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Letter to the Editor of European Polygraph

Dear Editor of European Polygraph,

Please accept my response to Mr. Matte's to European Polygraph regarding the Nelson and Handler (2015) article titled "Statistical Reference Distributions for Comparison Question Polygraphs."

My original response to Mr. Matte can be found in the journal Polygraph, where both the publication of interest and Mr. Matte's original letter to the editor were printed. I am a bit perplexed at the need to respond a second time to the same letter in a different journal. Much of the content of Mr. Matte's response is not new, has been printed elsewhere, and does not pertain to the article in question. Regardless, Mr. Matte can be expected to disagree verbosely with anyone who is skeptical about or disagrees with his proprietary conclusions and reported claims of ~100% test accuracy (Mr. Matte's published claims of 99.x% accuracy amount to what researchers might consider to be rounding error for conclusions of ~100%.) Because Mr. Matte has expanded his letter to the editor, I have expanded my response accordingly.

There are so many scientific and statistical errors in Mr. Matte's publications that it is difficult to know where to start. Mr. Matte's assertions, reliance on false hypothesis, gross misunderstanding of scientific principles and irresponsible statistical sugges-

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tions are so erroneous and so outrageous that they are likely to reinforce misperceptions that the polygraph itself is mere pseudoscience. Firstly, self-publication of a set of research guidelines does nothing to ensure the correctness or adequacy of those guidelines, and does nothing to rectify the flawed scientific methodology that lead to Mr. Matte's irresponsible claims of ~100% accuracy. Mr. Matte's assertion that sample size relates to the generalizability of conclusions is simply wrong. Sampling method does affect generalizability, and generalizable results can sometimes be obtained from small studies that make use of proper sampling methods. Generalizable results cannot be obtained from even large studies if the sampling methodology is flawed.

Mr. Matte's misunderstanding of the principles of psychology, physiology and scientific testing are evident in his continued convenient reliance on the false hypothesis of fear as the basis of the polygraph test, along with his false assumption of clairvoyance around the reason for the emotion of fear, and the false assumption that present day or historical polygraph recording devices can discriminate fear from other emotions such as anger, hope, disgust or joy or love. The evidence is abundant that fear is not a sufficient basis to understand responses to polygraph stimuli, and that the polygraph cannot discriminate between different emotions or their causes. (Despite these limitations, the polygraph has been shown to discriminate truth and deception at rates significantly greater than chance, though less than Mr. Matte's published claims of ~100% accuracy.)

Mr. Matte's misunderstanding of scientific research, and his views on laboratory and field studies, is plainly inconsistent with many decades of scientific research. Fundamentally, Mr. Matte appears to be confused about the difference between ecological validity and external validity. External validity – whether real world results are likely to be similar to the study results – has been shown to be not wholly contingent on the ecology of field studies. There are countless examples in every field of science and testing for which the results from laboratory studies have at times correlated well with results observed in real world settings. To suggest otherwise is to suggest that all laboratory research should be abandoned. A more realistic view would simply ask whether laboratory results do or do not agree with field study results. Additional questions might address whether laboratory or field study results are more likely to be incorrect when there is disagreement, and whether study results do or not agree with real world experience. An inherent limitation of field studies is that it is impossible to sufficiently control all variables to study research questions about causality. Although field studies can be used to study correlation, questions about causality can only be studied under controlled laboratory conditions. All types of research design can have some value and purpose. However, I do not believe that Mr. Matte's report-

ed claims of ~100% accuracy are consistent with real world experience, for which we can reasonably conclude there is some observable and measurable margin of error.

To illustrate how field studies and sampling methodology can lead to erroneous results that are not generalizable, consider an example in which a study sample is selected based on field cases that are confirmed by confession. This sample is at risk for selection bias because false-positive cases will be systematically excluded unless the innocent person makes a false confession. At the same time, false-negative errors will be systematically excluded unless a guilty person confesses after successfully passing a polygraph. It will then be no surprise that the result of this field study with a confession-confirmation sample will be ~100% accurate because the study sample includes no error cases. These results will not be generalizable and will not be observed in real-world settings. The conclusions from such a study are of no real value.

In the case of Mr. Matte's research, his reported "field study" results showing of ~100% accuracy prove nothing in reality and are not likely to ever be consistent with field accuracy. In reality, it would be naïve to expect to achieve ~100% deterministic perfection from a test of amorphous psychological and social phenomena, and it will lead only to frustration, aggravation and wholesale mistrust of the polygraph if polygraph professionals mislead the agencies, countries and communities we serve into believing they can somehow achieve certainty or perfection or the absence of decision all errors. Instead, it is the obligation of tests and testing professionals to develop and use replicable procedures to realistically quantify the margin of uncertainty and to constrain errors to within acceptable tolerances. Laboratory studies that have predicted polygraph accuracy rates at something less than perfection are far more likely to be consistent with reality than Mr. Matte's published claims of ~100% accuracy.

