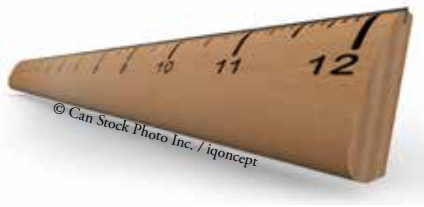
One Word Essay (more or less): What Does the Polygraph Measure? [1]

Raymond Nelson



Uncertainty.

In order to appreciate the word "uncertainty" as the best one-word answer to this important question, it is helpful to first have a broader understanding of polygraph and testing, including the following concepts:

- **No unique physiology associated with deception:** all physiological phenomena have multiple purposes and there is no physiological response or behavior that can function as a deterministic indicator that is uniquely associated with lying or deception.

- **Recorded data are a proxy for deception or truth telling:** polygraph data are physiological responses for which there is a statistically significant relationship with the criterion states of deception and truth-telling. Data from multiple proxy signals can be combined in a reproducible quantitative structural model (recipe) to optimize the effective classification of deceptive and truthful cases.

- **No such thing as a perfect test:** tests are needed and used when we want to evaluate amorphous phenomena that cannot be subjected to mechanical/physical measurement

[1] This is the last of an unplanned series of essays involving the title theme "What does the polygraph measure."

(subject only to mechanical measurement error) or perfect deterministic observation. We do not need a test when it is possible to observe deterministic phenomena or when we can measure something directly.

- **Polygraph results are probabilistic - not deterministic:** determinism is the notion that there is only one possible outcome and no possible alternatives. Deterministic outcomes are always be exactly the same regardless of human choice, behavior, or random chance. Polygraph results cannot be deterministic, because there is no unique physiological lie response, and are therefore probabilistic.

- **Differential salience:** the operational construct underlying the comparison question polygraph is that autonomic responses vary significantly to different types of test stimuli (relevant and comparison questions) as a function of deception and truth telling regarding the relevant investigation target issues. The basis of observed responses can be thought of as originating in cognition, memory, emotion and behavioral conditioning relative to the test stimuli. It is not assumed that truth and deception are physiologically or psychologically different as a function of the topic or investigation target. It is assumed only that differences in response to different types of test stimuli can provide information about the salience of the stimuli, and that differences in responses can be normed and evaluated probabilistically for deception and truth-telling.

- **Reference data:** statistical reference data are a scientific knowledge-base that describe the numerical scores (location, dispersion and distribution shape) that are normally observed or expected among deceptive or truthful persons. These data are used as a basis for comparison to determine the level of significance of an observed test result.

- **Categorical results are a simplification of probabilistic results:** test results can be interpreted categorically as statistically significant or not statistically significant, or any another categorical descriptor (e.g., positive, negative, inconclusive, no opinion, DI, NDI, SR, NSR, NO) when the test score exceeds an established numerical cutting score or when the probability of error is less than or equal to a previously declared tolerance for error. Categorical results allow for simple and convenient interpretation by persons not trained in the interpretation of probabilistic test results.

- **Polygraph does not measure lies per se:** lies are not a form of physical substance and there is no unique physical response activity that can be used to achieve either

deterministic observation or mechanical measurement of deception. The term "lie detector test" is simply a term of convenience. Polygraph test results are a measurement of the uncertainty surrounding a categorical conclusion of deception or truth-telling.

All forensic and scientific test results are measurements of the margin of error or uncertainty surrounding conclusions about phenomena that cannot be subjected to perfect deterministic observation or direct physical measurement. Tests are needed and used to make objective conclusions about things for which neither simple deterministic observation nor mechanical/physical measurement are possible. All scientific test results are imperfect and are therefore probability statements, and all conclusions based on scientific evidence – including test results - are made relative to some alternative (but that is for another discussion).