



## Brief communication

## Rebuttal to objections by Iacono and Verschuere et al.

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## ABSTRACT

The arguments presented by Iacono and Verschuere et al. against the publication of the Mangan et al. field study of the Quadri-Track Zone Comparison Technique in *Physiology & Behavior*, are based largely on dated articles that examined control question polygraph techniques whose psychological test structures, physiological analyses, and scoring systems are significantly different than those of the Quadri-Track ZCT. Iacono and Verschuere et al. alleged that the Quadri-Track ZCT is biased against the innocent and can be defeated with the use of countermeasures without considering the technique's unique "remedial inside track" that quantifies the innocent examinee's fear of error—and the guilty examinee's hope of error—which are factored into the overall score, thus avoiding false positive and false negative errors. Their objection to the use of confessions as the criterion for ground truth presumes that the polygraph examinations conducted in this field study were conducted in a vacuum. They ignored the various methods of post-test confirmation and research studies that support the use of confessions as ground truth. Verschuere et al. cited the National Research Council's 2003 report to support their conviction that the accuracy of polygraph tests is well below perfection and errors often occur. However, they failed to mention that the accuracy range values of the seven field studies which met the National Research Council's scientific criteria were from 0.711 to 0.999 with a median value of 0.89, and that the field study with the highest accuracy (0.999) was from a published 1989 field study on the Quadri-Track Zone Comparison Technique.

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Mason  
Szucko  
Kleinmuntz  
Webb

The thrust of William Iacono's objections to our field study [8], echoed by Bruno Verschuere et al. is in our use of confessions as the criterion for ground truth. Confessions acquired from legitimate polygraph examinations do not suffer the abuses of a suspect's rights that may be found in the general police interrogation arena. The protocol of the Quadri-Track Zone Comparison Technique [10–12,14] absolutely forbids the use of any accusatory or interrogative approach during any portion of the pre-test interview and collection of the physiological data. Furthermore, since 1980, co-author Armitage instituted a policy at the Buffalo Police Department that permits both prosecutors and defense attorneys to view live, through close-circuit television, the entire polygraph examination—including the post-test interview. The result of Armitage's "open viewing" policy is most telling: No confessions have ever been challenged in that venue. Therefore, any leveraged confessions would have been video recorded and viewed by counsels and objections made, but that has not occurred in any of the cases. In addition, the American Society for Testing and Materials (ASTM) and the American Polygraph Association (APA) both require that all polygraph examinations be video or audio recorded in their entirety and retained for at least one year. Another check on validity is provided by the Quality Control Review program at the Buffalo Police Department that examines the process and independently scores the polygraph charts, thus verifying the accuracy of the polygraph technique.

Research by Gary D. Light and John R. Schwartz [7] entitled "The Relative Utility of the Forensic Disciplines" revealed the following:

The efficacy of the forensic disciplines in felony criminal investigations conducted by the US Army Criminal Investigation Command (USACIDC) during the period from 1 July thru 30 December 1990 involving a total of 1069 forensic examinations was assessed. The combined laboratory examinations consisting of firearms, illicit drugs, latent prints, questioned documents, serology, trace evidence and photographic comprised 55% of the forensic examinations, and the Polygraph (PDD) comprised 45% of the examinations used in this study. "Of the 1069 examinations reviewed, there were no instances in which the findings of one discipline contradicted the results of any other discipline." The report further states "The findings of this comparison support other studies that utilized the confession as ground truth (Barland and Raskin [4]; Patrick and Iacono [16]). In these studies, PDD was found to have been over 90% accurate in the field setting. Iacono [6] asserts that sample bias creates "substantial methodological shortcoming" (p. 201), and that PDD examinations which historically have been selected for studies based on confessions as a select group and reflect bias in favor of PDD. While there can be no question that examinations verified by confession are a unique subset of PDD examinations, this study indicates that this bias has a minimal impact, and confession-based samples would accurately reflect the overall population. This assertion is further substantiated by a study conducted by Mason [9], wherein 111 PDD examinations were conducted in which ground truth was ascertained by urinalysis examinations. The validity of PDD (verified by these biomedical tests) was in excess of 95% and if utilizing confessions in conjunction with the urinalysis forensic discipline accuracy of that confession subset would be over 98%."

It should be noted that in our study on the Quadri-Track ZCT, we calculated the average score for the unconfirmed and confirmed cases which revealed no significant difference in the reactivity of the subjects between the confirmed and unconfirmed cases, and there was no significant difference in the inconclusive rate, all of which indicates no significant difference in the examinees whose cases were

unconfirmed and the confirmed cases appear to be a representative sample of the total cases.

The data base used in this study encompassed a seven-year period (1 January 2000 through 31 December 2006). The innocent subjects used in this study were identified solely by the analysis and scoring of their respective physiological data which were subsequently confirmed by confession from the guilty subject in each of their related cases. Hence, the identification of the guilty examinee that resulted in a confession could not have influenced the results of the previously tested innocent examinees in the same case identified as truthful from the analysis and scoring of the physiological data recorded on their polygraph charts. Therefore potential false negatives were not excluded from the study.

None of the unconfirmed cases during that seven-year period or thereafter ever resulted in the discovery that an error had been made, i.e. conviction of a truthful examinee or exculpation of a deceptive examinee. Iacono hypothesized that the false-negative and false-positive errors will be found in the unconfirmed cases, which arguably could occur, albeit on rare occasions, but this theory is not supported by any empirical data.

