 DATA BASE FOR COMPARING
MATTE, BACKSTER, AND FEDERAL SYSTEMS
WITHOUT ZONE FOUR, FOR TABLES 14,22,30

NUM	CASE	CONF	CONC	C10	C20	C30	C40	TSWO
82	M48	NDI	NDI	-2	0			-2
83	M49	NDI	NDI	5	0			5
84	M50	NDI	NDI	6	-3			3
85	M51	NDI	NDI	5	3			8
86	M52	NDI	INC	-5	-5			-10
87	M53	DI	DI	-2	-15	-11	-13	-41
88	M54A	DI	DI	1	-10	-8		-17
89	M54B	DI	DI	-8	-7	-8		-23
90	M54C	DI	DI	-7	-10			-17
91	M55A	DI	DI	-4	-6	-1	-4	-15
92	M55B	DI	DI	-6	-3	-9	-3	-21
93	M56	DI	DI	-10	-7	-6		-23
94	M57A	DI	DI	-9	-4	-3		-16
95	M57B	DI	DI	-12	-10			-22
96	M58A	DI	DI	-7	-11			-18
97	M58B	NDI	INC	-3	-8			-11
98	M59A	DI	DI	-8	-2	-12		-22
99	M59B	DI	DI	-9	-11			-20
100	M60	DI	DI	-3	-8	-8		-19
101	M61A	DI	DI	2	-10	-5		-13
102	M61B	DI	DI	-3	-6			-9
103	M62A	DI	DI	-8	-10			-18
104	M62B	DI	DI	-5	-9			-14
105	M63A	DI	DI	-9	-9			-18
106	M63B	DI	DI	-6	-10			-16
107	M64A	DI	DI	-8	-10	-5		-23
108	M64B	DI	DI	-4	-8			-12
109	M65A	DI	DI	-4	-5	-3		-12
110	M65B	DI	DI	-9	-7	-6		-22
111	M66	DI	DI	-9	-7	-7		-23
112	M67A	DI	DI	-5	-11	-12		-28
113	M67B	DI	DI	-4	-5	-8		-17
114	M68A	DI	DI	-11	-7	-12		-30
115	M68B	DI	DI	-4	-7	-8		-19
116	M69A	DI	INC	8	5	-1		12
117	M69B	DI	DI	-8	-5	-3		-16
118	M70A	DI	DI	-13	-9	-3	-9	-34
119	M70B	DI	DI	-7	-8	-10		-25
120	M71A	DI	DI	-1	-10	-6		-17
121	M71B	DI	DI	-6	-13			-19
122	M71C	DI	DI	-12	-6			-18
*** Total ***				***	***	***	-57	-761

APPENDIX G-2 DATA BASE FOR COMPARING
MATTE, BACKSTER, AND FEDERAL SYSTEMS
WITH ZONE FOUR, FOR TABLES 13,21,29

NUM	CASE	CONF	CONC	C13	C23	C33	C43	GS23
1	A1A	DI	DI	-10	-12	-13		-35
2	A2A1	NDI	NDI	4	4	5		13
3	A3A2	NDI	NDI	10	3			13
4	A4A1	NDI	NDI	8	3			11
5	A5A2	DI	DI	-8	2	-9		-15
6	L6A1	NDI	NDI	8	-1	5	11	23
7	L7A2	DI	DI	-18	-11	-9		-38
8	L8A3	NDI	INC	-8	-4	0	-3	-15
9	A9A	NDI	INC	3	-1	4		6
10	A10A	DI	DI	-4	1	-12		-15
11	A10B	DI	DI	-3	-15			-18
12	A11A	NDI	NDI	5	6			11
13	A11B	DI	INC	-7	2	-5		-10
14	A12A	DI	DI	-3	-17	-12		-32
15	A13A	DI	DI	-17	-14			-31
16	A14A	DI	DI	-8	-6	-4		-18
17	A15A	NDI	NDI	9	10			19
18	A15B	NDI	NDI	-1	9			8
19	A16	NDI	NDI	14	4			18
20	A17	DI	DI	-8	-10			-18
21	A18	NDI	NDI	8	8	7		23
22	A19	NDI	NDI	0	7	6		13
23	A20	NDI	NDI	12	6			18
24	A21A	NDI	NDI	1	13	10		24
25	A21B	NDI	NDI	6	2			8
26	A22	NDI	NDI	13	6			19
27	A23A	NDI	NDI	6	11			17
28	A23B	DI	DI	-4	-4	-7		-15
29	A24	NDI	NDI	7	1			8
30	A25	DI	DI	-6	-15			-21
31	A26A	DI	DI	-10	-9	-1		-20
32	A26B	DI	DI	-12	-11			-23
*** Total ***				-13	-32	-35	8	-72

