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# EUROPEAN POLYGRAPH

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## Psychological Aspects of the Quadri-Track Zone Comparison Technique and Attendant Benefits of its Inside Track

The Quadri-Track Zone Comparison Technique is a psychological test that *in-*  
*fers* deception or truthfulness to the target issue by the elimination of variables  
identified in Chapter 9, Forensic Psychophysiology Using the Polygraph (Matte  
1996) that could have caused the autonomic responses other than a deliberate  
attempt at deception. These variables fall into four categories: (a) Emotionally  
induced sympathetic response, (b) Non-Emotionally induced sympathetic re-  
sponse, (c) Emotionally induced parasympathetic response, and (d) Factors af-  
fecting strength of emotional and non-emotional response.

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The Quadri-Track Zone Comparison test structure (Fig. 1) shows a Primary Track and a Secondary Track, that includes a non-current exclusive control question<sup>1</sup> and a direct relevant question regarding a single issue. A third track labeled Inside Track contains a *Fear of Error* control question and a *Hope of Error* relevant question. Each relevant question is compared with the control question preceding it within the same track. The scores attained from the comparison of the control versus relevant question in each track is tallied for a total score from the three tracks which is then married to a conclusion table that employs a score threshold based on a statistical predictive table for estimating error rates (Matte 1989a), to wit: +3 and -5 for 1 chart, +6 and -10 for 2 charts, +9 and -15 for 3 charts, +12 and -20 for 4 charts. A minimum of 2 charts must be used to arrive at a decision of truth or deception. Scores below the aforesaid threshold fall into the Inconclusive category.

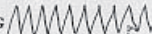
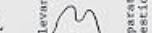

Figure 2 shows the Quadri-Track ZCT's test question format and the order in which the questions are asked during the administration of the test and collection of the charts, except that with each chart collected, the two direct relevant questions (33 & 35) are switched in their position so that each direct relevant question is compared with the other two control questions (46 & 47).

Figure 3 provides an example of test question formulation regarding a larceny where the exact amount of deposit money stolen is known. Otherwise the prefix "approximate" would have been used.

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<sup>1</sup> The non-current exclusive control (comparison) question, also known as the Backster control question, is formulated to be in the same category of offense or matter as the relevant question or issue. However, this control question is separated in time from the relevant issue with the use of a *time bar*, thus it is considered an earlier-in-life (non-current) control question. Hence this control question excludes the period in which the crime was committed. The term "control" question has been replaced with the term "comparison" to conform to the scientific literature. Nevertheless, in this thesis the term "control" is still used to avoid duplication of the term comparison in succession which could cause confusion, such as comparison of the comparison versus relevant questions.

Figure 1. Quadri-Track ZCT Test Question: Structure &amp; Format

| MATTE QUADRI-TRACK ZONE COMPARISON TEST STRUCTURE   |     |                                      |   |    |                                      |    |                                 |    |                                      |    |
|---|-----|--------------------------------------|---|----|--------------------------------------|----|---------------------------------|----|--------------------------------------|----|
| (Cannot jump track to make comparison)  |     |                                      |   |    |                                      |    |                                 |    |                                      |    |
| PNEUMO TRACING                   |     | OUTSIDE TRACK                        | PRIMARY TRACK   |    | SECONDARY TRACK                      |    | INSIDE TRACK                    |    | OUTSIDE TRACK                        |    |
| ELECTRODERMAL (GSR/GSG) TRACING  |     | Symptomatic Question (Outside Issue) | Reviewed, Exclusive Control Question  |    | Reviewed, Exclusive Control Question |    | Fear of Error Control Question  |    | Symptomatic Question (Outside Issue) |    |
| CARDIO TRACING                   |     |                                      | Strong Relevant Question  |    | Strong Relevant Question             |    | Hope of Error Relevant Question |    |                                      |    |
| QUESTION NUMBER   | 14J | 39                                   | 25  | 46 | 33                                   | 47 | 35                              | 23 | 24                                   | 26 |
| COLOR CODE  | Y   | YR                                   | B   | G  | R                                    | G  | R                               | Gw | Rw                                   | B  |
| TRI-ZONE COMPARISON   |     |                                      | ZONE  |    | ZONE                                 |    | ZONE                            |    | ZONE                                 |    |
| COLOR LEGEND:   |     |                                      | ZONES   |    | SPOT ONE ANALYSIS SCORE              |    | SPOT TWO ANALYSIS SCORE         |    | SPOT THREE ANALYSIS SCORE            |    |
| B Symptomatic (Outside Issue)   |     |                                      | 1. Black (Symptomatic)  |    | +/-                                  |    | +/-                             |    | +/-                                  |    |
| G Exclusive Control Question  |     |                                      | 2. Green (Exclusive Control)  |    |                                      |    |                                 |    |                                      |    |
| R Relevant Question (Strong)  |     |                                      | 3. Red (Strong Relevant)  |    |                                      |    |                                 |    |                                      |    |
| w Indicates Zone is influenced by Zones in Spots #1 and #2  |     |                                      | Note: White (w) suffix to a Zone places that Zone in the  |    |                                      |    |                                 |    |                                      |    |
| Gw Inside Issue Control Question (Variable strength)  |     |                                      | Inside Track to recoup response scores lost as a result of an Inside Issue.                                     |    |                                      |    |                                 |    |                                      |    |
| Rw Inside Issue Relevant Question (Variable strength)   |     |                                      | TRACK Identifies a pair of questions related for comparison/quantification (G & R Zone) or evaluation (B Zone). |    |                                      |    |                                 |    |                                      |    |
| YR Sacrifice Relevant Question  |     |                                      |   |    |                                      |    |                                 |    |                                      |    |
| Y Neutral Question (Irrelevant)   |     |                                      |   |    |                                      |    |                                 |    |                                      |    |
| THREE SPOTS SCORED AND TALLIED FOR A GRAND TOTAL = TRUTH, DECEPTION, INCONCLUSIVE                                 |     |                                      |   |    |                                      |    |                                 |    |                                      |    |
| SPOT Identifies a Track which is quantified.  |     |                                      |   |    |                                      |    |                                 |    |                                      |    |
| © 1995 by James Allan Matte   |     |                                      |   |    |                                      |    |                                 |    |                                      |    |

## Legend:

- 14J Neutral Irrelevant Question
- 39 Preparatory/Sacrifice Relevant Question
- 25 Symptomatic Question
- 46 Non-Current Exclusive Control Question
- 33 Relevant Question
- 47 Non-Current Exclusive Control Question
- 35 Relevant Question
- 23 Fear of Error Control Question
- 24 Hope of Error Relevant Question
- 26 Symptomatic Question

Figure 2. Quadri-Track ZCT Test Question: Sample Format

| Type | No. | Question  |
|------|-----|---|
| Y    | 14J | Were you born in the United States?   |
| YR   | 39  | Regarding whether or not you stole that \$5000.00 deposit discovered missing from the safe at ABC Market, 999 Sunset Avenue, Buffalo, New York on 4 July 2003: Do you intend to answer truthfully each question about that? |
| B    | 25  | Are you completely convinced that I will not ask you an unreviewed question during this chart?  |
| G    | 46  | Between the ages of (18) and (24) – Do you remember ever stealing anything?   |
| R    | 33  | Did you steal that missing \$5000.00?   |
| G    | 47  | During the first (18) years of your life – Do you remember ever stealing anything from someone who trusted you?   |
| R    | 35  | Regarding the \$5000.00 deposit discovered missing from ABC Market on 4 July 2003, did you steal that money?  |
| Gw   | 23  | Are you afraid an error will be made on this test regarding the target issue?   |
| Rw   | 24  | Are you hoping an error will be made on this test regarding the target issue?   |
| B    | 26  | Is there something else you are afraid I will ask you a question about, even though I told you I would not?   |

Figure 3.

It should be noted from figure 3 that the Sacrifice Relevant Question is introduced as a Preparatory Question that fully identifies the relevant issue, so that the first direct relevant question (33) can be short, succinct and not elicit mental effort or exercise that could cause an autonomic response. The second direct relevant question (35) is slightly longer but still shorter than the Preparatory/Sacrifice Relevant Question. The Preparatory/Sacrifice Relevant Question must NOT exceed the scope of the two direct relevant questions. Inasmuch as the Preparatory/Sacrifice Relevant Question is necessarily lengthy, it is expected to elicit mental effort and an autonomic response from both the Innocent and Guilty examinees. Therefore, the Preparatory/Sacrifice Relevant Question fully identifies the relevant issue, allows both the truthful and deceptive examinee to react and relieve their anxieties on that first relevant question, a variable listed under Category B (Matte 1996), and prepares



them for the introduction of the two direct relevant questions (33 & 35) that are used for a determination of truth or deception.

Clarence D. Lee in his 1953 book *The Instrumental Detection of Deception* cautions that in the formulation of relevant questions “on the mental side all effort must be avoided except that involved in the deception syndrome. In a number of experiments with students, it was found that even doing very simple mental problems in arithmetic caused a rise in blood pressure, the magnitude of which rise was probably proportional to the effort, indicating that those skilled in mathematics would react less than those unskilled. Also in an actual case when suspect was asked if he was at a certain place at a date long past, his effort to remember the date resulted in increased blood pressure despite the fact that he answered truthfully.” Since then, several studies on the effects of mental exercise or effort have been conducted confirming C.D. Lee’s tested hypothesis that mental exercise or effort can generate an autonomic arousal which would be indistinguishable from deception. [(Boiten F. 1993); Bongard S., Pfeiffer J. S., Al’Absi M., Hodapp V., and Linnenkemper G. (1997); Fokkema D. S. (1999); Ring C., Carroll D., Willemsen G., Cooke J., Ferraro A., Drayson M. O. (1999); Winzer A., Ring C., Carroll D., Willemsen G., Drayson M., Kendall M. (1999)].

