Module 4:
The Need for Psychological Science

• Hindsight Bias
• Overconfidence
• Perceiving Order in Random Event
• The Scientific Attitude: Curious, Skeptical, and Humble
• Critical Thinking
Hindsight Bias

• To believe, after learning an outcome, that one would have foreseen it.

• Errors in recollection and explanations prove the need for good science. Why?
  – Common sense more easily describes what HAS happened, not what will happen.
Overconfidence

• Our prediction about psychological behavior is negatively influenced by overconfidence.
Perceiving Order in Random Events

• We are prone to see patterns where none exist. Why?
• We constantly want our world to make more sense.
• Patterns where none exist provide a sense of predictability. Predictability reduces chaos.
So…….

Hindsight bias, overconfidence, and perceiving order in random events lead us to overestimate our intuition.

(Much of Freud’s psychoanalytic theory was based on all three)
The Scientific Attitude: Curious, Skeptical, and Humble

• **Intellectual curiosity:** A passion to explore and understand without misleading or being misled.

• **Being skeptical but not cynical:**
  – Can the position of the planets at your birth influence the course of your future?
  – Does parental behaviors determine a child’s sexual orientation?
  – Do infant vaccinations cause Autism?
  – Can electrocuting the brain reduce severe depression?

No, No, No, Yes
The Scientific Attitude: Curious, Skeptical, and Humble

• **Intellectual curiosity**: A passion to explore and understand without misleading or being mislead.

• **Being skeptical but not cynical**:

• **Humility**: Always be humble enough to accept the evidence that proves you are wrong.

ALL THREE are the bedrock of modern science
Critical Thinking

• Does not blindly accept arguments and conclusions.

• **Critical thinking requires:**
  – Examining assumptions
  – Assessing the source
  – Seeks to discover hidden factors
  – Evaluates evidence
  – Assesses conclusions
Module 5: The Scientific Method and Description

• The Scientific Method
• Description: Case Study, Naturalistic Observation, Survey
The Scientific Method

• **What is a theory?**
  – An explanation, using integrated principles that organizes observations and predicts behaviors or events.

• **Hypothesis:**
  – A testable prediction often implied by a theory. (Empirical hypothesis will be quantified.)

• **Operational definitions:**
  – To reduce researcher bias, a carefully worded statement of the exact procedures used in research study.
  – Want to test human intelligence? First, operationally define it!

• **Replication:** Repeating research studies. Why is this important?
So…….
How do we scientifically (empirically) test our hypotheses and refine theories??

• There are several methods of scientific study:
  • Descriptive methods
    – Case Study
    – Naturalistic Observation
    – Surveys
  • Correlational methods (Module 6)
  • Experimental Methods (Module 6)
Descriptive methods

• Case Study
  – In depth study of individual or group
  – Early brain discoveries, child cognitive development, primate language abilities all came from case studies.
  – Downside: Be careful about
    • Inferences
    • Results can be misleading if subjects are atypical
Descriptive methods

• Naturalistic Observation:
  – Observing and recording behavior in naturally occurring situations without manipulating or controlling the situation.
  – Does not explain behavior
  – Excellent way to study cultures, subcultures, individuals...
  – Warning: make sure you the researcher don’t influence the behavior by your presence.
Descriptive methods

• Survey:
  – A method of collecting the self-reported attitudes or behaviors of a particular group, usually by questioning a representative sample of the group.
    • Cell phone use and driving?
    • Teen drug use and relationship with dad?
    • Pot smoking and Facebook use?
  – The key to a successful survey:
    1. Make sure questions are worded correctly
       1. Estate tax or Death tax
       2. Reproductive healthcare or abortion
    2. Make sure you have a truly representative sample
       1. Avoid “sampling bias”
       2. Before accepting the results of a survey, find out and consider the sampling
Module 6
Correlation and Experimentation

• Definition in book is sort of yuck.
• Correlation: The relationship between two separate events (variables).
• Correlational coefficient: A statistical index (numeric expression) of the relationship between two variables.
• Scatterplot: graphing the plot points of all the relationships observed or recorded.