psychological
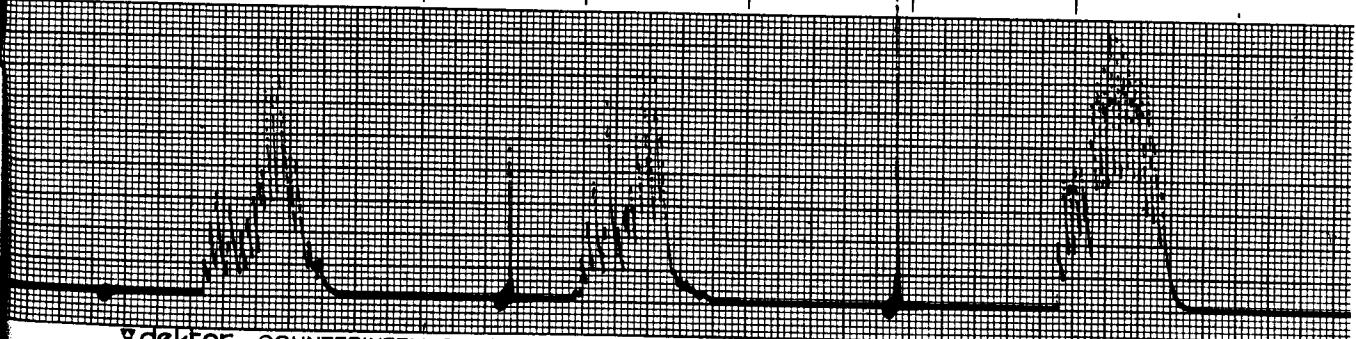# stress
evaluator

pse·101

∇dektor COUNTERINTELLIGENCE AND SECURITY INC.

psychological stress evaluator pse·101

The Dektor Psychological Stress Evaluator (PSE-) detects, measures and graphically displays certain specific, stress-related components of the human voice: superimposed on the audible voice frequencies are inaudible frequency modulations (FM) whose strength and pattern relate inversely to the degree of psychological stress in the speaker at the moment of utterance.

THE PHYSIOLOGICAL BASIS

These involuntary frequency modulations are understood to result from minute oscillations of the muscles of the voice mechanism. Such oscillations, known as physiological tremor or micro-tremor, can be shown in the laboratory as a normal accompaniment to the activity of any voluntary muscle, occurring at a rate of 8-14 cycles per second.

Whereas most of the functional indicators of stress are attributed to the Autonomic Nervous System (ANS), physiological tremor as seen in the voice mechanism appears to be controlled by the Central Nervous System (CNS); as the ANS gains dominance in a stress situation, the micro-tremors are suppressed.

In contrast to the hold-over of the ANS stress indicators, recovery of the FM indicator upon removal of the stressing stimulus allows evaluation of closely spaced stimuli, as may occur in narrative speech.

THE APPLICATION

The recognized principle of involuntary physiological changes related to psychological stress has broad application in psychophysiological and pharmacological research and many other professional fields. Stress induced by fear, anxiety, guilt and conflict facilitates detection of attempted deception during interrogation and aids in a variety of professional decisions based on judgments concerning motivation, honesty, reliability, areas of tension and "psychological set."

The PSE- is employed by law enforcement agencies, retail food and drug chains, private investigators, law firms and psychiatric clinics as an effective tool in industrial,

dektor

psychology, criminal investigation, corporate security and employee screening, and medical or psychiatric diagnosis.

THE INSTRUMENT

Use of the Voice as the physiological medium for stress evaluation, with the consequent elimination of attached body sensors, avoids the artificial and often misleading stresses induced by painful pressure instruments, restricted posture and tense pre-test procedures associated with other methods of stress instrumentation.

A tape recording preserves the speech pattern containing the voluntarily formed words which carry the involuntary speech components indicating stress. Using electronic filtering and frequency discrimination techniques, the PSE- processes the voice frequencies and displays the inaudible, stress-related FM patterns on a moving strip chart. These FM patterns, as interpreted by Dektor Chart Interpretation Criteria, indicate the levels of psychological stress.

The chart is traced with a heated stylus on heat-sensitive paper for ease of operation and permanence. The tape recording can be charted in four different modes of display for gross and detailed evaluation, to provide optimum charts of different types of tests.

The PSE- may be used throughout the world without concern for local voltages or cyclic rates. Automatic sensing circuits provide regulated functioning at any alternating current voltages from 90-135 V and 180-260 V, 50-60 Hertz. One year warranty.

Panel controls include

Mode Selection
Edit Button
Stylus Heat
Base-line Zero
Chart Drive Speed

VALIDITY TESTING

After its development the PSE- was tested not only for validity of the instrument and chart interpretation criteria, but also for the limits of its applicability. Of particular interest were its ability to accept narrative answers as well as YES/NO; to discriminate between degrees of stress; and to display stress level on an absolute rather than relative basis. In this phase of testing, no inconclusive calls or retests were permitted.

To these ends, the first test series performed used the TV program, "To Tell the Truth" for subjects. Since only the statement, "My name is . . . . " was evaluated, no comparison with known truth or known stress was possible, thereby requiring chart interpretation on an absolute basis. This series also tested for narrative responses. Twenty-five segments of three subjects each were evaluated. In each segment, two subjects lied and one told the truth about his name. Of the 75 subject evaluations, 71 were correctly called for a success of 94.7 percent.

The second test series, in conjunction with initial demonstrations of the PSE- , consisted of traditional lie-detection tests (Peak of Tension and General Question Tests). Both YES/NO and narrative answers were given. This series evaluated very low stress levels, because the "lie" was invited and no jeopardy or real anxiety was involved. Of 24 tests, containing 180 evaluated elements, all elements were correctly called in 22, providing a success of 91 percent on a total test basis.

The third test series was performed on actual felony suspects by a Maryland County Police Chief Polygraph Examiner using the PSE- and the polygraph simultaneously. Lie detection questioning techniques were employed, as well as a complex test structure, inasmuch as "guilty knowledge" as well as innocence and guilt was of interest to the Police Department. Twenty-six cases containing 162 relevant elements have been corroborated by confession or investigation. This series was a real-world high-stress test situation, in which PSE- evaluation provided the subsequently corroborated correct results in all elements for a success figure of 100 percent.

The fourth test series was structured to provide for comparison, reaction to presumed emotion producing words and presumed neutral words. Subjects read aloud words from each group randomly presented on 3 by 5 cards. Of 53 elements in the seven tests, 52 were correctly identified as to word group, for a success of 98.4 percent.

An additional finding of this test series is of particular interest. When stress responses of each subject were ranked according to degree, the expected variation could be subjectively related to differences in environment and background among the subjects. For instance, a retired police officer now responsible for resolving bomb threats stressed most on the word BOMB, to a lesser degree on felony words and least on misdemeanor words.

Field employment of the PSE- has resulted in over a thousand actual examinations performed, ranging from psychiatric evaluation to criminal lie detection, with results equaling or exceeding the above test results. Moreover, tests have been accomplished successfully in Greek, Spanish, German, Italian, Arabic (Syrian and Iranian), Chinese Mandarin and Vietnamese.