There have been questions regarding the value and effectiveness of the sacrifice relevant question citing research by Capps (1991) and Horvath (1994). Capps investigated the value of the sacrifice relevant question in predicting the overall results of a polygraph examination in terms of “deception indicated” versus “no deception indicated.” Capps found that using the sacrifice relevant to determine truth and deception was correct in 71% versus examiners who rendered an opinion on the overall examination who attained an accuracy of 93%. Capps does not show the wording of the sacrifice relevant question used, hence we do not know whether its scope was restricted to the relevant questions, nor do we know the length of the sacrifice relevant question. However, the sacrifice relevant question is not designed to predict the results of the examination and the above results of Capps study fail to support that notion when comparing its accuracy (71%) to the results of the overall examination’s accuracy at 93%.

To this author’s knowledge, only the Backster ZCT and the Quadri-Track ZCT include an *intent sentence* following the sacrifice relevant question that formulates into a Preparatory/Sacrifice Relevant question that is introduced in that

manner during the review of the test questions prior to the collection of the physiological data recorded on the polygraph charts.

Horvath (1994) conducted a laboratory study on the merits of the sacrifice relevant question “to explore further the issues raised by Capps’ (1991) research. The sacrifice relevant question used in this study was: “Do you intend to answer truthfully each question about the stolen envelope?”

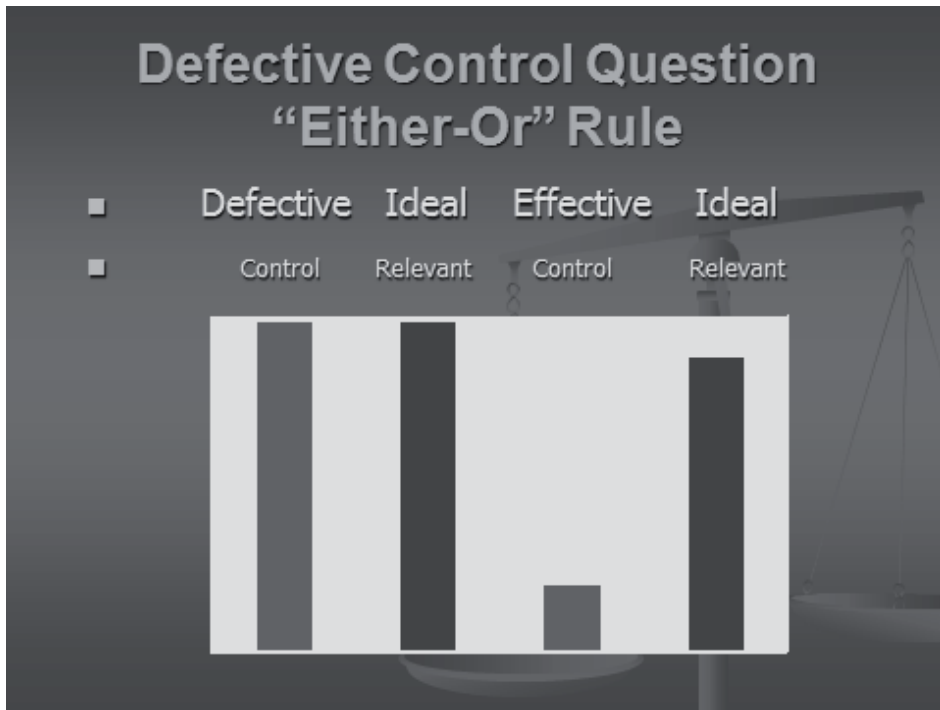
The aforesaid sacrifice relevant question fails to fully identify the matter under investigation and the specific issue being tested. Furthermore, its length does not approach that used in the Quadri-Track ZCT’s Preparatory/Sacrifice Relevant Question which fully identifies the issue being tested, which has been raised in a court proceeding in which this author testified. Equally important is the fact that the Horvath study is a laboratory study based on responses caused by a set of stimuli that are significantly different from those set of stimuli present in field studies. To his credit, Horvath acknowledges the limitations of laboratory studies, stating “This general conclusion, however, must be interpreted with some caution. These data were collected in a laboratory environment where motivational and other differences may make it unlikely that the results can be generalized to real-life testing situations. Of course, this caveat would apply to all laboratory studies and indeed there are some who maintain that results in that environment should not ever be extended to actual testing situations.” That opinion by Horvath is supported in a thesis by Matte & Reuss (2010).

The Quadri-Track ZCT employs Cleve Backster’s “Either-Or” rule (Matte 2010) which dictates that:

To arrive at an interim spot analysis tracing determination of (+2) or (-2) there must be a significant and timely tracing reaction in either the red zone (relevant) or the green zone (control) being compared.

If the red zone indicates a lack of reaction, it should be compared with the neighboring green zone containing the larger timely reaction. If the red zone indicates a timely and significant reaction it should be compared with the neighboring green zone containing no reaction or the least reaction. Presence of response to one or both green zone questions in addition to red zone question indicates serious green zone question defect (see Fig. 4).

Figure 4.



The "Either-Or" rule<sup>2</sup> is aided by the use of non-current exclusive control questions that distinctly separate the time frame embraced by the control questions from the time frame of the relevant questions. This provides the examinee with a clear choice between the threats posed by the red and green zone questions creating a double-bind effect<sup>3</sup> (Bateson et al. 1956).

However, unlike the Backster technique, the Quadri-Track ZCT restricts the comparison of each relevant question to the control question preceding it within the same Track (non-selective approach) and the assignment of a minus one score rather than a zero (in the Pneumo and Cardio tracings only) when the relevant question elicits a significant reaction equal to its neighboring control

<sup>2</sup> The "Either-Or" Rule is unique to the Backster ZCT and the Quadri-Track ZCT (Research by Meiron et al 2008) showed that the "Either-Or" rule was an essential element of the Backster ZCT and its high accuracy.

<sup>3</sup> Double-bind: A situation in which a person must choose between equally unsatisfactory alternatives; a punishing and inescapable dilemma. American Heritage Dictionary.

question, inasmuch as Backster's "Either-Or" rule deems that control question to be defective. The electrodermal tracing is excluded from the Dual-Equal Strong Reaction Rule due to its volatility and sensitivity to extraneous stimuli. Furthermore, the increasing score threshold required for a determination of truth of deception does not diminish with the addition of charts collected and scored.

The Quadri-Track ZCT's Dual-Equal Strong Reaction Rule demands that when the *red* and *green* zones being inter-compared both contain timely, specific and significant reactions of maximum and equal strength, a minus one (-1) score is assigned to that spot. The rule is based on the premise that both zone questions appear to be equally threatening to the examinee, the degree of threat being proportionate to the degree of the responses, which indicate 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. A sophisticated guilty examinee may be able to cause a reaction on the control question but cannot control an oncoming reaction to the relevant question.

The aforementioned Dual-Equal Strong Reaction Rule can significantly reduce the rate of inconclusives that hide the use of physical and mental countermeasures. Dr. David Lykken (1998), in his book *A Tremor in the Blood* stated that "A much more effective method of beating the lie detector, however, is to augment one's reactions to the control questions. However disturbed one may be by the relevant questions, the scoring rules require that the examiner cannot diagnose 'deceptive' if the control reactions are just about as strong or even stronger."

Using the Lykken scenario, the Quadri-Track ZCT would not assign a zero score but a Minus One (-1) score in the pneumo and cardio tracings on all three tracks totaling a Minus -6. The threshold for Deception is Minus -5 per chart, and since this minimum -6 score would apply to all charts, a Deceptive result would ensue. Furthermore, since the reaction to the relevant question must be significant, it would be most difficult for the reaction to its neighboring control question to be twice as large in order to meet the 2 to 1 ratio required for a plus +1 score.

However, the *inference process* that is used to determine truthfulness from deception in the Quadri-Track ZCT depends largely on the Inside Track con-

taining the *Fear of Error* control question which is compared with the *Hope of Error* relevant question. It should also be understood that every test question and their position within the test contributes to its final result.

In the Matte & Reuss 1989b field study, the Inside Track reduced the Inconclusives for the Truthful from 52% to 9% and prevented 5% false positives. The Inside Track further reduced the Inconclusives for the Deceptive from 17% to 3% and prevented 2% false negatives. Overall accuracy 100% with 6% Inconclusives.

In the Mangan, et al 2008 field study, the Inside Track reduced the Inconclusives for the Truthful from 32% to Zero, and the Deceptive from 12.3% to 2.2%. Overall accuracy 100% with 2.2% Inconclusives.

In the Shurany et al. 2009 field study, the Inside Track reduced the Inconclusives for the Truthful from 31% to Zero and the Deceptive from 71% to 7.1%. Overall accuracy 96.5% with Zero Inconclusives.

It becomes quite obvious from aforesaid field research studies that the Inside Track had a major impact on the reduction of Inconclusives which can hide the use of countermeasures. However its impact goes much further in that it addresses known variables identified by Dr. Paul Ekman, professor of psychology at the University of California and by the Committee for the Review of Scientific Evidence on the Polygraph in the 2003 report by the National Research Council of the National Academies of Science.

Dr. Ekman, in his 1985 book *Telling Lies* discusses the elements 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 felt that the polygraph examination, like behavioral clues to deceit, is vulnerable to what he terms the ‘Othello Error’, because the Shakespearean character Othello failed to recognize that his wife Desdemona’s fear might not be a guilty adulterer’s anguish about being caught, but instead could be a faithful wife’s fear of a husband who would not believe her. Both cause an autonomic nervous response.

