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James Allan Matte*
Matte Polygraph Service, Inc.
Williamsville, New York
USA

Minimum Number of Polygraph Charts Required to Reach a Conclusion of Truth or Deception in Psychophysiological Veracity Examinations

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For many years, the American Polygraph Association's standards of practice required that a minimum of two polygraph charts containing the same test questions had to be collected before a conclusion of truth or deception could be rendered. The assessment of the validity of any psychophysiological veracity test is based on the assumption that the test consistently measures the same properties. This consistency, known as reliability, is usually the degree to which a test yields repeatable results, i.e. the extent to which the same ex-

* jamesallanmatte@mattepolygraph.com

aminee retested is scored similarly (Matte 1996). This long-standing standard was in concert with APA-accredited polygraph schools.

However, recent changes to that standard have been implemented by the Federal, Utah and Integrated Zone Comparison Techniques, which now require that a minimum of three polygraph charts must be collected to reach a determination of truth or deception. Nevertheless, the minimum two polygraph charts requirement is still the standard for the Backster Zone Comparison Technique, the Quadri-Track Zone Comparison Technique and the Reid Technique.

In order to satisfy both schools of thought, the American Polygraph Association (APA) and the American Society for Testing and Materials (ASTM) have changed their standard as follows:

Division III: APA Standard of Practice.

3.9.6. Examiners are required to collect a sufficient number of charts so as to acquire sufficient data for proper evaluation, in conformance with a validated testing technique.

ASTM Designation E2062-10

Standard Guide for PDD Examination Standards of Practice.

7.4. Examiners shall collect a sufficient amount of physiological data suitable for evaluation in compliance with the format utilized.

Nonetheless, two recent quality-control reviews of a polygraph examination conducted in a criminal case that is being pursued in a court of law have criticized the original polygraphist for rendering a decision of deception on the basis of only two polygraph charts, even though the technique used required only two charts. This is an example of polygraphists in positions of authority imposing the requirements of their technique of preference on other techniques without supporting scientific evidence. It became apparent that a review and analysis of field cases needed to be conducted to resolve the issue which generated this study.

Method & results

The raw data from three published field studies on the Quadri-Track Zone Comparison Technique,¹ a uni-faceted single-issue test that offers two threats to the examinee – the relevant questions and the control questions – was reviewed and analyzed.

The first field study by Matte & Reuss (1989a, b), comprised a total of 122 confirmed cases. The base rate of deception was 64 out of 122 (52%). Of the 64 confirmed deceptive subjects, the polygraphists' decisions were DI in 62 (97%), NDI none, and Inconclusive in 2 (3%). Of the 58 confirmed nondeceptive subjects, the polygraphists' decisions were DI none, NDI 53 (91%), and Inconclusive in 5 (9%). The polygraphists were correct in 115 of 122 cases (94%), wrong in none of the cases, with inconclusive results in 7 cases (6%).

The total number of charts collected in the aforementioned 122 cases was 319 charts, which, when divided by the number of cases (122), equals an average of 2.6 charts per case. Further analysis revealed that 66 cases (54%) collected only two charts.

The second field study by Mangan, Armitage, Adams (2008) comprised a total of 140 confirmed cases. The base rate of deception was 91 out of 140 (65%). Of the 91 confirmed deceptive subjects, the polygraphists' decisions were DI in 89 (63.6%), NDI none, and Inconclusive in 2 cases (1.4%). Of the 49 confirmed nondeceptive subjects, the polygraphists' decisions were DI none, NDI 49 (35%), and no inconclusives. The polygraphists were correct in 138 of 140 cases (98.6%), inconclusive results in 2 cases (1.4%), with no errors.

The total number of charts collected in the aforementioned 140 cases was 306 charts, which, when divided by the number of cases (140), equals an average of 2.1 charts per case. Further analysis revealed that 133 cases (80.7%) collected only two charts.

The third field study by Shurany, Stein, Brand (2009) comprised a total of 57 confirmed cases. The base rate of deception was 28 out of 57 (49.1%). Of the

¹ A detailed explanation of the Quadri-Track ZCT is published in *European Polygraph*, Volume 1, 2009, Number 1(7); *Physiology & Behavior*, 95, 2008, 17-23, and *Polygraph*, Volume 18, 1989, Number 4.

