Research Methods

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Hurdles to Understanding

- Hindsight Basis
  - Tendency to believe, after learning the outcome, that this knowledge was already known
  - Evolutionary Upbringing: Possibly an offshoot of our habit to analyze an event and figure out why it occurred
- Coincidence Error
  - Mistakenly thinking a random sequence of events has a pattern
  - Evolutionary Upbringing: Can help make predictions, we like to understand things
- Overconfidence Error
  - Tendency to believe we know more than we do
  - Evolutionary Upbringing: Can help us lead others
- Barnum Effect
  - Tendency for people to accept vague characterizations of themselves
    - Horoscopes…

Basic Terminology

- Applied Research
  - Clear applications
  - You can use it
- Basic Research
  - Explores curiosity
  - Not immediately useful
- Hypothesis
  - Expresses a possible relationship between two or more variables
- Sampling
  - Identify population you want to study
  - Take a *random* sample from population
    - Non random sample can lead to skewed results
  - Random assignment
    - After a random sample, randomly separating into groups
- Experimental Method
  - Looks to prove casual relationships

Methods of Descriptive Research

- Case Studies (Descriptive research)

    - Detailed picture of one/few subjects
    - Great story, descriptive research
    - No correlation data
- Survey Method
    - Most common method in psych
    - Measures correlation
    - Needs a good sample
    - Low response rate
- Naturalistic Observation (Descriptive research)
    - Watch subjects in natural environment
    - No manipulation
    - Difficult to show cause and effect (event unlikely to occur naturally)
    - Pro: little to no Hawthorne Effect
        - Alteration of behavior due to awareness of being observed

Textbook Notes

Thinking Critically with Psychological Science
(Pages 16-29)

The Necessity of Psychology

- Can't trust intuition and common sense
    - Hindsight Bias: Can cause people to reinforce false claims
    - Overconfidence: Think we know more than we do
    - Coincidence Error: Try to make sense of something that is truly random

The Scientific Attitude

- Underlying all science is curiosity and desire to understand
- Science requires facing uncertainty
- Three important attitudes: curiosity, skepticism, humility

Critical Thinking

- Critical Thinking: Examines assumptions, discerns hidden values, evaluates evidence and assess conclusions
    - Can lead to surprising conclusions

Scientific Method

- Theory predicts behaviors or events, suggests the relationships between variables
- A theory produces a testable prediction, a hypothesis
- Hypothesis results in testing to approve or disprove
    - Bias can cause alterations of data
- To check biases, scientists report their findings with precise operational definitions

    - Operational Definitions: a painfully obvious definition

Descriptions
- Case Studies: can suggest directions of further study, but don't supply any correlations
- Naturalistic observation: doesn't explain behavior, but describes it

Experimental Method
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Vocab
- Catharsis (noun)
    - Process of releasing and thereby providing relief from strong/repressed emotions

Correlation
- The relationship between two variables
    - Positive or negative
        - Positive: values increase or decrease together
        - Negative: values increase or decrease contrastly
    - Strong, moderate, weak
- Spurious Correlations (fake correlations)
    - Data set can be manipulated to force possible correlations
- Misinterpreting Correlations
    - Certain variables may be omitted or unknown causing correlations to be misinterpreted
    - Causal relationships can be mistakenly suggested
- Correlation studies
    - Not causal (*don't prove cause and effect relationship*)
        - Causation proved by experimentation
    - Correlation is not causation
- Correlation Coefficient
    - Number that measures the strength of a relationship
    - Range from -1 to +1 (from perfect negative correlation to perfect positive correlation)
    - Closer to 0, weaker relationship

Experimental Method
- Looks to prove causal relationships
- Independent variable
    - Manipulated
- Dependent variable

    - Measured

- Confounding variables
    - Causes change, but not independent variable
    - Want to minimize (can be done through sampling)
- Hawthorne effect
    - Awareness of being observed changes behavior
- Experimenter Bias (Experimenter Expectancy Effect)
    - Subconscious influences participants
    - Confounding variable
    - Not conscious
    - Double-Blind Procedure
        - Neither experimenter nor participant know who is in which group
- Placebo effect
    - Placebos can work even if you know about it's a placebo
    - Thinking you are getting treatment can produce results
- Order Effect
    - Order of treatment can impact results

Textbook Notes

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Correlation

- Correlations are difficult to observe and often need a correlation coefficient
- Correlations help us predict, does no prove causation
- Experimentation can provide causation
    - Try to manipulate in order to isolate desired variables

Describing Data

- Data should be organized in a meaningful way
- Measures of central tendency
    - Summarize data (mode, mean, median)
- Measures of variability
    - Describe variation (range, standard deviation)

Significant Differences

- Is generization safe?
    - More samples is better, less variability is better, and understanding the representative sample is better
- If the sample is reliable, the difference is also reliable