The National Research Council of the National Academies of Science’s 2003 report stated:

“Gustafson and Orne (1963) suggest that an individual’s motivation to succeed in the detection task will be greater in real-life settings (because the consequences of failing to deceive are grave), and this elevated motivational state will also produce elevated autonomic activation.” “This Theoretical argument also leaves open significant possibilities for misinterpretation of the polygraph results of certain examinees. It is plausible, for instance, that a belief that one might be wrongly accused of deceptive answers to relevant questions – or the experience of actually being wrongly accused of a deceptive answer to a relevant question – might produce large and repeatable physiological responses to relevant question in non-deceptive examinees that mimic the responses of deceptive ones.”

The National Research Council of the National Academies of Science further stated “examinees who fear being falsely accused have strong emotional responses that mimic those of the truly deceptive. Under this hypothesis, field conditions might have more false-positive errors than are observed in the laboratory and less accuracy.”

In the Matte & Reuss 1989a field study, the Fear of Error increased the total scores for the Truthful from +341 to +762 thus increasing the score by +421 points. The Fear of Error control question generated an adjustment to the 58 Innocent case scores by increasing the score an average of +7.3 per case. The average total score per Innocent case without the Fear of Error adjustment was +5.89 and with the Fear of Error adjustment was +13.1. This shows that the “Fear of Error” factor is extremely significant and cannot be ignored in the scoring of Innocent cases. It also increased the average score per case for the Guilty from -19.7 to -25.1.

In the Mangan, et al 2008 field study, the Fear of Error increased the scores for the Truthful from a mean of +4.0 per chart to +7.1 and the Deceptive from a mean of -6.9 per chart to -10.0. When applied to the traditional case of 3 charts the score is NDI +21.3 and DI – 30.0.

In the Shurany et al. 2009 field study, the Fear of Error increased the total score of the Truthful from a mean +3.39 per chart to +5.39 per chart, and the Deceptive from -3.54 per chart to -6.08 per chart. When applied to the traditional case of 3 charts the score is NDI +16.1 and DI -18.24.

The significant increase of scores for the truthful examinees confirms the Fear of Error hypothesis by Dr. Ekman and the National Research Council of the

National Academies of Science. Furthermore the presence of the Inside Track within the construct of the technique addresses that variable listed under Category A (Matte 1996). Importantly, its presence for comparison with the Hope of Error relevant question addresses another variable concerning the legitimacy of reactions to the direct relevant questions (33 & 35) that often raises the issue of false positives.

Significant, consistent and specific reactions to the Inside Track's Hope of Error relevant question with a comparative lack of reaction to the Fear of Error control question provides confirmation of the legitimacy of reactions to the two direct relevant questions. The above scenario can be of great assistance in overcoming objections by a guilty examinee during the post-test interview and in court proceedings. In this regard, the Inside Track provides indispensable evidence in the defense of a Deceptive result in a court of law.

Recently, it was suggested (Cushman 2010, 2011) that the score threshold used in the Quadri-Track ZCT of +3 and -5 *per chart* was too high and that using the traditional scoring threshold of +/- 4 *per case* (fixed threshold) on the first two tracks containing control/relevant question pairs, without the use of the Inside Track scores, there would be no difference in accuracy if inconclusives are omitted from the data, opining that inconclusives are not errors, hence made no difference in accuracy. Therefore the Inside Track served no useful purpose. This implied that the Inside Track questions had no influence on the direction of the examinee's psychological set and resultant salience and scores of the preceding control/relevant questions. It also excluded the important role that the Inside Track plays in addressing the Fear of Error variable and the Hope of Error's confirmation of the legitimacy of reactions to the relevant questions in the two previous tracks. The Hope of Error relevant question also adds valuable scores to the scores produced by the relevant questions in the primary and secondary tracks that were weakened by defective control questions that embraced unknown serious crime(s) of equal or greater significance or by the implementation of countermeasures.

This author presented a very strong case in a recently published thesis (Matte & Reuss 2010) against viewing and reporting Inconclusives as errors. However, the Office of Technology Assessment (OTA 1983) and the National Research Council of the National Academies of Science (NAS 2003) reported Inconclusives as errors. At least one research staff member of the National Center for Credibility Assessment and Associate Editor of *Polygraph*, Journal of the American Polygraph Association also considers inconclusives as errors,



citing the OTA and the NAS for support (Pollina in Krapohl, 2 Oct 08 and 3 Mar 09). While this author concurs with Cushman that inconclusives should not be viewed and reported as errors, there remains serious challenges to that viewpoint from academia.

The review of the Inside-Track's Fear and Hope of Error questions with the examinee during the pretest interview can have a positive influence and effect on the salience of the control/relevant questions in the Primary and Secondary tracks. It is therefore incorrect to reach a conclusion based solely on the scores of the Primary and Secondary tracks without considering the psychological influence and effect that the Inside-Track questions had on the examinee and ensuing pairs of control/relevant questions contained in the Primary and Secondary tracks whose scores could have been weaker without that Inside-Track influence.

The suggested  $\pm 4$  fixed threshold was applied by this author to the 58 Innocent confirmed cases in the 1989 field study which resulted in 3 false positives and 17 inconclusives (29.3%), whereas the higher increasing threshold of +3 and -5 per chart threshold with the Inside Track resulted in Zero errors and 5 inconclusives (8.6%). Interestingly, the American Society for Testing and Materials (ASTM 2010) and the American Polygraph Association (APA 2007) both require that a technique attain an accuracy rate of at least 90% with no more than a 20% inconclusive rate to qualify as an evidentiary examination.

It should also be noted that the use of the traditional score threshold of  $\pm 4$  per case is a fixed threshold that can be severely challenged with devastating results in a court of law. For instance, a decision of deception could be rendered with a total score of -4 for 4 charts. An attorney could show that the polygraphist could have attained a score of -18 per chart yet found his client deceptive on the basis of only a -1 score per chart. He could further show that a total of -72 points could have been scored but his client only scored 4 points, which hardly supports a finding of deception. A compelling example of such a cross-examination can be found in chapter 9, Examination and Cross-Examination of Experts in Forensic Psychophysiology Using The Polygraph (Matte 2000). The suggestion to lower the score threshold even further to -3 or even -2 for the guilty in order to avoid usage of the Inside Track, which according to Cushman (2009) is just extra work that doesn't pay any dividends, is further invitation for challenge in court, and deprives the technique of the ability to address the Fear of Error variable and the Hope of Error's capability to confirm the legitimacy of reactions to the relevant questions, an issue that is certain to be raised in court.



Conversely, the average score per case for the truthful and deceptive in the Matte & Reuss 1989a field study was +13.1 and -25.1; the Mangan et al. 2008 field study with the traditional 3 charts is +21.3 and -30.0; the Shurany et al. 2009 field study with the traditional 3 charts is +16.1 and -18.24. These scores, supported by the statistical predictive tables for estimating error rates (Matte Reuss 1989a) are scientifically supported and legally defensible.

Research data (Raskin et al. 1978, Matte & Reuss 1989a) show that as the scores increase so does the accuracy, but at the expense of an increase in inconclusives. The Raskin, et al study provides a graph that shows that as the score threshold increases, the accuracy and inconclusive rate also increases. However when the threshold reaches past +/-6, the inclusive rate rises dramatically to 50% at +/-12, hence the cut-off score threshold of +/-6 with an inconclusive rate of 9% and 90% accuracy was chosen as the most utilitarian score threshold. Had they been able to maintain an inconclusive rate below 9% until a score threshold of +/-12 had been attained, a 99% accuracy could have been achieved. The score threshold used in the Quadri-Track ZCT was developed from statistical data acquired from 122 confirmed field cases and this threshold was used in three published field studies that attained an overall average accuracy of 98.8% with less than a 3% Inconclusive rate. The aforementioned research data shows that the Inside Track is largely responsible for that achievement.

The pretest interview is most important in that it prepares the examinee psychologically for the collection of the physiological data. The Quadri-Track ZCT's pretest interview is non-accusatory and standardized. It is composed of 6 phases as described below:

1. Acquisition of background information from examinee.
2. Acquisition of examinee's version of the incident.
3. Explanation of polygraph instrument and physiology recorded.
4. Review of studies validating Quadri-Track ZCT and numerical scoring accuracy.
5. Review of all test questions in Test A only. But examinee apprised of other issues to be covered in separate tests.
6. Explain importance of examinee cooperation. Truthful are cooperative, follow directions. Deceptive are uncooperative, Do Not follow directions. The former does not want an error to be made. The latter does want an error to be made (Reinforced clarification of Fear/Hope of Error). (Anti-counter-measure has been set).

A detailed explanation of the pretest interview for the Quadri-Track ZCT is published in Chapter 8, Forensic Psychophysiology Using The Polygraph (Matte

1996) and Part II, 2002 Supplement to Forensic Psychophysiology Using the Polygraph (Matte 2002). A critical part of the pretest interview is the introduction of the earlier-in-life control questions which must be presented as having equal importance as the relevant questions. Furthermore, the fear-of error control question which is ultimately compared with the hope-of error relevant question, must be presented in accordance with the procedure contained in the technique's protocol which requires feedback from the examinee as assurance that those test questions were correctly interpreted by the examinee.

The Quadri-Track ZCT uses a Control-Stimulation Test (Matte 1996) which is administered as the first chart prior to the collection of the charts pertaining to the relevant issue. The role of the Control-Stimulation test goes beyond its original purpose of assuring the innocent and stimulating the guilty. The stimulation test also serves as a *control test* to establish the examinee's capability and manner of response to a known lie under controlled conditions. It is also important that the examinee perceives the control-stimulation test as the means by which the polygraphist acquires a *known deception exemplar* from the examinee, thus will not relate that role to the non-current exclusive control questions, which are used for comparison with their neighboring relevant questions. Otherwise the control questions can become as strong or stronger than their neighboring relevant questions if a guilty examinee perceives the control questions as the means by which a *known deception exemplar* is obtained for comparison with the relevant questions thus producing a greater threat from the control questions and an invitation to use countermeasures. The control-stimulation test should be administered before any of the relevant tests related to the target issue so that each succeeding tests will have been subjected to the same psychological influence.

