Brief communication

The Quadri-Track Zone Comparison Technique: It’s just not science

A critique to Mangan, Armitage, and Adams (2008)

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We argue that the article by Mangan and co-workers on the Quadri-Track Zone Comparison Technique is an example of the failure of the peer-review procedure. This study is not properly grounded in current psychophysiology on lie detection. It also lacks the defining characteristics, such as a replicable methodology, of a proper scientific study. The finding that the Quadri-Track Zone Comparison Technique is highly accurate is likely due to a methodological artefact, and deserved no place in a peer-reviewed journal.

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Examinig field data of 140 polygraph tests, Mangan et al. [10] conclude that ‘the Matte Quadri-Track Zone Comparison Technique has clearly demonstrated ... that it is able to overcome the troublesome Othello error, nullify the effect of countermeasures, and provide a very high degree of accuracy.’ Meanwhile, their article and its optimistic conclusion stand in sharp contrast to a large number of studies that criticised polygraph testing for, amongst others, its considerable error rate [1,3,7,9,11].

The report of the National Research Council [9], written by highly distinguished scholars, concluded that “Almost a century of research in scientific psychology and physiology provides little basis for the expectation that a polygraph test could have extremely high accuracy” (p. 2). Based upon 37 laboratory studies and 7 real-life field studies, they concluded that polygraph tests discriminate lying from truth telling well below perfection and that errors often occur. We argue that the study by Mangan, Armitage and Adams does not refute any of the concerns voiced by polygraph critics. Rather, the near perfect accuracy these authors reported found can best be seen as the artefact of a scientifically inadequate approach. More specifically, their study heavily draws upon untested and unscientific hypotheses, neglects established empirical findings, is biased in methodology and scoring, and lacks the methodological rigour to allow independent replication. Simply put, it’s just not science.

1. Test theory

The Quadri-Track Zone Comparison Technique is a variant of the Control Question Test. The general assumption underlying Control Question polygraph Tests is that in innocent examinees, control questions (e.g., “Before the year 2003, did you ever hurt someone you love?”) elicit larger physiological responses than relevant questions (e.g., “On May 5th, did you shoot John Doe?”). The reversed is expected in guilty examinees: larger responses to the relevant questions than to the control questions. This assumption, however, has no grounding in psychological theory (see e.g., [2,8]). Mangan et al. cite ‘psychological set’ as the theoretical framework of this assumption. This theory, also known as ‘anti climax dampening’ theory [12] “involves the inter-relationship of two issues, questions or topics, in close proximity to each other, where the more important, bothersome or stimulating issue suppresses or completely eliminates emotional response to the other issue, question or topic which the person might have responded to had the other strong issue, question or topic not been present” [12].

While it may sound impressive to non-experts, this theory is vague and unspecified. It has never been tested nor has it appeared in any peer-reviewed journal. Moreover, it’s not very compelling and in the absence of empirical evidence, unlikely to be true. Simply put, this “theory” is nothing more than an unproven claim.

2. Othello error

Based on a review of the evidence at hand, there is little reason to assume the Quadri-Track Zone Comparison Technique (QTZCT) can overcome the problems of false positive outcomes. As a matter of fact,
the ‘dual equal strong reaction rule’ supported by the authors is heavily biased against the innocent and is likely to result in false positive errors. The reason for this is obvious: similar responding to both the control and the relevant question types leads to inconclusive test results, i.e., no decision can be made. The ‘dual equal strong reaction rule’ holds that when the examinee exhibits similar responding to both questions types, he/she must be considered deceptive, meaning the test is biased towards false positive outcomes.

3. Countermeasures

The authors claim that the QTZCT is immune to countermeasures. Countermeasures are everything an examinee can do to alter the test outcome. Biting your tongue, for example, is an effective means of creating a physiological response. It has been repeatedly shown that a large proportion of guilty examinees can obtain a truthful test outcome through the use of countermeasures on the control questions (e.g., [5]). The authors offer no evidence whatsoever that the QTZCT is indeed immune to countermeasures. Absent such evidence, their claim is naïve and unlikely to be correct. The authors assume that a guilty examinee can increase physiological responding on the control questions to the level of that for the relevant questions, but not beyond. Indeed, this seems to be the reason why the authors advocate scoring similar responding to both the control and the relevant question types as signalling deception. Here, the authors simply ignore several published empirical research indicating that a substantial proportion of guilty examinees can augment their physiological responses to the control questions beyond those to the relevant question, thereby obtaining a truthful test outcome (for a review see [4]).

4. Sampling bias

Given the problems associated with the QTZCT outlined above, how can the near perfect accuracy rates found by Mangan et al. be explained? Most likely, this is due to sampling bias related to the confession criterion of ground truth on which the authors rely. Patrick and Iacono convincingly argued that this methodology produces inflated accuracy rates [6,11]. The accuracy of a polygraph test constitutes of the number of false negative test results (innocent examinees deemed guilty) and the number of false negative test results (guilty examinees escaping detection). An innocent examinee who obtained a false positive test results will be confronted with the test outcome, but is unlikely to confess. A guilty examinee who obtained a false negative test outcome is not further investigated and is therefore also unlikely to confess. When using confessions as the criterion of ground truth, both types of errors will be systematically excluded because no confession is present. Selection of only cases in which a confession is present thus inflates accuracy, and this biased methodology may explain the extraordinary findings of Mangan et al.

5. Lack of methodological rigour

Development of the QTZCT has taken place outside the academic community. The study by Mangan et al. painfully illustrates this. Insufficient details are given to allow independent replication, and the two publications that are cited to support the validity of the QTZCT did not undergo standard scientific peer-review. With two exceptions (the most recent being from 1975), none of the references in the article are peer-reviewed publications. Unfortunately and incomprehensibly, the study by Mangan et al. passed peer-review. The readers of Physiology and Behavior should realize that the QTZCT has little to do with science, and the publication by Mangan et al. even less.

References