

# Theory of Polygraph Testing

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February 2018

# Hypothesis

- A fancy idea intended to explain how the universe and reality work
  - Some small part of the universe and reality
- An Explanation
- A Question
  - Research question
- Not accepted without evidence
- The purpose of scientific experiments is to prove a hypothesis false
- Most hypothesis turn out to be false

# Personal Opinion

- An conclusion without evidence
  - From a professional
  - From a non-professional
- A hypothesis
- Most hypothesis turn out to be false
- Should not be accepted without evidence

# Professional / Expert Opinion

- A conclusion or from a professional
- Role of the expert is to help others understand the evidence
- Supported by evidence
  - A conclusion or opinion without evidence is a personal (subjective) opinion

# Hypothesis

- An idea that needs to be researched and studied to prove it wrong
  - If it can be proven wrong then it is FALSE
- When it cannot be proven wrong it can be published for others to scrutinized and prove wrong
  - If others can prove it wrong then it is FALSE
- If research cannot prove it wrong then it can be said to be **supported by the evidence**
- Nothing is ever proven in science
  - Most hypothesis are proven false
  - A small number of hypothesis are supported by evidence

# Theory

- Working theory
- A hypothesis that has been supported by evidence
- There is always more to learn
- All knowledge is incomplete
- All knowledge is incorrect
- All theories are wrong
  - We cannot yet explain the entire universe
- Humans cannot know everything
- We continue learning

# Laws of Science

- Theories
  - Knowledge supported by evidence
- Evidence so so strong and compelling that we do not expect the knowledge to ever change
- We do not expect evidence to controvert the idea
- Laws of science
  - Gravity
  - Newtonian Physics
  - Mathematics
  - Logic

# Scientific Theory of Polygraph

- NOT Psychological Set
  - Not fear
  - Not anxiety
  - Not apprehension
  - Not survival
  - Not well being



# Science

- Testable
  - Can be tested and proven false if false
- Untestable ideas are un-scientific

# Pseudo-science

- Unscientific ideas that pretend to be science
- Use of false hypothesis when we know they are false
- Unscientific practices
- Cargo-cult science

# Psychological Set

- Subjective
  - Fear
  - Anxiety
  - Apprehension
- Untestable
  - Fear
  - Anxiety
  - Apprehension
- Requires (impossible) mind-reading

# Psychological Set

- Not supported by evidence
- Evidence shows it is false
  - DLC questions produce greater changes in physiology for innocent persons
  - Polygraph works with psychopaths
- Does not explain why the polygraph works for innocent
  - Innocent people can be expected to be more afraid of the RQs than CQs
- Incomplete
  - Completely ignores major areas of psychological discussion and theory
    - Behavioral conditioning
    - Cognition
    - Motivation and goal achievement
- Terms of science are used metaphorically (irresponsibly)

# Statistical Theory for Polygraph

- Analytic hypothesis
- Testable
- Falsifiable
- Will be either
  - False
  - Supported by the evidence

# Analytic Theory for Polygraph

- Greater changes in physiological activity are loaded differentially in response to different types of test stimuli as a function of deception or truth-telling in response to the relevant target stimuli
  - Works with DLC and PLC questions
  - Describes the evidence that we observe
  - No attempt at mind-reading
    - Emotions
    - Cognitions
- Already well supported by evidence from several decades of research by industry, academic and government scientists

- Greater changes in physiological activity are loaded differentially in response to different types of test stimuli as a function of deception or truth-telling in response to the relevant target stimuli

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