The two symptomatic questions, developed by Cleve Backster, are used in the Quadri-Track ZCT to reassure the examinee that no unreviewed questions will be asked during the test. The first symptomatic question is strategically positioned between the Preparatory/Sacrifice relevant question and the first non-current exclusive control question to absorb the expected strong reaction from the examinee, whether innocent or guilty as previously explained, prior to the introduction of the first control question. The second symptomatic question is strategically positioned as the last test question immediately following the last relevant question. It has been noted that examinees often show relief on the last test question. Such relief should not be permitted to occur on a question (control/relevant) used for a determination of truth or deception. The symptomatic questions have orienting value with logical purpose

to the examinee who after the first chart has been collected, will realize that the polygraphist kept his promise and thus will narrow his focus to the green or red zone questions. A neutral question that has no orienting value may be disregarded by the examinee who will then relieve on the previous question having orienting value, namely the last relevant question. There has been some controversy regarding the effectiveness of the symptomatic questions. Capps, Knill, Evans (1993) found support for the symptomatic questions' ability to reduce inconclusives, but others (Honts, Amato, Gordon 2000; Krapohl, Ryan 2001) found no evidence of its ability to detect the presence of outside issues or reduce inconclusive results. It should be noted that the Honts, et al study was a laboratory study using a mock crime design. However, the overall opinion of its critics was that there is no apparent danger in including the symptomatic questions. In the final analysis, the symptomatic questions have served their intended purpose in the Quadri-Track ZCT since 1977 when the technique was first developed. The published research provides no evidence that they should be abandoned. On the contrary, the current psychological test structure of the Quadri-Track ZCT which includes symptomatic questions is fully supported by the results of its related research.

Investigation into the validity and effectiveness of technical questions such as the preparatory/sacrifice relevant question, the symptomatic question, and the fear/hope of error questions have been uni-dimensional when in fact they are multi-dimensional which has led to misguided evaluation of their full purpose, function, effectiveness and validity.

The aforementioned published field research studies on the Quadri-Track Zone Comparison Technique have yielded high quality chart interpretation results through manual scoring of the physiological data. However, the time has come for the development of an algorithm that will embody all of the chart interpretation rules of the Quadri-Track Zone Comparison Technique (Matte 1996) which will enable the polygraphist and quality control reviewers to focus on the adequacy of target selection, question formulation and pretest interview which have an impact on the validity of the physiological data that forms the basis of the test results.

The protocol described in this thesis pertains to the Quadri-Track Zone Comparison Technique, and is not a critique of other polygraph techniques which have their own protocol and psychological test structures supported by published research.

## References

American Polygraph Association Magazine (May/June 2007), by Laws, Division III: APA Standards of Practice (Effective 01/20/2007), The Magazine for the Polygraph Professional, Vol. 40, No. 3.

American Society for Testing and Materials (2010), Standard Practice for Conduct of Research in Psychophysiological Detection of Deception (Polygraph), Designation: 3-1954-05, Para. 5.1 and 5.2.2.

Backster C. (1974), *Anticlimax Dampening Concept*, Polygraph, No. 3 (1), p. 48–51.

Backster C. (1963, 1979), *Standardized Polygraph Notepack and Technique Guide*, New York, Backster School of Lie Detection.

Backster C (1989, September), *Backster Zone Comparison Technique: Chart Analysis Rules*, San Diego, Backster School of Lie Detection.

Bateson G., Jackson D. D., Haley J., Weak-Land J. (1956), *Toward a Theory of Schizophrenia*, Behavioral Science, Vol. 1, p. 251–254.

Boiten F. (1993), *Component Analysis of Task-related Respiratory Patterns*, International Journal of Psychophysiology, No. 15, p. 91–104.

Bongard S., Pfeiffer J. S., Al'Absi M., Hodapp V., Linnenkemper G. (1997), *Cardiovascular Responses during Effortful Active Coping and Acute Experience of Anger in Women*, Psychophysiology, No. 34, p. 459–466.

Capps M. H. (1991), *Predictive Value of the Sacrifice Relevant*, Polygraph, No. 20 (1), p. 1–6.

Cushman B., Krapohl D. (2010, September), *The Evidence for Technical Questions in Polygraph Techniques. A Presentation to the American Polygraph Association*, Myrtle Beach, S.C.

Cushman B. (2009, July 27), *Comment, RE: APA School Curriculum Standardization*, Polygraph Place Bulletin Board.

Cushman B. (2011, February 15), 2010 Presentation RE: Technical Questions, Electronic mail message to J. A. Matte.

Cushman B. (2011, February 18), 2010 APA Presentation RE: Technical Questions, Electronic mail message to J. A. Matte.

Ekman P. (1985). *Telling Lies – a How-To-Guide for All those Who want to Detect Lies*, Berkley Books, New York.

Fokkema D. S. (1999), *The Psychobiology of Strained Breathing and its Cardiovascular Implications: A Functional System Review*, Psychophysiology, No. 36 (2), p. 164–175.

Gustafson L. A., Orne M. T. (1963), *Effects of Heightened Motivation on the Detection of Deception*, Journal of Applied Psychology, No. 47 (6), p. 408–411.

Honts C. R., Amato S., Gordon A. (2000, April 21), *Validity of Outside-issue Questions in the Control Question Test. Final Report on Grant no. N00014-98-1-0725. The Applied Cognition Research Institute*, Boise State University, Idaho.

Horvath F. (1994), *The Value and Effectiveness of the Sacrifice Relevant Question: An Empirical Assessment*, Polygraph, No. 23 (4), p. 261–279.

Krapohl D. (2001), *A Belated Look at Symptomatic Questions*, Polygraph, No. 30 (3), p. 206–212.

Krapohl D. (2008, October 2), Review of Matte-Reuss manuscript by D. Pollina for APA Journal, Electronic mail attachment.

Krapohl D. (2009, March 3), Review of Matte-Reuss manuscript by D. Pollina for APA Journal, Electronic mail attachment.

Lee C. D. (1953), *The Instrumental Detection of Deception – The Lie Test*, Springfield, Charles C. Thomas, Publisher.

Lykken D. T. (1998), *A Tremor in the Blood – Uses and Abuses of the Lie Detector*, New York, division of Plenum Publishing Corporation.

Mangan D. J., Armitage T. E., Adams G. C. (2008), *A Field Study on the Validity of the Quadri-Track Zone Comparison Technique*, *Physiology & Behavior*, No. 95 (1–2), p. 17–23.

Matte J. A. (1978), *Quadri-Zone Comparison Technique*, *Polygraph*, No. 7 (4), p. 266–280.

Matte J. A. (1996), *Forensic Psychophysiology Using the Polygraph: Scientific Truth Verification – Lie Detection*, Williamsville, J.A.M. Publications.

Matte J. A. (2002), *2002 Supplement to Forensic Psychophysiology Using The Polygraph*, Williamsville J.A.M. Publications.

Matte J. A. (2010), *A Field Study of the Backster Zone Comparison Technique's Either-Or Rule and Scoring System Versus Two Other Scoring Systems when Relevant Question Elicits Strong Response*, *European Polygraph*, No. 4 (12), p. 53–70.

Matte J. A., Reuss R. M. (1989a), *Validation Study on the Polygraph Quadri-Zone Comparison Technique. Research Dissertation Abstract*, LD 01452, Vol. 1502, Proquest Information and Learning (Formerly known as University Microfilm International).

Matte J. A., Reuss R. M. (1989b), *A Field Validation Study of the Quadri-Zone Comparison Technique*, *Polygraph*, No. 18 (4), p. 187–203.

Matte J. A., Reuss R. M. (2010), *Guiding Principles and Benchmarks for the Conduct of Validity Studies on Psychophysiological Veracity Examinations Using the Polygraph*, *European Polygraph*, Vol. 4, No. 4.

Meiron E., Krapohl D., Ashkenazi T. (2008), *An Assessment of the Backster "Either-Or" Rule in Polygraph Scoring*, *Polygraph*, No. 37 (4), p. 240–249.

National Research Council of the National Academies of Science (2003), *The Polygraph and Lie Detection*, Washington, The National Academies Press.

Office of Technology Assessment (1983, November), *Scientific Validity of Polygraph Testing – A Research Review and Evaluation*, Washington.

Raskin D. C., Barland G. H., Podlesny J. A. (1978, June), *Validity and Reliability of Detection of Deception*, National Institute of Law Enforcement and Criminal Justice, Law Enforcement Assistance Administration, U.S. Department of Justice.

Ring C., Carroll D., Willemsen G., Cooke J., Ferraro A., Drayson M. (1999), *Secretory Immunoglobulin A and Cardiovascular Activity During Mental Arithmetic and Paced Breathing*, *Psychophysiology*, No. 36 (5), p. 602–609.

Shurany T., Stein E., Brand E. (2009), *A Field Study on the Validity of the Quadri-Track Zone Comparison Technique*, *European Polygraph*, No. 1 (7), p. 5–23.

Winzer A., Ring C., Carroll D., Willemsen G., Drayson M., Kendall M. (1999), *Secretory Immunoglobulin A and Cardiovascular Reactions to Mental Arithmetic, Cold Pressor, and Exercise: Effects of Beta-adrenergic Blockade*, *Psychophysiology*, No. 36 (5), p. 591–601.