Because deterministic perfection is not likely to be observed in reality, it will likely lead only to frustrated expectations and frustrated responses from referring professionals and policy makers, along with cynical and skeptical responses from scientists if the polygraph profession were to take seriously Mr. Matte's published claims of ~100% accuracy. More importantly, members of the public are likely to feel harmed by the polygraph when they inevitably discover that the polygraph cannot provide certainty deterministic perfection, but serves only as a probabilistic test in the same way that every other scientific test provides a probabilistic measure of uncertainty surrounding a phenomena that cannot be subject to simple deterministic observation or direct physical measurement. Mr. Matte's published claims of ~100% accuracy therefore do not advance or benefit the polygraph profession, and in reality represent a liability for the profession and a hazard for agencies, communities and individuals.

Regarding Mr. Matte's objections to the Nelson and Handler (2015) article, we note that the table in Appendix P is calculated from the statistics published by Mr. Matte on page 98 of his 1998 study (co-authored with Mr. Reuss), which recommends cut-scores of -5 and +3 per chart, and includes an instruction to average the scores for all charts in order to use these recommended cut-scores. Mr. Matte's suggested cut-scores for 2, 3 and 4 charts are linear multiples of the cut-scores from his 1998 publication. More importantly, this illustrates another of Mr. Matte's scientific shortcomings. Every graduate student in every accredited university in the U.S. and every other country will learn that standard deviations – though they use the same unit of measurement as the data and mean scores – are not subject to linear addition, subtraction, multiplication or division in the same way as mean or average scores. Mr. Matte's use of simple linear multipliers for recommended cut-scores – calculated from mean and standard deviations – is therefore mathematically and statistically incorrect. Mr. Matte's calculations and cut-scores are actually incapable of informing us of the level of statistical significance of the test result. Although Mr. Matte's misunderstanding of science, research and statistics is well beyond the scope of what can be addressed in this letter, the correct procedure for this situation would involve the recalculation of cut-scores at a desired level of significance after first squaring the standard deviation values before applying a linear multiplier for the number of charts and then once again taking the standard deviation as the square root of the multiplied statistic. Instead of attempting the seemingly impossible task of correcting his statistical and scientific misunderstandings we elected to simply recalculate the distributions from Mr. Matte's own published mean and standard deviations per chart, and to republish the formulations using Mr. Matte's recommended per chart cut-scores – including the instruction to average the score for all charts – from the 1989 publication that he co-authored with Mr. Reuss.

In response to Mr. Matte's arguments in favor of the IZCT format, for which studies included in the APA (2011) report also concluded an essentially ~100% perfect accuracy level, it begins to appear that these responses may be motivated by mere vanity in response to detailed criticism of the scientific shortcomings of those published claims of ~100% accuracy. Although I cannot read minds any more effectively than Mr. Matte, it is my view that Mr. Matte and others are simply unhappy with a skeptical view of the published claims of achieving ~100% perfect accuracy (i.e., certainty). Although it may be interesting to ponder what motivation supports the publication of claims of ~100% accuracy or deterministic perfection, it would benefit readers more to focus the discussion strictly on whether the scientific and procedural assumptions are or are not sufficient to support Mr. Matte's reported conclusions. An even more productive effort would focus solely on realistically quantifying the probabilistic margins of uncertainty in the lie detection context. The core of the

issue is whether the reported conclusions of ~100% accuracy are realistic and replicable by others. Most importantly, it would advance the profession more to discuss whether broader scientific and statistical principles do or do not concur with the assumptions and procedures employed in the research on the MQTZCT and IZCT formats. It is my position that Mr. Matte's assumptions, procedures and conclusions are not consistent with science, including psychology, physiology, test theory, information theory, statistical decision theory and other areas of science. Although other evidence does support the polygraph as highly accurate, field examiners throughout the world are not likely to achieve the ~100% perfect accuracy as claimed in publications on the MQTZCT and IZCT.

