

Four companies produce virtually all the equipment used by professional lie detection examiners:

Associated Research, Inc., Chicago, Ill. : Keeler Polygraph.

C. H. Stoelting Co., Chicago, Ill. : Deceptograph.

Lafayette Instrument Co., Lafayette, Ind. : Polygraph.

Lee & Sons, San Rafael, Calif. : Berkeley Psychograph.

These devices cost from about \$600 to \$2,000 depending on the model and associated equipment. Though each device has its partisans, there is little to choose between them. Other equipments also exist but they are not in general use:

Darrow Photo-polygraph (Stoelting).

Higley Reactograph.

Electronic Psychometer (B & S Associates).

Cardio-pneumo-polygraph (Stoelting).

Electronic Lie Detector (Thompson Metrigraph Labs).

Chatham Polygraph (Associated Research).

Pathometer (Fordham University).

The term "polygraph" refers, most precisely, to the multiple-pen subsystem which records the instrumental responses on a roll of paper; through usage, it has come to represent the entire lie detection equipment. Frequently, an extra pen is used to mark the times during the interview at which questions were put to the person being examined. A time marker is not required because the recording paper contains time marks and is run at a constant speed of 6 inches per minute. More than three physiological responses may, of course, also be recorded on a polygraph but this is not typical in routine lie detection. One examiner employs two pneumograph tubes, one on the upper and another on the lower chest; many examiners are known not to use one (it may be any one) of the three "standard" indicators.

Suggestions have been made that other physiological responses, such as face temperature, electro-cardiograph (EKG), and electro-encephalograph (EEG) should be included in lie detection work but virtually no research has been accomplished to learn whether the addition of these indicators would increase the accuracy of lie detection. On the other hand, instruments which measure 10 physiological variables simultaneously are common in medical and psychophysiological research; one such instrument can record 29 channels in a form suitable for automatic data processing.

4. "THEORY" OF LIE DETECTION

Lie detection is an empirically developed procedure without an adequate theoretical foundation; it is an art and not a science. Lying may be a widespread and popular pastime but no attempt has been made to account for the extent and variety of physiological and behavioral responses which may be observed when a person attempts deception. To the best of our knowledge, there is not even a taxonomy of lying which defines the situation and purposes for which one person might attempt to deceive another. When one considers the amount of deception thought to exist in everyday life, it is surprising that no genius has arisen to codify this area.

As early as 1917, Marston recognized that some physiological responses probably always are present during an interrogation, whether or not a person is lying, but he thought that their magnitude would be larger when a person tries to deceive. The greater response would be due to some residue of learning, explainable in such terms as conditioned responses, conflict, or a threat of punishment (Davis, 1961, p. 161). However, the theoretical aspects of lie detection still await exploration and it is difficult to believe that this area of technology can develop without a theory.

5. EFFECTIVENESS OF LIE DETECTION METHODS

It should be possible to estimate the effectiveness of lie detection by the same methods that are employed in all classes of scientific observation and we shall start by examining the reliability and validity of lie detection.

A. VALIDITY

Validity is defined as an estimate of the extent to which an instrument (or test) measures what it is supposed to measure. As applied to lie detection, validity may be estimated by comparing the agreement between conclusions derived by use of the polygraph with other, independent measures of deception (or truthfulness). For example, a judgment, based on examining a polygraph record, that a person attempted to deny a previous conviction for felony may be compared to a court record of conviction. For practical purposes, independent