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## Polygraph Verification Test

### Abstract

If we as examiners wish to define what is the most problematic part of a polygraph test while conducting a Comparison Question Test (CQT) the answer would be adjusting the correct comparison question for this particular examinee. A few years ago the author asked Cleve Backster how he would define a good comparison question, and his answer was “the one which gives us the correct result.” An examiner from Canada once told the author that development of a Comparison Question is 50% knowledge, and 50% art. Due to the problem of proper selection and introduction of the Comparison Questions (CQ), many examiners finish a test questioning whether or not their result was correct based on their selection and introduction of this question.

In 2003, the author learned from Nathan J. Gordon, the Polygraph Validation test (PVT). It was explained that this method could be used to identify false

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positive results, verify deceptive results, and in the latter case, assist in breaking a deceptive examinee's objections. Later it was explained that the original idea for this new method came from William L. Fleisher (Gordon's partner) and that Gordon then modified and applied it.

The PVT is administered as a Peak Of Tension Test, or more correctly, a Guilty Knowledge Test after the administration of a CQT, providing the examinee different possible reasons for his failure of the CQT, while monitoring on which of the reasons he is focusing on.

## The Research Method

Seventy-three (73) cases, consisting of 188 examinees, were selected, in which we were able to examine all possible suspects. Out of the 73 cases, 48 were confirmed by confession. The tests were conducted by three examiners in Costa Rica. The format used was the Integrated Zone Comparison Test (IZCT), using formats with 4 relevant questions as well as 3 relevant questions. All tests were multi-faceted in nature.

During the pre-test interview each examinee was informed that the procedure included 2 tests: one regarding the issue under investigation, and the other regarding possible reasons the initial test may have indicated that the examinee lied regarding the target issue. This second test, it was explained, would serve as a confirmation to the result of the initial test, or perhaps offer a plausible reason why a truthful person may have failed the test. It was further explained that since the second test (PVT) would be administered before the initial test was analyzed, that the examiner would not know the outcome of either test until after data from both examinations was collected.

Regardless of the result of the initial IZCT (CQT), which were based on numerical scoring (Horizontal Scoring System and 3 point spot analysis), a single chart of the PVT test was then administered.

After the pre-test interview was completed a regular IZCT was conducted. After all of the IZCT data was collected the examinee was asked: "Do you remember that we said we are going to conduct another test? In case the test we

just finished indicates you did not tell the truth, there could be more than one reason. This test will help identify exactly what that reason was.”

## PVT Questions

**Pre-fix: If your first test indicates you failed, was it because:**

1. you were tired?
2. you did not understand the questions?
3. you were afraid that I would ask a question we did not review?
4. you lied to questions regarding your personality (CQ's)?
5. you were involved in the target issue(s)?
6. a mistake occurred in the test?
7. you do not believe in the procedure?

## Analysis of PVT Data

The PVT is analyzed the same way as a Guilty knowledge or a Peak of Tension test. The key question is number 5. The reaction could be either an anticipatory reaction common in a Peak of Tension format, or a spot reaction when question 5 is compared with questions 4, which refers to lying to the Comparison Question on the IZCT test, or 6, which would almost be like a Directed Lie question (DLC), since it would be the position of any innocent examinee that a mistake must have occurred.

## Results

In this research, 188 examinees were tested utilizing this two stage approach of the traditional IZCT/CQT, followed by the application of a single chart of PVT.

An example of a case with three examinees showing their PVT tests:

Of the 188 examinees tested, the IZCT CQT analysis resulted in two (2) inclusive determinations, which were eliminated from the study. Of the 186 remaining IZCT CQT examinations, the PVT results were in total agreement with 184 of the initial determinations. The results of the PVT for the remaining 2 were inconclusive due to a lack of reactions to C4, R5, or C6. Interestingly, both of these examinees were truthful to the target issues and it appears had no psychological commitment to the questions in the PVT.

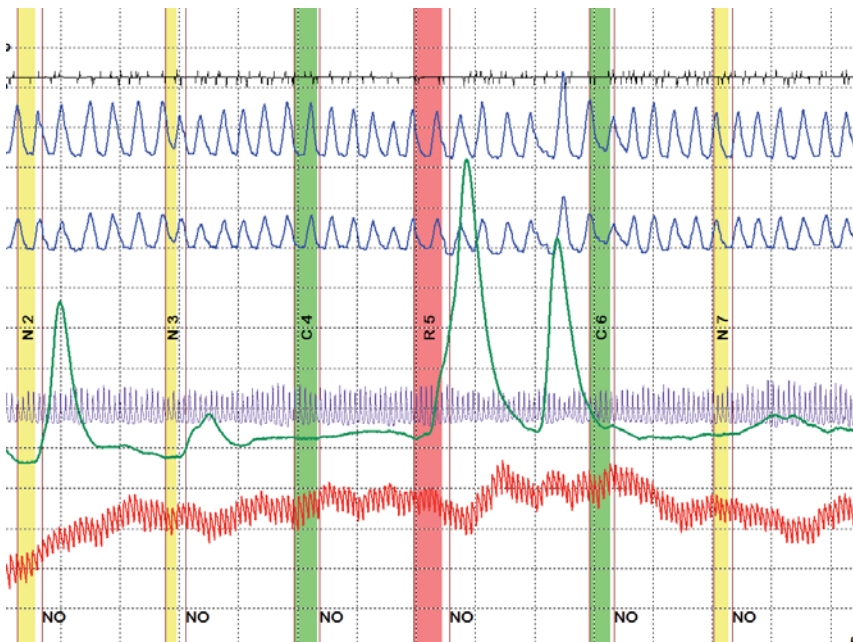
In the two inconclusive examinations eliminated from the study, the PVT indicated both examinees were deceptive. Both of these PVT results were then verified by confession.

## Remarks

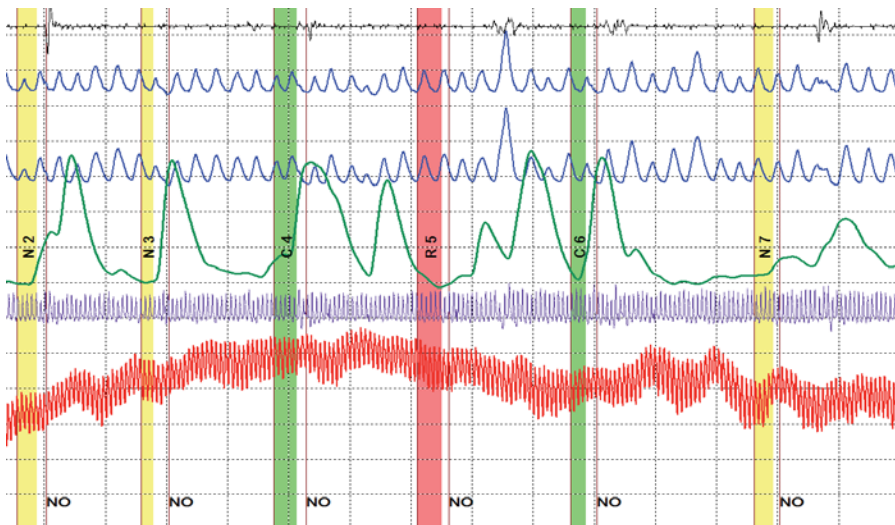
The author has been contacted by two other independent examiners who utilized the PVT after CQT formats. In a private examination in Israel, an inclusive CQT result was determined to be deceptive by the PVT, which was then confirmed by confession. In a law enforcement examination in the United States, a deceptive CQT result was made questionable by a truthful PVT result, and the examinee was later determined to be innocent by the ongoing investigation. In both of these cases the PVT resulted in correct outcomes changing an inconclusive result to a proper determination of deception, and changing a false/positive result into a correct determination of truthful.

## Summary

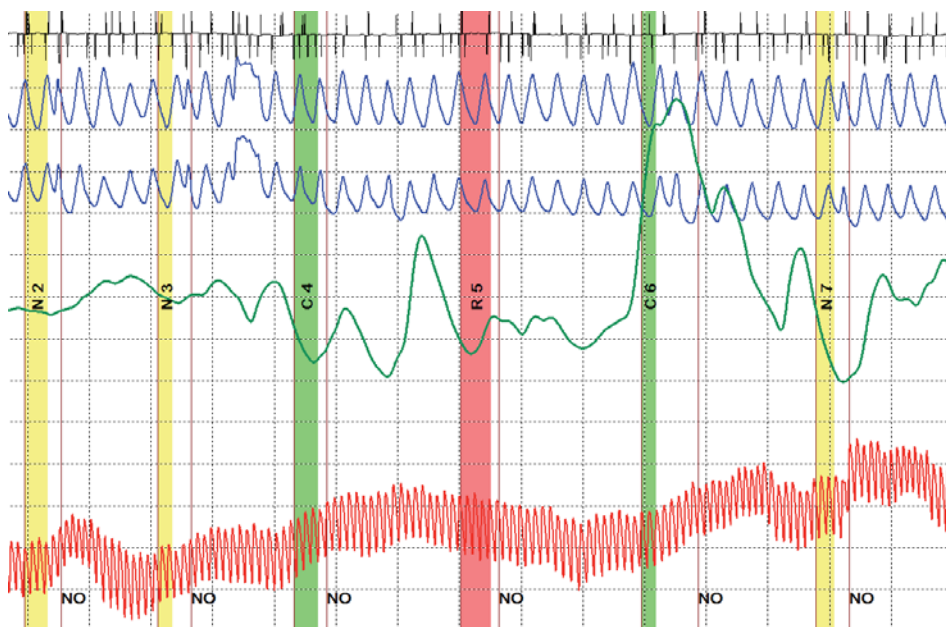
Based on the current study it appears that the PVT is a valid way to confirm the result of the CQT, which takes minimal time to complete, and can actually serve to increase the accuracy of the polygraph procedure.



