

## CHAPTER 2 STUDY GUIDE -- METHODS IN PSYCHOLOGY

### I. Empiricism: How to Know Stuff

- A. Originally, there were two kinds of Greek doctors: Dogmatists and Empiricists
  - 1. Dogmatists attempted to treat illnesses by developing theories about the body's functions
    - a. Dogmatism – the tendency for people to cling to their assumptions
  - 2. Empiricists attempted to treat illnesses by understanding the illness through the observation of sick people
    - a. Empiricism – the belief that accurate knowledge of the world requires observation
  - 3. Only in the last 300 years have people trusted observation over elders, laying the foundation for modern science
- B. The Scientific Method
  - 1. The Scientific Method is a set of principles about the appropriate relationship between ideas and evidence
  - 2. Empiricism is at the heart of the scientific method
    - a. Theory – a hypothetical explanation of a natural phenomenon
      - i. Begins with the simplest theory, referred to as *the rule of parsimony*
    - b. Hypothesis – a falsifiable prediction made by a theory
  - 3. Results of these tests can disprove theories but cannot prove them
- C. The Art of Looking
  - 1. Empirical method – a set of rules and techniques for observation
    - a. *Method* in science typically refers to technologies that enhance the powers of the senses
      - i. Biologists use microscopes, astronomers use telescopes, and so on
    - b. Psychology's empirical methods are among the most sophisticated in modern science because people are especially difficult to study due to their:
      - i. *Complexity*
      - ii. *Variability*
      - iii. *Reactivity*

### II. Observation: Discovering What People Do

- A. To *observe* means to use one's senses to learn about the properties of an event
  - 1. Observing something means using your senses to learn about the thing's properties
    - a. Casual observations are notoriously unstable; they can't tell you about many of the properties of something you might be interested in
  - 2. To know and understand the properties you must measure them
- B. Measurement

1. Must first *define* the property to measure, then find a way to *detect* it
2. Defining and Detecting
  - a. Operational Definition – description of property in terms of a concrete condition that can be measured
    - Example: The operational definition of "a second" = *the duration of 9,192,631,770 cycles of microwave light absorbed or emitted by the hyperfine transition of cesium-133 atoms in their ground state undisturbed by external fields* (roughly takes six seconds just to say).
  - b. Measure – device that can detect the events to which an operational definition refers
    - i. "Cesium clock" can actually count a second
    - ii. Electromyograph (EMG) – a device that measures muscle contractions under the surface of a person's skin
3. Validity, Reliability, and Power
  - a. Validity - the extent to which a measurement and a property are conceptually related
  - b. Reliability - the tendency for a measure to produce the same measurement whenever it is used to measure the same thing
  - c. Power - the ability of a measure to detect the concrete conditions specified in the operational definition
4. Demand Characteristics
  - a. People are often trying to behave as they think they *should* behave
    - i. Demand Characteristics – those aspects of an observational setting that cause people to behave as they think they should
      - (a) Example: "Do you think these jeans make me look fat?"Naturalistic Observation – a technique for gathering scientific knowledge by unobtrusively observing people in their natural environments
      - (a) Example: Biggest groups leave smallest tips in restaurants
      - (b) Two reasons why naturalistic observation doesn't solve demand characteristic problems
        - (1) Some of the things that psychologists want to observe do not occur naturally
        - (2) Some of the things that psychologists want to observe can only be gathered from direct interaction with a person
    - ii. Techniques for avoiding demand characteristics
      - (a) Allow subjects to respond anonymously
      - (b) Measure behaviors that are not susceptible to demand characteristics
        - (1) Example: Pupil dilation in response to excitement
      - (c) Retain lack of relationship information between demand and behavior(i.e., keep the participant *blind* to the purpose of the

study)

(1) Sometimes requires a *cover story*, or misleading explanation

(2) Might also require *filler items*, or pointless measures that are meant to mask the true purpose of the observation

#### 5. Observer Bias

##### a. Expectations can influence observations

- i. Even well-intentioned observers may make adjustments in favor of an expectation

##### b. Expectations can influence reality

- i. Reactions to an expectation can have an impact on the participant in real time

##### c. Double-Blind – an observation whose true purpose is hidden from the researcher as well as from the participant

- i. Scoring responses without knowing what is “supposed to happen” removes potential for bias, and is easy to do if a computer can do the scoring

#### C. Descriptions – way to make sense of large page of numbers

##### 1. Graphic Representations

Frequency Distributions – graphic representations of the

- a. measurements of a sample that are arranged by the number of times each measurement was observed
- b. Normal Distribution – a frequency distribution in which most measurements are concentrated around the middle

##### 2. Descriptive Statistics – brief summary statements that capture the essential information from a frequency distribution

Descriptions of Central Tendency – summary statements about the

- a. value of the measurements that lie near the center or midpoint of a frequency distribution

(1) Mode – the most frequent measurement in a frequency distribution

(2) Mean – the average of the measurements in a frequency distribution

(3) Median – the “middle” measurement in a frequency distribution, or the value that is greater than or equal to the values of half the measurements and less than or equal to half of the values of the measurements

##### b. Descriptions of Variability

(1) Range – the numerical difference between the smallest and largest measurements in a frequency distribution

Standard Deviation – a statistic that describes the average

(2) difference between the measurements in a frequency distribution and the mean of that distribution