Unlike laboratory studies where there is no post-test connection, field studies of real-life cases are connected to post-test investigations and adjudications that can reveal errors or corroborate test results, which is another form of validity confirmation. The validity of the Quadri-Track ZCT, with over 30 years of use, is supported by the volume of successful cases in the United States and other countries in different situations.

There are significant differences between the Quadri-Track ZCT and other polygraph techniques. The Quadri-Track ZCT includes safeguards against false positives resulting from the Othello Error<sup>1</sup> [5] and its system addresses physical and mental countermeasures, all of which was cited by National Academy of Science [15] as major issues that reduced the accuracy of polygraph tests. These built-in safeguards, which are not available in any other polygraph techniques, place the Quadri-Track ZCT in a unique category. As such, papers critical of control question tests in general are essentially inapplicable to the Quadri-Track ZCT.

Verschuere et al. stated that the Quadri-Track ZCT's 'dual equal strong reaction rule' is heavily biased against the innocent and is likely to result in false false-positive errors because it assigns a minus one score rather than a zero when there is a significant response to the relevant questions and an equally strong response to the neighboring control question. As explained in our study, Backster's 'Either-Or' Rule [1–3,12] dictates that when such a situation occurs, the control question is deemed to be defective and thus that relevant question is compared against the other neighboring control question that, if functioning properly, should have little or no response, providing a score of minus 2. On the other hand, the Quadri-Track ZCT's comparison of relevant versus control question is non-selective, meaning the examiner is required to compare the relevant question with the control question immediately preceding it within the same track. Thus when compared with a defective control question, the responsive relevant question is assigned a minimum score

<sup>1</sup> The *Othello Error*, a term used by Dr. Paul Ekman (1985) to describe the vulnerability of polygraph examinations to the elements of fear. "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." 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.

of minus one only in the pneumo and cardio tracings, as explained in the study for a total of minus 2 in that particular track. Aside from the fact that the 'Either-Or' rule forms the nucleus of the Backster ZCT which has been the most widely used zone comparison technique for the past 48 years, its 'Either-Or' rule has been tested in a large field study [13] involving six polygraphists from a state law enforcement agency that has been using the Backster ZCT for several years. This study, which is near completion, used the three prevailing methods of scoring charts including the Backster scoring system with its 'Either-Or' rule, and found that the Backster scoring system produced the least inconclusives with no errors.

Verschuere et al. failed to consider the fact that if for some reason, the significant response on that relevant question was due to a fear of error rather than fear of detection, the Fear of Error control question within the Inside Track would more than compensate with plus scores that can accrue a total score of plus 9 per chart. The Inside Track's Fear of Error control question was specifically designed to prevent false positives, and the results of the previous published field study (Matte and Reuss) [14] and our field study [8] support that conclusion, and refute Verschuere's statement that the Quadri-Track Zone Comparison Technique is biased against the innocent.

Verschuere et al. also stated that guilty examinees can use countermeasures that can produce physiological responses on the control questions greater than their expected autonomic responses on the neighboring relevant questions, thus obtaining a truthful test outcome. Again, Verschuere et al. fail to consider the role and impact of the Inside Track's Hope of Error relevant question that would provide greater compensatory minus scores than the plus scores created by the countermeasure, thus avoiding a false false-negative result.

Verschuere et al. cited the National Research Council's 2003 report of their research findings concluding that "polygraph tests discriminate lying from truth telling well below perfection and that errors often occur." However, Verschuere et al. fail to mention that the accuracy range values of the seven field studies which met the National Research Council's scientific criteria were from 0.711 to 0.999 with a median value of 0.89. The study with the lowest accuracy (0.711) was the Szucko and Kleinmuntz study [17] which used examiner trainees who were permitted to review and analyze only one chart, and based their decision as to truth or deception with no inconclusives permitted on only one chart. Furthermore they used global evaluation rather than numerical scoring in their chart analysis. The Szucko and Kleinmuntz study failed to replicate field examinations normally administered by experienced polygraph school graduates who are required to conduct a minimum of two polygraph charts before rendering an opinion of truth or deception, and render an Inconclusive opinion when the data is inadequate. Furthermore, experienced expert polygraphists are trained to recognize countermeasures which are far more difficult to apply successfully in the field than in a laboratory setting. The study with the highest accuracy (0.999) was from the Matte and Reuss field study [14] (NRC P.125, 337, 351). The NRC report stated that the range of accuracy indexes estimated from the scientifically acceptable field studies most likely overstates true polygraph accuracy in field settings involving specific-incident investigations, citing the use of countermeasures and the fear

of error by innocent examinees. However the NRC failed to recognize the fact that examinees in field cases have the opportunity to employ countermeasures and indeed do employ them, hence the reported results of field studies embody the effects of countermeasures. As to false positives caused by the innocent examinee's fear of error, that issue has been adequately addressed with the use of the Quadri-Track Zone Comparison Technique's Inside Track.

Iacono and Verschuere et al. should make note that Polygraph is not a trade journal. It has been the official peer-reviewed journal of the American Polygraph Association since 2003 [18].

In our study, we provided statistical data with analysis tables and textual explanation of its results. We are convinced that the methods used in our study adhere to acceptable scientific principles which can be replicated by qualified researchers who fully understand the complete protocol of the Quadri-Track ZCT—most notably its unique remedial inside track and scoring system—and use field cases administered by polygraph experts formally trained in the Quadri-Track Zone Comparison Technique.

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