(3) Methodological studies

Under this heading, we wish to review several experiments in which the polygraph or some of its component indicators was used, not always for the purpose of lie detection. In general, these studies show that the polygraph is a sensitive instrument so much so that the responses it measures can be affected by a variety of influences. Therefore, adequate controls are required before the polygraph can be used as an effective instrument. For example:

(*a*) Greater GSR responses were observed in 40 college students when a Negro rather than a white examiner operated the GSR instrument. Rankin and Campbell (1955).[4]

(*b*) The GSR response adapts (i.e., becomes reduced) most quickly to a light stimulus, next to a buzzer and least to a question (i.e., an idea). Demonstrated on 54 students by Kubis (1948).

(*c*) Even though electric shock was used every time the subject told the truth in an experiment where he tried to deny a number he had selected, the GSR response was not reversed. This demonstrated, on 23 students, the relative stability of objective criteria of deception and the accuracy of their identification under conditions designed to obscure the criteria and to confuse the diagnosis. Block et al. (1952).

(*d*) Innocence (of suspected criminals) can be determined objectively with greater accuracy than guilt. Only blood pressure records were used in a preliminary, feasibility study of 17 verified innocent and 33 verified guilty polygraph tracings. Leonard (1958, pp. 118–121).

(*e*) Though a sudden rise in blood pressure in response to relevant questions is generally suggestive of guilt, Arther (1955) shows four verified cases in which it occurred with innocent subjects. A "control question" technique has been devised by Inbau and Reid (1953) to avoid this possible error of interpretation.

(*f*) Polygraph experts who conducted an examination produced no more accurate judgments than did other examiners who had access only to the records of the same examination. This was accomplished in an experiment which was virtually real-life, involving a presumed disclosure of classified information. However, accuracy of both groups was not high. In the critical retest period, the examiners (those who performed the tests) were able to detect the two experimental lie situations in 41 percent of the cases; one of the two lies in 54 percent of the cases; and neither lie in 5 percent of the cases. The corresponding average percentages for raters (having access only to the records) were: 54 percent, 36 percent, and 10 percent. In the test session immediately following, the accuracy of examiners and raters dropped to a chance level. Adaptation was rapid and appreciable within the same day of testing. Kubis (1962).

(*g*) In a long series of experiments, Ellson (1952) showed that objective measures of such physiological indicators as GSR, breathing rate, breathing amplitude, breathing time, systolic pressure and diastolic pressure, when taken singly, rarely distinguish between deception and non-deception in more than about 75 percent of the cases. When these indicators are combined optimally by means of statistical discriminant functions, the accuracy rises to about 90 percent correct classification of liars in experiments. Greater accuracy is possible, but was not demonstrated in these experiments, provided that improved techniques and procedures are found to increase the statistical reliability of the individual measures.

Perhaps these studies are sufficient to indicate that the polygraph can demonstrate validity of the order of 90 percent in experimental situations. However, the polygraph test is subject to error when a variety of uncontrolled influences are present, some examples of which are offered in these studies. Greater accuracy may be anticipated by combining the results of several physiological indicators in accordance with statistical rules which reflect their predictive value, provided we can also increase the reliability of measuring these indications.[5]

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[4] A reviewer comments: An activity "has one Negro examiner. There has been no observable difference in the recorded patterns of his interviews of white subjects, compared with interviews conducted by white examiners." No data were offered to support this view, while Rankin and Campbell's data suggest that the reverse is probably true.

[5] A polygraph examiner comments: "Methodological studies, as well as much of the literature in the field have, for some reason, emphasized research and experimentation on the galvanic skin response. This is somewhat anomalous, in view of the fact that many experienced and expert examiners place little or not credence in the galvanic skin response. Some competent examiners admit frankly that they do not even turn on the