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A TREMOR IN THE BLOOD: USES AND ABUSES OF THE LIE DETECTOR. By *David Thoreson Lykken*. New York: McGraw-Hill Book Co. 1981. Pp. xiii, 317. \$14.95.

A foolproof method for determining truthfulness would greatly simplify the jobs of personnel departments, law enforcement agencies, and the courts. Since so much of the purpose of these bodies depends on distinguishing fact from fiction, it is not surprising that they rely heavily on polygraphs, which, their operators claim, are almost completely accurate. Although this reliance has reached astronomical proportions — hundreds of thousands of people are subjected to polygraphic examinations each year — the machines are, Dr. David Lykken argues, insufficiently reliable to justify their use in most cases. In *A Tremor in the Blood*, Lykken, a professor of psychology and psychiatry, examines the most common methods of lie detection, attacks the assumptions on which they rely, and criticizes the evidence that has been adduced to support their use. In only one instance — when used to detect what he calls “guilty knowledge” — are the tests tolerably accurate. Lie detection techniques, Lykken warns, are simply too unreliable to be used to screen job applicants, conduct criminal investigations, or determine a suspect’s guilt or innocence.

Each of the three major lie detection techniques — the clinical lie test, the polygraphic lie test, and the voice stress analysis test — is considered in turn and shown to be error-prone. Examiners using the clinical lie test record physiological responses on a polygraph or voice stress analyzer, but do not rely on the machine for a final decision. Instead, they reach a conclusion by considering the test results and their own impressions of the subject’s behavior. This test, Lykken argues, assumes that all people display similar behavioral symptoms when they lie and that examiners can properly detect these symptoms. But the testing techniques have not been developed by professional psychologists, and it is impossible to make fine distinctions among emotions by monitoring responses to various stimuli (p. 58). Lykken’s overall assessment of the clinical lie test is thus not surprising: “The clinical judgment of a polygraph examiner is no more valid than that of any other observer, just as subject to bias and prejudice, and probably wrong 25% of the time” (p. 101).

In polygraphic lie tests, the sole determinants of deception are the mechanically recorded physiological reactions of the subject to a variety of relevant and control questions. The five major types of polygraphic lie tests — the relevant/irrelevant test, the lie control test, the truth control test, the positive control test, and the relevant control test — are distinguished by the types of control questions

used.¹ Each of these tests, however, labels a subject as deceptive if he responds more strongly to the relevant questions than to the controls or more strongly to one relevant question than to others.

Because polygraphic lie tests rest on false assumptions, Lykken asserts, they are invalid. The tests work only if different individuals' physiological reactions to questions are uniform and predictable. However, extensive scientific research negates this possibility (p. 56). Nervous or intimidated subjects may respond strongly to relevant questions even though they are being truthful.² These tests, therefore, tend to classify such individuals as deceptive. At the same time, callous liars or hardened criminals may show only slight responses to relevant questions, even when lying.³

Not content to let the reader infer the inaccuracy of polygraphy from its flawed assumptions, Lykken also demonstrates that test results are unreliable. Evidence of the accuracy of polygraphy is scarce because truth is never conclusively determined in most cases. Figures reported by polygraphers are often measures of reliability — how often they agree — rather than measures of validity — how often their results match the "ground truth" (p. 74). And when researchers do purport to measure validity, they frequently examine only total agreement. Validity can be assessed more accurately, however, by determining the percentages of agreement for truthful and deceptive subjects independently and averaging the two.⁴ When this more accurate measure is used, scientific data show that the validity of polygraphs is between sixty-three percent and seventy-two percent, only slightly above a chance validity of fifty percent. These

1. In the relevant/irrelevant test, the control questions are not related to the activity that the subject is being questioned about. In the lie control test, the control questions are related questions such as: "Prior to the last year did you ever steal anything?" It is assumed that a person answering "no" to one of these questions is not being fully honest. In the truth control test, the control questions are specific questions about another activity or crime that the examiner convinces the subject he is suspected of committing, although there actually exists no such activity or crime. The positive control test has the subject answer each question with a lie and with the truth, with the one serving as a control for the other. The relevant-control test asks only relevant questions, which serve as a control for each other. Pp. 149-50.

2. This is particularly true of the relevant/irrelevant test, but also true of the lie control test since the relevant questions are much more specific and threatening. P. 117. The truth control test could theoretically avoid this problem, but it is rarely used because it is so difficult to plan and execute. P. 133. The positive control test relies on the assumption that people will be more aroused when uttering a spontaneous lie than when answering truthfully under instructions, although there is no evidence to support this assumption. P. 137. The relevant control test lacks validity because there are too many variables that could cause a stronger reaction to a particular relevant question. P. 143.

3. Lykken also notes that a polygraph can be cheated if the subject augments his response to control questions by, for example, changing his breathing pattern. Pp. 238-41.

4. If the total agreement method were used and there were 51 honest employees and one thief, the polygraph test could incorrectly identify the thief and still have a validity of 51/52 or 96%. If each is determined separately and averaged, there would be 50/51 honest individuals diagnosed truthful (98%) and 0/1 deceptive person diagnosed dishonest (0%). Averaged together the validity of the test is 49%. P. 79.

results stand in stark contrast to polygraphers' claimed validity of over ninety percent.

Lykken saves his harshest criticisms for the third major lie detection technique, the history of which he terms a "scandalous story" (p. 86). Voice analyzers are supposed to detect changes in voice patterns as subjects respond to control and relevant questions. Lykken found no credible evidence that the analyzer could detect stress. Even if stress could be detected, the determination of truthfulness or deceit relies on the same assumptions that underlie the use of polygraphs.

Because each of these principal methods of lie detection is invalid, Lykken condemns their use in most situations. Too often, investigators, who assume that lie detectors are valid and will produce conclusive results, rely totally on these devices and thus accuse innocent people. The psychological pressures that the machines generate, moreover, may lead to false confessions and further undermine the interests of justice. Juries, too, place great weight on polygraphic evidence, and the introduction of such evidence may greatly affect their verdicts.

With proper safeguards, however, polygraphs can aid investigators. Lykken proposes that they be used, not to assess truthfulness, but rather to determine the existence of guilty knowledge.⁵ Under this technique, the polygraph is used to measure reactions to statements or pictures involving details of a crime; only a subject with guilty knowledge should show a strong reaction to these stimuli. Because this test uses the polygraph to detect recognition rather than deception, it is not based on the flawed assumptions of the other tests. The validity of the guilty knowledge test has been demonstrated in laboratory tests, and there is little chance of an innocent person reacting strongly to only the correct facts of a crime. The test has not been used in the past and would not be practical in all situations, but Lykken makes a strong case for its use in the future.

A Tremor in the Blood offers the first comprehensive, scientific critique of lie detection. Although further research is required, Lykken has successfully shifted the burden of proof back to the polygraph industry. His book should generate both a "healthy scepticism" about lie detection techniques and a "sceptical interest" in the detection of guilty knowledge as a means of criminal investigation (p. 306). The legal and medical professions and the public should find Lykken's work interesting, informative, and extremely important.⁶

5. This method has also been referred to in polygraphic literature as the "peak of tension test." P. 252.

6. Lykken's book is also reviewed by Hirsch, *Lie Detector on Trial — Can it be Trusted?*, 73 CHRISTIAN SCIENCE MONITOR 17 (1981), and in Book Note, 94 HARV. L. REV. 1925 (1981).