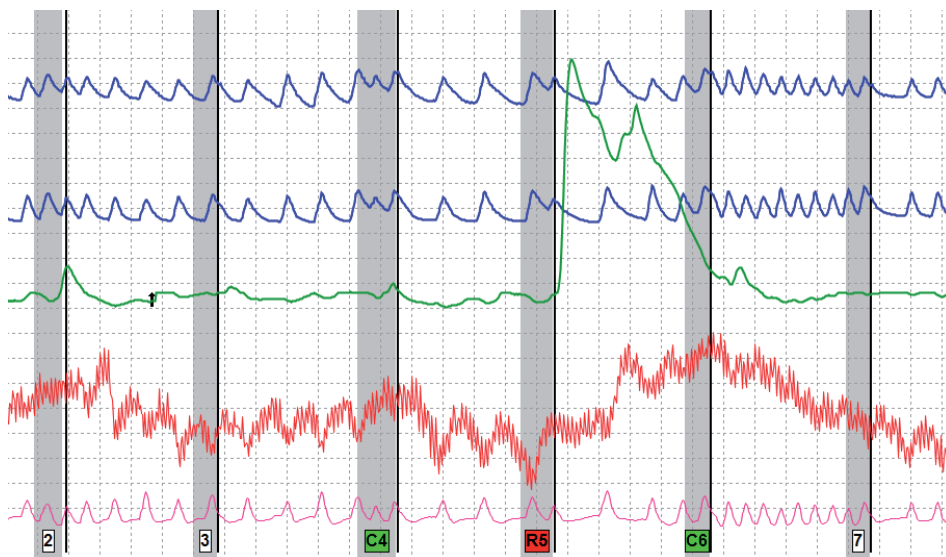
A significant reaction in the PVT to R5, with a deceptive, as later verified, examinee. Note the lack of reaction to C4 and C6, as well as the classic peak of tension “global” evaluation.



The PVT chart of the second examinee, who was later verified as truthful. This examinee is focused on the CQ's.



The PVT chart of the third examinee, later verified as truthful. Once again, the more significant reactions occurred to CQ's.



Another deceptive chart recorded with another brand of instrument

## References

Gordon N. J., Cochetti P., *The Horizontal Scoring System*, Polygraph 1987, Vol. 14, No. 2.

Krapohl D., *A Comparison of 3 and 7 Position Scoring Scales with Laboratory Data*, Polygraph 2008, Vol. 27, No. 3.

Gordon N. J., *The Academy for Scientific Investigative Training's Horizontal Scoring System and Examiner's Algorithm for Numerical Chart Interpretation*, Polygraph 1999, Vol. 28, No. 1.

Gordon N. J., Fleisher W., Morsie H., Habib W., Salah K., *A Field Validity Study of the Integrated Zone Comparison Technique*, Polygraph 2000, Vol. 29, No. 3.

Gordon N. J., Mohammed F. B., Faro S. H., Platek S. M., Ahmad H., Williams J. M., *Integrated Zone Comparison Technique Accuracy with Scoring Algorithms*, Physiology and Behavior 2006, Vol. 87, No. 2.

Fleisher W., Gordon N. J., *The Polygraph Validation Technique*, Polygraph 2004, Vol. 4, No. 3.

Shurany T., Chaves F., *The Integrated Zone Comparison Technique and ASIT PolySuite Algorithm: A Field Study*, European Polygraph 2010, Vol. 4, No. 2.





# Report





# EUROPEAN POLYGRAPH

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## Report: Recent Polish Polygraph Experts Seminar

– Szczytno, Poland, May 26–27, 2011

### Introduction

On 26–27 May 2011, the Seminar of Experts on Polygraph Examinations was held at the Police Academy in Szczytno, Poland. This was a continuation of annual meetings dedicated to psychophysiological detection of deception (PDD) issues. The seminar brought together the representatives of Polish public institutions (Internal Security Agency, Intelligence Agency, Central Anticorruption Bureau, Military Police, Military Intelligence Service, Military Counterintelligence Service, Border Guard, Police, Public Prosecutor's Office), researchers and foreign guests. This report presents a summary of the main topics and conclusions of the seminar.

The seminar began with an opening address by Dr. Krzysztof Wiciak, the leader of the Police Academy Group in Questions of Tactics and Techniques of

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Braving Organized Delinquency, and was afterwards chaired by the Vice-Dean for Research at the Faculty of Law and Administration at the University of Warmia and Mazury in Olsztyn, Prof. Jerzy Kasprzak.

The objective of this seminar was to provide an opportunity for an exchange of views on the current state of development in the field of the polygraph (and more widely – PDD) in Poland, including legal and scientific aspects.

### Main topics covered

Following the welcoming remarks, each speaker introduced different matters of PDD. The presentations related to:

- polygraph training (U.S./APA standards);
- references to experiences in usage of polygraph in countries other than Poland (Russia, USA);
- the legal and practical view of polygraph expertise from the perspective of a principal (penal prosecution agency);
- the methodology of polygraph examinations (formulation of test questions, scoring systems);
- the significance of emotions in polygraph testing;
- development and improvement in new psychophysiological detection of deception technologies (fMRI, EEG – examination of scanning nervous system functioning as an alternative to the polygraph);
- current trends in the field of polygraph testing (PCSOT);
- selected medical aspects of polygraph examination;
- some afterthoughts concerning previous seminars, conclusions and challenges for the Polish polygraphist community.

### Speaker-by-speaker summary

Michał Widacki, a novice polygraphist representing Andrzej Frycz Modrzewski Krakow University, made the first presentation, about basic polygraph training carried out in the United States. He described how such training looks on the basis of his own experience that he gained by attending the American International Institute of Polygraph. The training program consists of 400 hours of classes on the following subjects: history of the polygraph, instrumentation, formulation of test questions, polygraph techniques, chart evalua-

tions, pre- and post-test interviews, development and application of polygraph skills, ethics in forensic psychophysiology, report writing, polygraph counter-measures, legal issues, psychological issues in polygraph and physiology. Eight written examinations test students' knowledge and skills to determine satisfactory progress throughout the training program and to document student understanding prior to course completion. Laboratory evaluations and critiques, meanwhile, serve to test students' practical performance – their skills and ability to prepare for and conduct the diverse components of a variety of polygraph examination types.

The next lecturer, Dr. Denis Solodov from the University of Warmia and Mazury, spoke about the polygraph in Russia. He brought up such issues as: the Russian history of polygraph examinations, famous cases, equipment produced by domestic companies, the price of polygraph services and legal regulations.

After presenting an interesting picture of usage of the polygraph in such powerful countries as the USA and Russia, Mr. Krzysztof Wójcik, representing the Appellate Public Prosecutor's Office in Krakow, acquainted attendees with crucial issues regarding the polygraph on the basis of inspection practice in the Polish public prosecutor's offices. He quoted P. Hofmański and S. Zabłocki, who formulated general guidelines concerning the acceptability of scientific methods in a trial:

- a trial is not a place for verification of a scientific hypothesis;
- not only the reliability of expertise, but also the error rate is important;
- a cognitive value as well as risks connected with the way of conducting examinations should be taken into account. There are no perfect methods. Only concrete examinations may be faultless.

In Poland a few possibilities exist for using polygraph examinations in legal proceedings:

- actions before entering a lawsuit or around trial (operational and within labour regulations);
- actions made on the basis of articles 192a §2 and 199a of the Polish code of penal procedure in connection with art. 199 and 171§5 p. 2 of the code.

Prosecutor Wójcik specified factors that cause narrow interest in polygraph examinations:

- juridical doctrine and the opinion of the judiciary;
- previous experience, including osmology;

- a passive way of conducting investigations (from behind a desk);
- lack of guidelines concerning actions that should precede a polygraph exam being ordered;
- shortage of workshop training for judges and prosecutors, who rely on the stereotypical opinion of a polygraph being useless.

This was followed by a presentation on the concept of formulation of test questions. Agnieszka Leszczyńska from the Internal Security Agency described particular types of questions: relevant, irrelevant, sacrificed relevant, comparison, symptomatic, overall truth and stimulating. She put the main stress on comparison questions and encouraged their usage.

The next speaker, Anna Królikowska, representing the Police Academy, talked about the influence of emotions on polygraph testing. Emotion is the complex psychophysiological experience of an individual's state of mind as interacting with biochemical (internal) and environmental (external) influences. Emotion fundamentally involves physiological arousal, expressive behaviors, and conscious experience. It can be positive or negative. Physiological correlates of emotions come with deception; however while running a polygraph test we are not able to determine which sort of emotion is responsible for a response recorded on the chart. We simply know that the polygraph works because of an emotional component, cognitive dissonance and behaviourism.

The next presentations concerned new PDD technologies. Dr. Jarosław Pietruszka (Polish Science Academy) discussed the latest research on fMRI (functional magnetic resonance imaging) which is used to measure the hemodynamic response (change in blood flow) related to neural activity in the brain or spinal cord. The MRI scanner is built around an extremely strong magnet: 1.5 teslas (30,000 times more than the Earth's magnetic field). This method enables us to examine which part of the brain functions during a specific operation because of the ability to evaluate a volume of blood flow through certain structures of the brain. An insincere answer causes greater oxidation in the frontal lobes as a result of cognitive effort during deception. American experiments confirmed at least 90% accuracy in detection of deception when using fMRI.

