

MINUTES

Since the last meeting it was planned to have four small meetings dealing respectively with the problem of inspection, the instrumentation of lie detection, the interview aspects of lie detection, and the diplomatic and political uses of lie detection. Further, the use of this technique in various agencies will be examined. The meeting on inspection took place on July 19, 1961, and led to the conviction that behavioral inspection (nonphysical inspection) offers a number of major advantages and does not have the serious deficiencies of the physical testing methods and that therefore it is definitely worthwhile to explore further on the state and improvability of the art.

Various autonomic responses may be used as measures of emotional state for the purpose of lie detection. There is some basis for dividing autonomic responses into those associated with attention which would be primarily cortical and might involve such responses as the GSR, and into those associated with guilty knowledge, which are primarily subcortical and might involve such responses as blood pressure. This dichotomy is by no means sharp and there is evidence that a fallen heart rate might be the most sensitive indicator of attention changes. Further, defense in the sense of social guilt is not entirely the same as defense at the physiological level of injury. Another dichotomy is suggested in terms of the instrumental situation: those which are analog or voltage measurements, and those which are time measurements. Since time measurements are easy and precise, and since it is possible to convert voltage measurements into time ones, this may be an important methodological consideration. In general, responses which are close to the basic physiological changes, which are relatively rapid, and which do not adapt out rapidly in repeated testing, would be relatively preferred; blood flow is a good indicator for these reasons.

A final dichotomy is in terms of responses which could be used on large scale field testing with great numbers of subjects, and those which would be practicable only under more limited use with very special subjects and better working conditions.

The following autonomic responses were considered especially useful:

Blood pressure: This may be feasible only under limited conditions.

Breathing rate and pattern.

GSR, especially palmar sweating.

Pulse volume, pulse rate, or pressure, depending upon the instrumental choice (photoelectric, impedance, and pressure transducers).

Velocity of pulse wave.

Systolic and diastolic blood pressure (may be available only under limited conditions).

Frontalis muscle tension and muscle potential peaks (probably only under limited conditions, unless converted from voltage into time measures).

Finger tremor (limited conditions).

Gastrointestinal reactions, using a telemeter capsule (this would need investigation).

Ocular movements (especially for observing whether attention is directed to one position or another on a map, but also in many other general situations).

EEG (especially phase differences, using a minimal five lead cap).

Reaction time (especially latency of verbal and autonomic responses to a given verbal stimulus).

Ballistocardiograph (or the ankle accelerometer).

Blood oxygen concentration (ear oximeter).

In all these there is, besides the immediate response value, the possibility of long-range shifts in baselines associated with a progressive shift in emotional state, such as the anxiety level. Some of the measures might be especially useful in this latter case.

Research should be undertaken in two directions. The first would involve laboratory testing of multisensor, multichannel systems to discover what valuable information could be obtained from patterns and combinations of autonomic responses. This involves data digitalization and the use of computers for data processing. The second involves field trials with a limited, well-established group of measurements, such as GSR, pulse, respiration pattern and rate, and relative blood pressure. This should also be done to test automatic data processing as far as possible. The field tests might involve actual work with police groups and an established criminal population, with student populations under