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Critique of Article by Nelson and Handler Entitled “Statistical Reference Distributions for Comparison Question Polygraphs”

Preface

This Critique was previously submitted to the Editor of the American Polygraph Association as a Letter-to-the-Editor consisting of 2046 words, two figures and 31 references challenging article by Raymond Nelson and Mark Handler entitled “Statistical Reference Distributions for Comparison Question Polygraphs” published in *Polygraph*, Volume 44, Number 1, 2015. The aforesaid Letter was rejected for publication in the Journal *Polygraph* by Handler, the newly appointed APA Editor who coincidentally is co-author of the article being challenged by this author, citing APA’s

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new guidelines limiting the length of a Letter-to-the-Editor to no more than 400 words, one table or figure and a maximum of 10 references.¹

Critique

This Critique is in regards to Appendix P. Matte Quadri-Track Zone Comparison Technique, Page 114 of article entitled “Statistical Reference Distributions for Comparison Question Polygraphs” by Raymond Nelson and Mark Handler, published in *Polygraph*, Volume 44, Number 1, 2015.

In Footnote #9, Nelson and Handler, referring to the 2011 APA meta-analytic survey, stated “Studies supporting this technique have been described as substantially methodologically flawed, and it is considered unlikely that the reported accuracy rates will be achieved in field settings.” The three field studies validating the Quadri-Track ZCT were in *field settings* (Matte, Reuss 1989b; Mangan, Armitage, Adams 2008a; Shurany, Stein, Brand 2009), and the studies were not substantially flawed as indicated in this author’s critique (Matte 2012). In fact, the aforesaid field studies met the most stringent requirements set forth in the *Guiding Principles and Benchmarks for the Conduct of Validity Studies of Psychophysiological Veracity Examinations Using the Polygraph* (Matte 2010), which require among other things a minimum sample of 50 confirmed cases (Matte 122, Mangan 140, Shurany 57). Conversely, the APA meta-analytic survey listed two studies validating the Utah ZCT Probable Lie Test, one of which was the Honts, Raskin, Kircher 1987 laboratory study that used a sample of only 20 cases; the Federal You-Phase (Empirical Scoring System) listed two studies, one of which was the Nelson, Handler, Blalock, Cushman 2012 field study (*Polygraph*, in press) that used a sample of 22 cases, and as of 6 January 2015, had not been published (R. Nelson, personal communication 6 January 2015), which raises serious questions about this study. Furthermore, the Utah ZCT Directed-Lie Test listed two studies, the Honts & Raskin 1988 field study with a sample of 25 cases, and Horowitz, Kircher, Honts, Raskin 1997 laboratory study with a sample of 30 cases. Sample size has a direct relationship to the applicability of the study’s results to the general population. As explained in detail in the aforementioned *Guiding Principles and Benchmarks*, several important elements present in field studies are

1 Previous published Letters to the Editor published in *Polygraph*, namely Letter by Matte regarding Cushman’s critique of the Matte Quadri-Track ZCT (MQTZT), *Polygraph* 43 (1), 2014, consisted of 6241 words and 35 references. Published Letter by Matte to the Editor regarding the APA’s Terminology Reference for the Science of Psychophysiological Detection of Deception, *Polygraph*, Vol. 41, No. 4, 2012, consisted of 2224 words and 18 references. Published Letter by Matte to the Editor of the *Journal of Forensic Sciences*, Vol. 56, No. 6, Nov. 2011 regarding the Horvath & Palmatier Laboratory Study on the Exclusive v. Non-exclusive Control Questions, consisted of 4081 words with 31 references.

lacking in laboratory studies, which is beyond the scope of this critique. The United States Court of Appeals for the Sixth Circuit, *U.S. v. Semrau*, 693 F.3d 510 (6th Cir. 2012) in its rejection of the fMRI Lie Detection test placed particular emphasis on the fact that Dr. Laken's fMRI lie detection test was based on laboratory studies using mock scenarios and the existing technology had not been fully examined in "real world" settings (Matte 2013a). This opinion raises serious questions regarding the use of laboratory studies to validate polygraph techniques. Dr. Nancy Kanwisher, professor at the Massachusetts Institute of Technology (MIT), and Dr. Elizabeth Phelps, professor at New York University, shared their doubts in much detail (Matte 2013a) about the value of laboratory studies pertaining to lie detection and the directed-lie in chapter 2 of Bizzi Hyuman S.E., Raianchle M.E., Kanwisher N., Phelps E.A., Morse S.N., Sinnott-Armstrong W., Rakoff J.S., Greely H.T.G. (2009). See also (Matte, Reuss 1999; Matte 1998; Iacono 2001).