In addition to this, Jerzy Wojciechowski MSc. (PSA), presented the method of electroencephalography (EEG) which is the recording of electrical activity along the scalp. EEG measures voltage fluctuations resulting from ionic current flows within the neurons of the brain over a short period of time, usu-

ally 20–45 minutes. EEG records P300 wave – an endogenous potential whose occurrence links not to the physical attributes of a stimulus but to a person's reaction to the stimulus. It can be used as an element of MERMER (Memory and Encoding Related Multifaceted Electroencephalographic Response) and as an indicator of the stimulus recognition and orienting response. The accuracy in detection of concealed information is similar to fMRI – about 90%. Unfortunately it has a serious weakness: simple countermeasures may decrease accuracy to 18% (at present some experiments are being run in order to solve the problem). The polygraph, in comparison to both methods, fMRI and EEG, seems not to be less accurate so far and, moreover, it is simply cheaper.

The seminar attendees had another opportunity to acquire knowledge about the Objective Scoring System. Raymond Nelson, representing Lafayette Instrument Co., explained the differences between version 3 and the previous ones. The OSS-3 computerized scoring algorithm is based on sound polygraph testing principles derived from existing research, and has demonstrable validity with multiple validation samples. Previous OSS versions could not be applied to multiple-facet investigations or mixed-issues screening tests, and were initially intended to provide a reliable hand-scoring system. The new one has become a computerized polygraph scoring algorithm and makes evaluating all kinds of comparison question polygraph techniques consisting of two to four relevant questions possible. Polygraph test examination data can be evaluated as an overall score, or through analysis of the individual question spots. The OSS-3/Screening algorithm is designed to provide maximum sensitivity to deception with multiple distinct stimulus targets, while constraining spurious results to minimal levels.

Małgorzata Wrońska MSc. from Andrzej Frycz Modrzewski Krakow University presented a new direction for using the polygraph – post-conviction sex offenders testing (PCSOT). Such examinations could play a role in achieving the following goals:

- increased disclosure of problem behavior that will be of interest to professionals who work with convicted sex offenders;
- deterrence of problem behavior among convicted sex offenders by increasing the likelihood that engagement in such behavior will be brought to the attention of supervision and treatment professionals;
- detection of involvement in or abstinence from problem behavior that would alert supervision and treatment professionals to any escalation in the level of threat to the community or potential victims of sexual abuse.

Different kinds of exams can be applied:

- sexual history disclosure (exploring all the aspects of the sexual background of offenders);
- specific issue testing (an exam verifying an allegation against an offender);
- monitoring polygraph exam (a polygraph examination that evaluates sexual re-offending and/or the commission of a new sex crime while in treatment and/or under court supervision);
- maintenance exam (an exploratory exam to investigate violations of any designated condition of probation, parole or treatment during a specific and defined time period while the offender is under court supervision and/or in treatment).

The last but one presentation, by Krzysztof Wróblewski, concerned health problems which may occur during polygraph examinations. The speaker identified problems connected with systemic and metabolic diseases. He listed some reasons of mental block and blackout that should be distinguished from epilepsy, e.g. a swoon, hypotension, irregular heartbeat, pulmonary, hypoglycemia, hyperglycemia, neurological and mental disorders, sleep disturbances, anxieties, self-mutilation.

## Concluding remarks

The author of this article shared his reflections with seminar attendees on the topics that had been discussed during prior international seminars: in Myrtle Beach, USA (45th APA annual seminar – Sep. 2010) and Emów near Warsaw, Poland (polygraphists' seminar organized by the Internal Security Agency – June 2010). He stressed that usually – apart from exchanging of options, knowledge and experience among experts; academic discussions and integration of the profession – the main purpose of such meetings is an overview of the state of the art and areas where existing or future action could help do our job more effectively. Therefore, it is worth answering the question where we are in terms of both a global profession and – against this background – a Polish group of polygraphists.

The American Polygraph Association is the leading polygraph professional association, establishing standards of practice, research and training that are recognized worldwide. It numbers over 3200 members divided into 4 groups: private, government, law enforcement and international. Three main issues were featured by the participants of the last APA seminar: further emphasis



on the internationalization of the association; achievements in sex offender testing; pressure from the American National Academy of Sciences (NAS) and courts to regulate the scientific foundations of polygraph techniques.

There were two formal proposals made:

- changing the name of the organization to “APA International” (in order to demonstrate APA’s opening its doors to an international growing membership);
- setting up the office of APA Vice President International.

Finally both ideas were turned down due to the conservative attitude of the majority; however, the results were close, so we can expect that things may change in the future. The new APA President, Nate Gordon, announced that he would take into consideration establishing APA national ad-hoc committees.

Plenty of time was also spent on post-conviction sex offender testing. It turned out that the polygraph in the United States is very successful in this area. The experience of our American colleagues can provide valuable input for improving the model of sex offender supervision and therapy in Poland, since a new law was passed this year and special sex offenders’ treatment units have been created.

Last but not least is the problem concerning scientific research in polygraph techniques. In January 2001, the NAS’s National Research Council began a project titled: “Study to Review the Scientific Evidence on the Polygraph”. The final report, published in October 2002, was not favorable to the polygraph. It undermined the accuracy of specific-issue tests and concluded there was scarce research in the area of applicant screening. The APA was not consulted to provide responses to many questions raised in this project. Recently, in 2011, the NAS recommended a new, separate (to law enforcement) organization to handle all forensic science. The proposed Criminal Justice and Forensic Science Reform Act creates an office within the Office of the Deputy Attorney General. The office would be run by a “director” that shall, among other things: a) “establish, implement, and enforce accreditation and certification standards”, b) “establish and implement standards and best practices for forensic science disciplines”, c) “establish and maintain a list of forensic science disciplines”. The Forensic Science Body, as an advisory body, will recommend a list of forensic science disciplines, which it will submit to the director. In this way there will be two lists: a good one and a black list. Such an initiative may

cause worries in the context of the NAS report mentioned above. This might affect indirectly polygraphists in different parts of the world. That is why the APA has intensified efforts to extend research and put techniques in order. There is now an emphasis on evidence-based, empirically supported methods in lieu of reliance on value-based methods. It is worth stressing that a good job is being done, *inter alia*, by Raymond Nelson. This course of action should also be followed in Poland.

The author of this article highlighted weaknesses in the field of polygraph examinations in Poland:

- deficiency of legal regulations and inconsistency of existing ones;
- objections to the scientific value of methods used; undefined error ratios;
- a dispersing polygraph society; lack of consolidation;
- absence of a domestic accredited polygraph school;
- poor cooperation with authorities conducting criminal proceedings, lack of mutual understanding and unsatisfactory level of knowledge of prosecutors and judges regarding polygraph utility.

In connection with the problems above we can identify key needs and challenges for the Polish polygraphist community:

- establishing basic legal norms describing subjective and objective criteria concerning polygraph examinations (e.g. who can be examined and in what circumstances);
- setting up training requirements (basic, advanced and continuing education);
- development of uniform licensing and quality control procedures;
- necessity of training directed at prosecutors and judges regarding the essence of polygraph examinations (including guidelines with relation to activities that shall precede ordering a polygraph exam);
- adaptation and supplementation of the results of research with reference to PDD techniques and technology.

These challenges should be addressed by coordinated action. Our goals could be achieved through:

- cooperation with one of the prestigious educational centers;
- government action;
- the rank-and-file initiative of the polygraph business line (e.g. national professional association).

Participants supported the proposal to establish a communication platform on the Internet for everyday use (gathering only during biannual seminars is insufficient to make desirable progress). The majority agree to follow APA standards of practice. Setting up the legal rules, following ethical standards and taking advantage of validated PDD techniques will help reach the point where test results could be indisputably admitted as evidence in Polish courts.

Initial steps were taken last year in Emów near Warsaw during the 1st International Seminar of Polygraphists. Work on key issues will be continued by attendees of the 4th Interdepartmental Seminar of Polygraphists on 20-23 September 2011 organized by the Military Police.



# Book reviews





*Normy prawne i standardy branżowe w zakresie badań  
poligraficznych w wybranych krajach  
(Legal Norms and Industry Standards in Polygraph  
Examination in Selected Countries),*

Agencja Bezpieczeństwa Wewnętrznego (Internal Security Agency),  
Emów 2011, 118 pp.

Even though polygraph examination has taken place in Poland for many years (both in forensic investigations and in HR procedures), there are still insufficient legal regulations concerning its admissibility, e.g. in the private sector, and standards to impose regulations and obligations on all the institutions involved in the examination, beginning with the commissioning party and ending with the polygrapher. Before undertaking steps aiming at the establishment of an organisation gathering polygraphers who will follow the jointly assumed standards or before any legislative initiative, it is advisable to become familiar with the legal regulations in other states. An in-depth analysis of these allows solutions to be defined that would be appropriate for introduction into Polish law.

A review of the legal regulations in selected countries (the United States, Israel, Lithuania, and Russia) was the main goal of the 1st International Polygraphers' Symposium organised at the Central Training Centre of the Internal Security Agency in Emów. Additionally, the symposium's participants reviewed the

current techniques in polygraph examination and currents in scientific research associated with them.

The publication consists of two parts: Law and Standards, and Techniques and Directions in Research. The president of the American Polygraph Association (APA), Daniel Sosnowski, presented standards in polygraph examinations in the United States (legal and ethical questions). Performing his analysis of the ethical questions, he introduced the requirements presented to the members of the APA and to candidates who want to join the organisation. An interesting approach here is the publication of the names of people newly admitted to the Association, so that the authorities of the organisation may be notified should some doubtful events from the candidate's past be known. Ethical conduct is a source of hope as a factor guaranteeing that the examination is conducted properly. The speaker also quoted examples of situations when the examination was carried out in such a way, but due to various circumstances the result was taken lightly, with serious consequences resulting, for example in the so-called Aldrich Ames Espionage Case of a Soviet spy employed by the CIA. Referring to standards for conducting examinations, the speaker pointed to the need to be versed with numerous techniques and use them according to the context.