- Statistically significance
    - Observed difference is probably not due to chance variation between samples

FAQS

- Psychological science focuses more on seeking general principles that explain many behaviors compared to explaining a particular behavior
- Gender and culture influence our behavior and attitude, however underlying processes remain the same for every human
- Psychologists study animals to learn more about different species and to learn more about people
- Psychology is not value free

(Topic)

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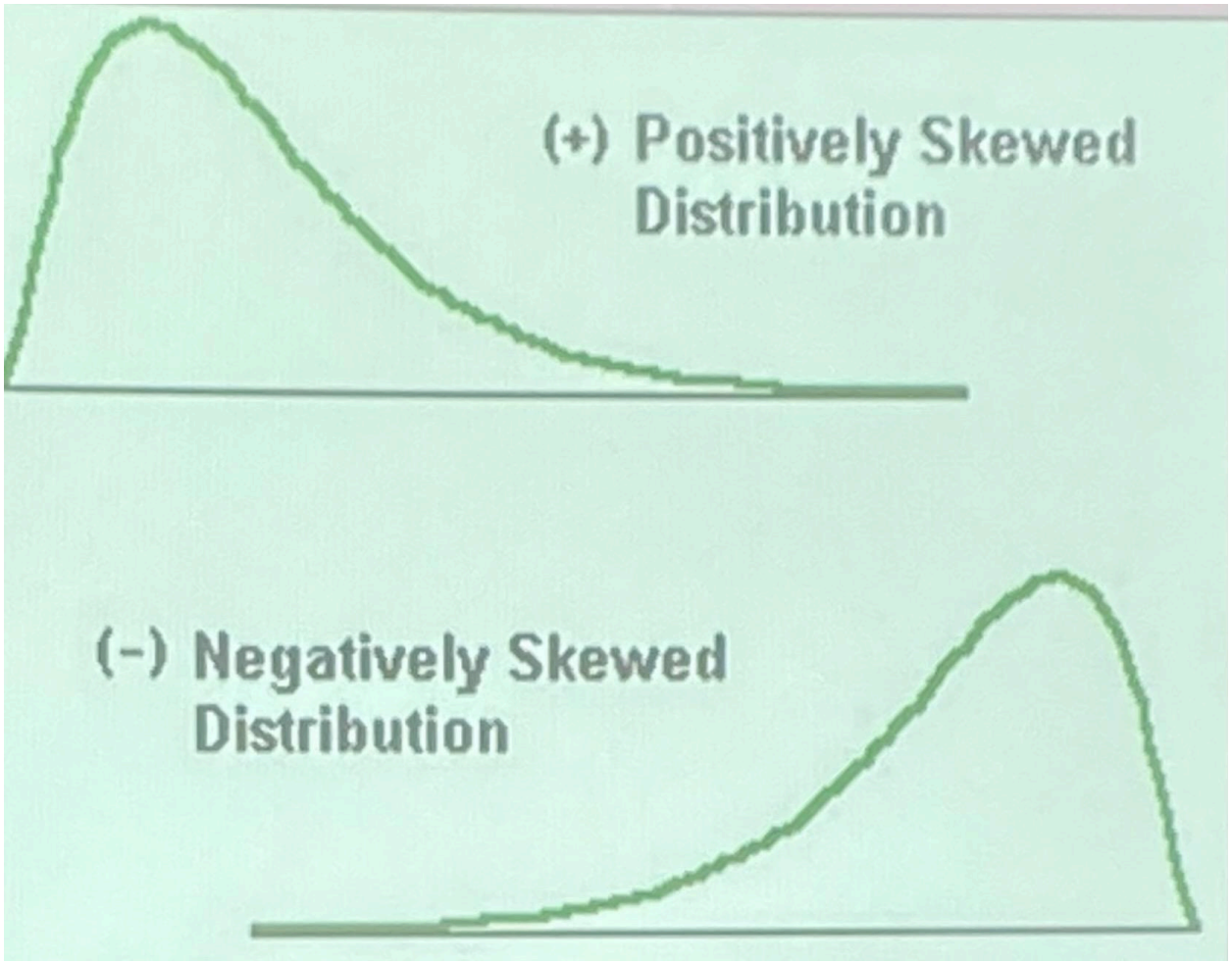
Statistical Analysis

- Try to share information with a common language
- Mean, median, mode
- Normal Distribution (bell curve)
    - Mean, median and mode are the same
- Distributions
    - Outliers skew distributions

Ethics of Experimentation

- Psychological studies tend to run into more ethical debates
- Operation Midnight Climax
    - Unethical study that involved slipping drugs to people and completely non consensual.
    - A lot of information was produced but at the cost of morality
- All science must now be done according to the code of ethics


(+) Positively Skewed
Distribution
(-) Negatively Skewed
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