In order to conduct an accurate and unbiased evaluation of a study, it must include related published critique(s) which may expose significant errors and omissions that can impact on the validity of the study. Unfortunately, this author's published 25-page critique (Matte 2012) reporting serious errors and significant omissions in the 2011 meta-analytic survey was apparently ignored. Prior to publication of aforesaid critique, this author brought to the attention of the APA Research Committee a glaring error in the APA survey at footnote #40 which stated

"This statistic was published in the Matte and Reuss (1989) reprint of the dissertation published in the journal *Polygraph*, but cannot be located in the original dissertations study for the no longer extant Columbia Pacific University."

In fact, the 'statistic' that the committee couldn't find in the dissertation is located in the Table of Contents on page 3, and on pages 46–47 and Table 11, pages 99–100 of the dissertation (Matte, Reuss 1989a). On 12 January 2012, this author received a letter on APA letterhead from Mark Handler, acknowledging the error and promising publication of an errata in the journal *Polygraph*. No acknowledgment of aforesaid error or any of the other errors cited in this author's critique were ever published in any APA publication including the journal *Polygraph*.

All cited publications authored by Matte, including the aforementioned Critique and the 1989 dissertation and field study published in *Polygraph* are available for review and download at www.mattepolygraph.com under the Heading of *Publications by James Allan Matte and co-authors*.

In Footnote #10, Nelson, et al, stated "Published procedures for this Technique involve the average total score per chart instead of the more common grand total score. This will require the summation of all scores for all charts and division of the results

to the number of charts.” This statement is inaccurate as reflected by the following descriptions of the Quadri-Track ZCT scoring system which marries the grand total score to a Conclusion Table offering a score threshold for each number of charts collected, supported by Predictive Tables for Estimating Error Rates published in Matte, Reuss 1989a.

A description of the scoring system in the Quadri-Track ZCT is set forth in article entitled “Psychological Aspects of the Quadri-Track Zone Comparison Technique and Attendant Benefits of its Inside-Track” published in *European Polygraph*, Volume 5, Number 2 (16), 2011, as follows:

“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.” The score threshold for each chart collected is symmetrical in that the second chart doubles the threshold score of chart 1, the third chart triples the threshold score of chart 1, and the fourth chart quadruples the threshold score of chart 1, hence all four score thresholds bear the same potential error rate (0.0). It should be noted that in spite of the high score threshold, the inconclusive rate for the three published field studies that validated the Quadri-Track ZCT averaged 2.4%. In a recently published study (Matte 2013b), it was shown that as the score threshold increases, so does the accuracy, which prompted the use of a +3 score threshold rather than a +1 as indicated in the Probability Table 10a-2 inasmuch as they both reflected the same error rate (0.0) without an increase in Inconclusives, offering a more conservative and defensible position as explained on pages 42–43 (Matte 2014), which also references a study (Matte 2013b) revealing a connection between the score threshold, rate of inconclusives and minimum number of charts required for a decision of truth or deception.

A detailed description is further set forth in “Numerical Scoring Systems in the Triad of Matte Polygraph Techniques” published in *Polygraph*, Volume 28, Number 1, 1999, which states:

“Appendix 1 depicts the Matte Quadri-Track Zone Comparison Test structure which shows that the vertical score tallied from spots 1, 2, and 3 are combined for a total score inasmuch as all spots deal with the same single issue. Appendix 2 depicts the Tri-Spot Quantification System for the Quadri-Track ZCT, and Figure 3 shows the Conclusion Table from which a determination is made as to Truth, Indefinite (Inconclusive), or Deception from the total scores tallied from spots 1, 2, and 3.”

The Quadri-Track ZCT Numerical Score Sheet and Conclusion Table

STIMULATION TEST DATA:		NUMBER SELECTED: _____																																																																																																																																																											
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The total combined score is married to the related number of charts collected and score threshold in the Conclusion Table to determine test results. When the total score reaches the score threshold indicated by the number of charts collected, the potential error rate of 0.0 is attained as reflected in the Predictive Tables for Estimating Error Rates, Tables 10a-2 and 10b-2 (Matte 1989a). The total score is not averaged to render a decision of Truth, Deception or Inconclusive as stated by Nelson and Handler. The confusion may be due to the diagram depicted as Table 10-C in this author's doctoral dissertation which formed the basis for publication of the field study on the MQTZCT in *Polygraph* (Matte 1989b). Table 10-C depicted a graph using two bell curves that showed the relation between the polygraph score and the distribution of scores for the innocent and guilty cases, based on the average score per chart from Tables 10a-2 and 10b-2.

The following diagram taken from page 19 of field study by Mangan, Armitage and Adams 2008a) shown here in black & white, further reflects the use of the Total Score to arrive at a decision of Truth, Deception or Inconclusive.