28 confirmed deceptive subjects, the polygraphists' decisions were DI in 26 (92.9%), NDI 2 (7.1%), and no inconclusives. Of the 29 confirmed non deceptive subjects, the polygraphists' decisions were DI none, NDI 29 (100%), and no inconclusives. The polygraphists were correct in 55 of 57 cases (96.5%), no inconclusives, and 2 (3.5%) false negative error.

The total number of charts collected in the aforesaid 57 cases was 175 charts, which, when divided by the number of cases (57), equals an average of 3.0 charts per case. Further analysis revealed that 11 cases (19.2%) collected only two charts. The two false negative cases were each based on three charts. There were no errors made on any of the cases based on two charts.

Discussion

The above data from the three field studies clearly supports the use of the two-chart minimum standard in the decision-making process of truth and deception. This is especially important to practicing polygraphists who are usually confronted with more than one target issue to resolve through polygraph testing. The administration of a psychophysiological veracity (PV) examination involves the mandatory conduct of a stimulation test, plus the collection of at least two polygraph charts on the first target issue, which could easily require an additional chart if the scores are marginal on the first two charts. If the polygraphist is faced with two or three target issues, each requiring a minimum of two charts, he is then faced with the prospect of collecting a minimum of seven charts (including the Stim test). Should the polygraphist be required to collect a minimum of three charts per target issue (test), he would then have to collect a minimum of ten charts. When we consider the physical and emotional fatigue factor, it can readily be appreciated that a three-chart minimum requirement would most likely cause inconclusive results in the third and possibly in the second target issue, depending on the physical-emotional endurance of the examinee.

The review of the aforementioned field studies revealed that in the Matte & Reuss (1989a,b) study, the average score per chart for the Truthful was +6 and for the Deceptive was -9, which would tally to +12 and -18 for two charts. In the Mangan et al. (2008) study, the average score per chart for the Truthful was + 7.1 and for the Deceptive was -10.0, which would tally to +14.2 and -20.0 for two charts. In the Shurany et al. (2009) study, the aver-

age score per chart for the Truthful was +5.39 and for the Deceptive was -6.08, which would tally to +10.78 and - 12.16 for two charts. These scores for two charts are well above the minimum score threshold of the Quadri-Track Zone Comparison Technique at +6NDI and -10 DI for two charts. It is therefore not surprising that no errors were made on those cases whose decision of truth or deception were based on two charts with scores that far exceeded the minimum score threshold, especially in the Matte & Reuss and the Mangan et al. studies, where the acquired scores doubled the required threshold scores. However, when the polygraphist acquires marginal scores from the first two relevant charts, he is obligated to continue his collection of additional charts until satisfactory scores have been obtained. When the polygraphist is confronted with only one target issue, he has the freedom and luxury to collect additional charts beyond the minimum two-chart requirement.

As a matter of practice, this author usually conducts and collects a third chart when confronted with only one target issue to augment reliability and further solidify the results in case of adversarial court proceedings. However, when confronted with more than one target issue for testing and the scores for the first two charts significantly exceed the score threshold as indicated in the Matte-Reuss and Mangan et al. studies, that test is concluded with two charts, and the next target issue is tested in accordance with Backster's Examination Reliability Rating Table (ERRT); see Figure 1 (Matte, 1996). The ERRT is used during the case preparation to determine which issue has the combined greatest Adequacy of Case Information, Case Intensity, and Distinctness of Issue, using a 5-point scale. If anyone of those three requirements fails to attain a score of 3 or higher (preferably higher), the case file is returned to the requester for additional information or else aborted. The target issue with the greatest overall score is administered as Test A, followed by the next target issue with the second highest score administered as Test B, and so on. This process minimizes inconclusive results and assures that tests are conducted only in those cases where there is ample and accurate case information from which to formulate the test questions, and that the issue being covered is sufficiently distinct and intense to elicit the examinee's psychological set without offering an opportunity for rationalization.

Figure 1.

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.

This author believes that the current standard of practice regarding the collection of polygraph charts mandated by the American Society for Testing and Materials and the American Polygraph Association adequately addresses that issue which relies on conformance with validated polygraph techniques.

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