APPENDIX G-2 DATA BASE FOR COMPARING MATTE, BACKSTER, AND FEDERAL SYSTEMS WITH ZONE FOUR, FOR TABLES 13,21,29

NUM	CASE	CONF	CONC	C13	C23	C33	C43	GS23
33	M1	DI	DI	-1	-4	-10	-5	-20
34	M2	DI	DI	-12	-13	-2	-1	-28
35	M3	NDI	NDI	4	4			8
36	M4	NDI	NDI	4	4			8
37	M5	NDI	NDI	10	0	4	10	24
38	M6	NDI	NDI	10	4			14
39	M7	NDI	NDI	4	4			8
40	M8	DI	DI	-15	-11			-26
41	M9	DI	DI	-12	-12			-24
42	M10	DI	DI	-7	-8			-15
43	M11	DI	DI	-9	-17	-19		-45
44	M12A	NDI	NDI	-2	7	12		17
45	M12B	NDI	NDI	7	10	0		17
46	M13A	DI	DI	-6	-10	-9		-25
47	M13B	DI	DI	-11	-11	-14		-36
48	M14	NDI	NDI	3	0	5	5	13
49	M15	NDI	NDI	6	2			8
50	M16	NDI	NDI	0	8			8
51	M17	NDI	NDI	7	8			15
52	M18	NDI	NDI	7	5			12
53	M19	NDI	NDI	3	5			8
54	M20	NDI	NDI	7	9			16
55	M21	NDI	NDI	6	2			8
56	M22	NDI	NDI	11	3	11		25
57	M23	DI	DI	-10	-14	-13		-37
58	M24	NDI	NDI	12	8			20
59	M25	NDI	NDI	12	-3			9
60	M26	DI	DI	-8	-10	-5	-11	-34
61	M27	DI	DI	-4	-9	0	-16	-29
62	M28	NDI	NDI	20	10			30
63	M29	NDI	NDI	8	3			11
64	M30	NDI	NDI	1	13			14
65	M31	NDI	NDI	18	10			28
66	M32	NDI	NDI	11	0			11
67	M33	NDI	NDI	5	13			18
68	M34	NDI	NDI	9	12			21
69	M35	NDI	NDI	7	7			14
70	M36	NDI	NDI	9	5			14
71	M37	NDI	NDI	-2	10			8
72	M38	DI	DI	-5	-3	-10	-12	-30
73	M39	DI	DI	-11	-11			-22
74	M40	NDI	INC	-4	3	4		3
75	M41	DI	DI	-10	-11	-12		-33
76	M42	NDI	NDI	2	13			15
77	M43	DI	DI	-4	-11	-11		-26
78	M44	NDI	NDI	7	7			14
79	M45	NDI	NDI	2	-5	15		12
80	M46	NDI	NDI	6	6			12
81	M47	NDI	NDI	6	7			13

APPENDIX G-2 DATA BASE FOR COMPARING
MATTE, BACKSTER, AND FEDERAL SYSTEMS
WITH ZONE FOUR, FOR TABLES 13,21,29

NUM	CASE	CONF	CONC	C13	C23	C33	C43	GS23
82	M48	NDI	NDI	2	7			9
83	M49	NDI	NDI	8	3			11
84	M50	NDI	NDI	8	0			8
85	M51	NDI	NDI	8	8			16
86	M52	NDI	INC	3	2			5
87	M53	DI	DI	-1	-17	-9	-18	-45
88	M54A	DI	DI	0	-12	-10		-22
89	M54B	DI	DI	-9	-12	-9		-30
90	M54C	DI	DI	-9	-11			-20
91	M55A	DI	DI	-9	-11	-5	-2	-27
92	M55B	DI	DI	-9	-3	-12	-7	-31
93	M56	DI	DI	-12	-11	-9		-32
94	M57A	DI	DI	-7	-6	-7		-20
95	M57B	DI	DI	-15	-12			-27
96	M58A	DI	DI	-5	-8			-13
97	M58B	NDI	INC	3	-3			0
98	M59A	DI	DI	-10	-1	-19		-30
99	M59B	DI	DI	-9	-13			-22
100	M60	DI	DI	-4	-8	-10		-22
101	M61A	DI	DI	2	-10	-11		-19
102	M61B	DI	DI	-5	-8			-13
103	M62A	DI	DI	-10	-13			-23
104	M62B	DI	DI	-9	-12			-21
105	M63A	DI	DI	-11	-10			-21
106	M63B	DI	DI	-9	-14			-23
107	M64A	DI	DI	-13	-11	-7		-31
108	M64B	DI	DI	-7	-11			-18
109	M65A	DI	DI	-6	-7	-6		-19
110	M65B	DI	DI	-10	-8	-7		-25
111	M66	DI	DI	-12	-7	-9		-28
112	M67A	DI	DI	-8	-15	-12		-35
113	M67B	DI	DI	-9	-8	-13		-30
114	M68A	DI	DI	-13	-7	-14		-34
115	M68B	DI	DI	-2	-9	-13		-24
116	M69A	DI	INC	5	-2	-1		2
117	M69B	DI	DI	-7	-6	-10		-23
118	M70A	DI	DI	-15	-13	-5	-11	-44
119	M70B	DI	DI	-9	-9	-12		-30
120	M71A	DI	DI	-3	-12	-6		-21
121	M71B	DI	DI	-9	-17			-26
122	M71C	DI	DI	-16	-7			-23
*** Total ***				***	***	***	-68	-775