MATTE QUADRI-TRACK ZONE COMPARISON TEST STRUCTURE

(Cannot jump track to make comparison)									
		OUTSIDE TRACK	PRIMARY TRACK		SECONDARY TRACK		INSIDE TRACK		OUTSIDE TRACK
PNEUMO TRACING									
ELECTRODERMAL (GSR/GSG) TRACING									
CARDIO TRACING									
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	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 Inside Track to recoup response scores lost as a result of an Inside Issue.								
Gw Inside Issue Control Question (Variable strength)	TRACK Identifies a pair of questions related for comparison/quantification (G & R Zone) or evaluation (B Zone).								
Rw Inside Issue Relevant Question (Variable strength)	SPOT Identifies a Track which is quantified.								
YR Sacrifice Relevant Question									
Y Neutral Question (Irrelevant)									

THREE SPOTS SCORED AND TALLIED FOR A GRAND TOTAL = TRUTH, DECEPTION, INCONCLUSIVE

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The Integrated Zone Comparison Technique suffered the same description of its published studies as *substantially methodologically flawed* from Nelson, et al, which at the time the 2011 APA meta-analytic survey was published, numbered three studies, but since then has been augmented by two additional published studies. Due to the limited scope of this critique, this author will leave the defense of the IZCT to its able developer Nathan J. Gordon.

Poor technique formats that defy logic, common sense and empirical data cannot be rectified with statistical methodologies. When all the facts are known and understood, logic reveals itself. Further discussion regarding this topic will be forthcoming. In the meantime, Nelson, et al should end their unwarranted and divisive rhetoric towards the MQTCT and the IZCT which deserve their rightful place as high performance evidentiary techniques.

All of the aforementioned studies authored by Matte are available for review and download at www.mattepolygraph.com under the heading of *Publications by James Allan Matte and co-authors*.

References

American Polygraph Association. (2011). Meta-Analytic Survey of Criterion Accuracy of Validated Polygraph Techniques. *Polygraph*, 40 (4), 193–305.

- Bizzi E., Hyman S.E., Raichle M.E., Kanwisher N., Phelps E.A., Morse S.I., Sinnott-Armstrong W., Rakoff J.S., Greely M.T. (2009). Using Imaging to Identify Deceit: Scientific and Ethical Questions. Cambridge MA, American Academy of Arts & Sciences.
- Iacono W.G. (2001). Forensic Lie Detection Procedures Without Scientific Basis. *Journal of Forensic Psychology Practice*. 1 (1), 75–86.
- Mangan D.J., Armitage T.E., Adams G.C. (2008a). A Field Study on the Validity of the Quadri-Track Zone Comparison Technique. *Physiology & Behavior*. 95, 17–23.
- Mangan D.J., Armitage T.E., Adams G.C. (2008b). Rebuttal to Objections by Iacono and Verschuere et al. *Physiology & Behavior*. 95, 29–31.
- Matte J.A. (1978). Polygraph Quadri-Zone Comparison Technique. *Polygraph*, 7 (4), 266–280.
- Matte J.A. (1998). An Analysis of the Psychodynamics of the Directed-Lie Control Question in the Control Question Technique. *Polygraph*. 27 (1), 56–67.
- Matte J.A. (1999). Numerical Scoring Systems in the Triad of Matte Polygraph Techniques. *Polygraph*. 28 (1), 46–55.
- Matte J.A. (2011). Psychological Aspects of the Quadri-Track Zone Comparison Technique and Attendant Benefits of its Inside-Track. *European Polygraph*. 5, 2 (16), 41–60.
- Matte J.A. (2012). Critique of Meta-Analytic Survey of Criterion Accuracy of Validated Polygraph Techniques. *European Polygraph*. 6, 1 (19), 19–44.
- Matte J.A. (2013a). fMRI Lie Detection Validity and Admissibility as Evidence in Court and Applicability of the Court's Ruling to Polygraph Testing. *European Polygraph*. 7, 4 (26), 191–198.
- Matte J.A. (2013b). The Connection between Score Threshold, Rate of Inconclusives and Minimum Number of Charts Required for Decision of Truth or Deception. *European Polygraph*. 7, 1 (23), 5–11.
- Matte J.A. (2014). A Letter to the Editor Regarding Cushman's Critique of the Matte Quadri-Track Zone Comparison Technique and its Inside-Track. *Polygraph*. 43 (1), 38–49.
- Matte J.A., Reuss R.M. (1989a). Validation Study on the Quadri-Zone Comparison Technique. *Dissertation – Research Abstract*. LD 01452, Vol. 1502, 1989. Proquest Information and Learning (University Microfilm International).

Matte J.A., Reuss R.M. (1989b). A Field Validation Study on the Quadri-Zone Comparison Technique. *Polygraph*. 18 (4), 187–202.

Matte J.A., Reuss R.M. (1999). Validation of Potential Response Elements in the Directed-Lie Control Question. *Polygraph*. 28 (2), 124–142.

Nelson R., Handler M. (2015). Statistical Reference Distributions for Comparison Question Polygraphs. *Polygraph*. 44 (1), 91–114.

Shurany T., Stein E., Brand E. (2009). A Field Study on the Validity of the Quadri-Track Zone Comparison Technique. *European Polygraph*. 1, 1 (7), 5–24.