The second part of the speech consisted of a discussion on the legal regulations that influenced polygraph examinations. Apparently, only 22 US states have such regulations, which unfortunately are frequently dependent on the financial situation of the state.

Another country whose industrial standards and legal norms were discussed is Israel. Tuvia Shurany, the former Head of the Department of Polygraph Examinations of the Israel Security Agency in Israel, presented the stories of the first trained polygraphers, and described the early use of the polygraph in the state of Israel.

Since the 1990s, one of the Israeli private universities has run a programme of polygrapher teaching, yet the quality of education cannot match that of the governmental school, which has been accredited by the APA since 1999. Shurany estimates that following commercial training, the private sector in Israel employs approximately a hundred polygraphers, whose work remains beyond any control. They frequently modify the formats of tests at will. Another problem here is the Israeli law stipulating that if any legal regulations are introduced, they will be binding for the people who joined the circle of polygraphers after the law came into force. The speaker believes



it necessary to establish an all-inclusive system of controlling the quality of tests, where – before the examination – an independent polygrapher should become acquainted with the case and approve the questions proposed by the examiner. Personally, I have certain doubts whether, despite the large number of polygraphers in Israel, there will always be a sufficient number of experts to allow an independent one to be nominated for every case.

The third address presented in the materials was a discussion of regulations and standards in the Republic of Lithuania. Karolis Stulpinas of the State Security Department also began with the recent initial stages of polygraph examinations in Lithuania. Today, in line with the law binding in the country, the polygraph may be used only in institutions reporting to the minister of internal affairs, minister of finance, special investigations services, 2nd Investigations Department and State Security Department, which means that no private organisations can legally conduct polygraph examinations. When the act was approved, other options of using the polygraph remained unknown, for which reason it is restricted to questions connected with confidential information and issuance of security certificates. Nevertheless, it must be admitted that the act itself regulates in great detail, among others, situations when no examination can be conducted. Moreover, it lists the rights of the examinee, and the rights and duties of the polygrapher, which may already be treated as standards. The other official document is the directive concerning polygraph examinations, which describes in even greater detail the goals of the examination, the equipment, and the audio and video recordings, also regulating the successive stages of examination. There is, however, no regulation concerning the training of experts. The directive states that the goal of the examination is to define the truthfulness of the examinee. Summing up, the speaker pointed to the most significant problems acknowledged by Lithuanian polygraphers, namely the too limited scope of use for testing, the small number of institutions authorised to conduct the tests, the lack of code of ethics, and the lack of regulations concerning education of polygraphers mentioned above.

In Russia, where polygraph examinations have been used officially since 1994, a draft federal act “On the use of the polygraph” was produced in 2005 (the legal grounds for polygraph use in the private sector is the federal act “On state secrets” from 2004, and the Labour Code of the Russian Federation). Presented by Renata Dąbrowska of the Polish Internal Security Agency, the draft defines the goals and principles of conducting examinations which follow the signing of a written, voluntary agreement by the subject, whether the examination is

requested by the employer or by the employee. Also defined are the limitations in conducting the examinations, the list of people undergoing examination, and the technical means to be used during examination. Russia is one of few states that regulate requirements towards the polygrapher, as well as the duties, rights and responsibility of the person commissioning the examination, and also the means of using the results of the examination. The draft contains a clause that the results of examinations are stored for three years by the initiator of the examination in a manner designed to prevent their loss or destruction. This must be too high an expectation, which in certain cases cannot be met.

Piotr Herbowski, who represented the Police Academy in Piła, presented questions related to the use of the results of polygraph examinations in accordance with Article 192a of the Polish Code of Criminal Procedure. He began by drawing attention to interpretative problems of the regulation which may lead to increased caution when commissioning polygraph testing by police officers. The claim was corroborated with a selection of research. An additional reason for the lack of increase in commissioning polygraph examinations following 2003 is perceived in questioning the use of polygraph examination results in criminal procedures. The speaker challenged the current practice that uses the results of the polygraph examination as incriminating, rather than exculpating evidence, e.g. in a preliminary procedure, when the future accused is named. Moreover, he regretted to note that the results of polygraph examinations are not accounted for in sentences, for which reason the appellate courts cannot relate to them, and which, moreover, gives the impression that polygraph examinations are either not conducted or not taken into account when the sentence is delivered.

The second part of the book focuses on techniques and directions in testing. It opened with a discussion of Directed Lie Screening Test (DLST) screening and diagnostic tests presented by Raymond Nelson of Lafayette Instrument Company, who focused on careful explanation of the differences resulting from the possible constructions and use. Moreover, Nelson also presented what the expert should say to the examinee during the number test and how.

The next item on Raymond Nelson's agenda was a discussion of the empirical system of evaluation. In 2006 he began working on the algorithm (OSS-3), which in the final effect retains Kircher's three primary physiological measurements, completing it in 2008 together with D. Krapohl and M. Handler. The researchers recognised the three-grade scale of evaluation to be superior to the seven-grade one, because it does not clash with the knowledge about

non-linear physiological reactions, and does not depend on the proportion and volume of evaluation. They justified their claim with research, as a result of which no significant differences were noticed. The paper also discussed briefly the main systems of evaluation.

In his presentation, Tuvia Shurany focused on the correct manner of conducting a series of one-issue tests with comparison questions. He also put special emphasis on the dangers related to these, e.g. pressures from the commissioning party to ask a larger number of questions. Quoting the results of his own research on the precision of individual tests, he concluded them by claiming that one should always follow the psychological disposition of the patient, lest the value of the examination be reduced. He also presented the Integrated Zone Comparison Technique (IZCT) derived from Baxter's Zone of Comparison. Moreover, the author described what he considers to be the most dangerous manner of interfering with the results of the test by the patient.

Professor Tadeusz Tomaszewski, Vice-Rector for Teaching and Personnel of the University of Warsaw, who had been invited to the seminar, presented a paper on experts' opinions for experts. Besides the interpretation of the regulations of the Code of Criminal Procedure allowing polygraph examination of witnesses, he focused on the lack of knowledge among experts. This time it was not lack of standards in polygraph or training, but the courts which the speaker found the main source of the problem, as – unaware of the potential of the examination – they are incapable of asking the experts the correct question to channel all their expertise. He cooled the enthusiasm that followed the legislative idea that would regulate the competencies by the definition of the minimum training requirements for a polygrapher with the claim that the court could appoint a person who does not meet the requirements imposed in the act. Unless the code itself also changes, that is. He also addressed the increasingly frequent references to the possibility of appointing an expert by the party dissatisfied with the expertise produced by the expert summoned by the court, i.e. the so-called private expertise that does not provide any proof, but only an opinion about it. With the freedom to assess evidence, the court may judge the work of an expert it appointed on the power of such a private opinion delivered by a person without appropriate qualifications. Professor Tomaszewski was not critical of the idea, even though the activity of private polygraphers operating not only in the private business sector but also in the “family” sector is known to be harmful.

The results of empirical research that combined polygraph examinations with the detection of deception on the grounds of facial expressions were presented by a representative of the Border Guard, Tomasz Rewerski. He made a highly apt selection of the research method which allowed the combination of the advantages of laboratory and field studies. The subjects were Border Guard candidates, who besides polygraph examinations were also video-recorded. An additional number test was performed during the examination. The task was to put a circle around one of the numbers, and provide negative answers to all the questions about the number selected. The video material gathered during this part of the test was used for the assessment of credibility of the examinees by the following professional groups: psychologists working in penal institutions, investigative custody and Border Guards Forces (one group), Border Guards Officers, fifth-year students of psychology, second-year students of German studies, and FBI agents. Being the smallest, the last group was not included in the final statistics. The result of the study showed few differences between the groups, which leads to the claim that graduation from psychological studies does not guarantee good lie detection; nevertheless, the psychologists employed by the institutions mentioned above were better at recognising a lie than psychology students. Between the students of German studies and psychology, there were also insignificant differences in favour of the psychology students. Nevertheless, the question whether the students of psychology are actually better educated in detection of deception or whether they simply have a few more years of life experience is worth considering, and may be compared to the correlation discussed above (psychologists and psychology students). The best results were achieved by the Border Guard group, where the results oscillated around 50%, with the remaining groups ranking below the level. Results below 50% may prove that people select incorrect premises for evaluating deception from facial expression. Would they achieve results exceeding 50% if they answered against their intuition?

What is the difference between lying and deception? The answer to this question was given at the beginning of his address by Professor Jan Widacki – Director of the Judiciary Institute of the Andrzej Frycz Modrzewski Kraków University. Discussing approaches in trying to find new techniques of detection of deception, he pointed to the improvement of polygraph testing and research of emotion correlates other than those used in polygraph examinations that can be measured at a distance. Doubts of a legal and ethical nature were emphasised, especially in the context of various agents using distance detection of deception for a variety of purposes. Luckily, at present, such procedures are still being worked on, as the obstacles include the construction of the examination (tests)

and combining them with technical questions in such a way that the examinee remains unaware of being controlled. The professor also expressed hope concerning the future of the fMRI examinations, comparing the work of the brain to that of the headquarters, and the physiological correlates of emotions to the frontline.

Summing up, the publication is a good source of knowledge on the regulations on polygraph examinations and their position in other states. The speakers referred not only to the current regulations, but also commented on their strengths and the ensuing doubts. Thanks to their clarity, the papers concerning the techniques of constructing the tests are certainly helpful for expert-practitioners and people embarking on a career as a polygrapher. Because polygraph examinations are used in lie detection, there is a need to continue working on the improvement of techniques associated with construction of the tests and the devices used in examinations. The use of the latest technological achievements may, however, not be contrary to the law and the ethical aspects of detection of deception.

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Abrams S. (1973), *Polygraph Validity and Reliability – a Review*, Journal of Forensic Sciences, 18, 4, 313.

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