I do not know whether Mr. Matte and others do or do not actually believe in the published claims of ~100% accuracy using his technique. Mr. Matte is simultaneously the author of his eponymously named technique, the purveyor to the public and professional marketplace that may wish to engage in commercial transactions involving the technique, the "researcher" who published claims of ~100% accuracy, and also a participant in the data collection as testing examiner. As Mr. Matte's professional model is merely a complex extension of a *expert-practice* model (in which the effectiveness and validity of a technique is largely dependent on the persona, experience and expertise of the practitioner – and less reliant on the application of recognizable scientific psychology and test theory), his reported claims of ~100% accuracy, premised on a misunderstanding of the mathematics of statistical decision theory, amounts to little more than the publication of Mr. Matte's personal testament that he views his technique and perhaps himself in a superlative light. This has very little, if anything, to do with science, and does not benefit the profession in any way replicable scientific way. In contrast, an *evidence-based practice* model will emphasize the validity of a technique is supported not by personal prowess or wizardry but by the correct application of methods and procedures that have been shown to work at known level of effectiveness as function of the correct application of the principles of science.

I believe the scientific community will look with suspicion and concern at Mr. Matte's claimed results of ~100% accuracy, at his mis-understanding of statistical principles, at his deeply flawed research, and his idiosyncratic and proprietary psychological formulations involving the measurement and discrimination of the different emotions of fear and hope – something that the psychophysiological researchers have not yet achieved, and something that known to be inconsistent with the technological and recording capabilities of the polygraph instrument. Mr. Matte's psychological formulations are so inconsistent with the reality of scientific psychology that it can be regarded as nothing short of magic or divination or clairvoyance to suggest that

we can reliably discriminate the experience of fear and hope, or dissimulation and dishonesty in the expression of fear and hope, simply by asking questions about fear and hope while recording physiological responses with a device that cannot in reality discriminate or record any physiological differences between fear and hope. A cynical view would suggest that it appears to be an opportunistic insult to the public and to the intellect of the polygraph profession for Mr. Matte to expect others to endorse or accept his claims of ~100% lie detection accuracy regarding amorphous social and psychological phenomena (fear and hope) for which the polygraph cannot actually record and discriminate. I will leave it to readers to ponder for themselves what form of motivation prompts these unrealistic claims. The most important consideration at this time is this: who will benefit from the re-publication of Mr. Matte's assertions.

If Mr. Matte is correct, then perfect lie detection has already been achieved by Mr. Matte's divinations. Scientists need not apply, because there would be no need for any further research or publication. If Mr. Matte and others are incorrect – if ~100% lie detection accuracy has not yet been achieved and cannot be realistically expected in field settings – then Mr. Matte's publications advance us nothing and add nothing but confusion and noise to the professional knowledge base pertaining to the instrumental and scientific detection of deception.

Perhaps what is more important is whether the editors of *European Polygraph* will continue to provide Mr. Matte with a forum to inject confusion and misinformation into the professional and scientific literature on lie detection and polygraph. I believe the polygraph profession that will be better served by the publication of more generalizable and replicatable analysis from authors who are less interested in esoteric mysticism and proprietary vanity, and more familiar with the application of mainstream scientific and statistical concepts in the polygraph testing context. It would seem like an unfortunate failure of the editorial and scientific publication process to allow the continuation of this needless and noisy discussion to cause any further negative impact on the profession.

Reprinting of Mr. Matte's letter to the editor serves primarily to provide Mr. Matte an opportunity to republish his proprietary brand of impossible mind-reading, amateur psychologizing, and pseudoscientific ideas (i.e., ideas that purport to be scientific but are actually inconsistent with science). Reprinting of fictitious conclusions in support of previous publications claiming ~100% accuracy will do nothing in reality to advance the polygraph profession and may only lead to increased skepticism among scientists regarding the scientific competence of the polygraph profession. Additionally, re-publishing all or part of the same material might amount to what some academics and scientists would call self-plagiarism, which is a form of plagiarism that is viewed by some as ethically questionable. Reprinting of previously

published material may also bring into question the copyright ownership of the twice-printed material, for which editors generally require either permission from the original publisher or some declaration that the material has not already been previously published in whole or part in another location. At the very least, republication of Mr. Matte's unscientific critique and misapplication of the principles of science will amount a moment of vanity and an opportunity for Mr. Matte repeat himself, but it will ultimately add only friction and confusion to the professional discussion. Most importantly, if the polygraph profession is to advance, it will be increasingly important to divest itself from unscientific ideas and unrealistic claims of ~100% accuracy supported only by the force of individual persona and verbosity, and not by a correct understanding of the principles of scientific research, or correct application of scientific theories from psychology, physiology, statistical decision theory and test theory.

June 30, 2015

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From the Editor

Science thrives by exchanges of arguments and disputes, even if caustic. In principle, they are useful, should only the dispute be based on factual argumentation and not arguments *ad hominem*. We have decided to publish both the texts: criticism by James A. Matte and Raymond Nelson's reply. The arguments of both the challengers have now been presented to the readers of *European Polygraph*; here the argument ends, as we consider the subject exhausted.

The Editor