

Tri 7 Research Final Review

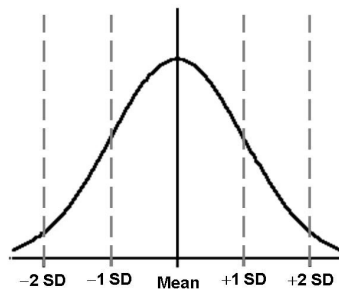
25 T/F questions

P-value

- Significance of p-value = .05 is that there is a 5% chance of getting the results by chance alone (5% chance of being wrong)

Gaussian Distribution

- Normal bell-shaped curve
- 68% of the values are w/in 1 SD of the mean
- 95% are w/in 2 SD of mean
- 99% are w/in 3 SD of mean



Difference btw Hypothesis and Theory

- Hypothesis: specific prediction between 2 variables
- Theory: integrated set of principles that explain observable events in terms of constructs.

Sampling Methods

- There is no way to get an exact representation of the total population by using a sample, but the goal is to get as close as possible

Independent/Dependent Variable

- IV: what the researcher controls
 - Ex: adjustment, meds
- DV: outcome of the IV
 - Ex: less pain, side effects

Quantitative vs Qualitative Data

- Nominal: category. Male/female, black/white
- Ordinal: ranking highest to lowest (1st 2nd 3rd)
- Interval: ordered set of numbers with arbitrary 0 (temperature)
- Ratio: intervals with a true 0 (length, weight, speed)

Case Studies

- Used as a communication tool to generate hypothesis
- *Some* educational/scientific value

The word “Prove”

- You can't prove a theory; you can only support it.
- You can't disprove a theory; you only disconfirm it.

Operationalization

- Changing a vague concept (subluxation) into a concrete or measurable definition
- Necessary in order to form a research question

Double Blind

- Neither researchers nor subjects know who is in the control group or the experimental group
- Both are unaware of intervention
- Removes researcher and subject bias

Null vs Alternative Hypothesis

- Null hypothesis (H_0): The intervention causes no change; there is no difference between control and experimental groups
- Alternative hypothesis (H_1): The intervention DOES cause a change; the 2 groups will be significantly different
- Goal of research is to “disprove” null hypothesis

Study power

- Related to sample size: \uparrow size = \uparrow power
- However: \uparrow size means that a difference may have little clinical relevance
 - Ex: BP 120/80 compared to BP 116/78 – might be significantly different but clinically not important

Placebo

- All treatments have a placebo effect

Define Research

- Research is the process of gathering data of information to solve a specific problem in a scientific manner.
- Research is the creation of new knowledge.

Purpose of Science

- The purpose of science is to produce useful models of reality.

Standard Deviation

- Def: a measure of the spread of the values in a curve
- If all data points are close to the mean, the SD is small

Measures of Central Tendency

- Mean – average of all numbers in a data set
- Median – middle #
- Mode – m/c #
- Range – difference btw highest and lowest
- SD – see prev slide

Correlation

- Correlation is not the same thing as cause & effect
- Ex: Just because 2 variables are high, doesn't mean that one caused the other to be high

Validity vs Reliability

- Validity – the test measures what you are trying to measure
- Reliability – you get the same answer every time

25 Multiple Choice Questions

Type 1 Error

- When you incorrectly reject the null hypothesis when it is actually true
- In other words – finding a difference between the 2 groups when there is no significant difference

Experimental study

- Main characteristic: Randomizing

P-value = 0.05

- 5% chance of getting wrong results
- Also known as the chance of making a Type I error

Type 2 error

- Accepting the null hypothesis when the alternative hypothesis is actually supported
- Ex: failing to recognize that there IS a difference between the groups

Sampling Types

- Random is the best way

Representative Sample

- Worst way to do it is “convenience sampling” – conducting surveys at a mall and asking anyone who stops by

Other sampling problems

- Poor response rate
- Participants drop out of study while in progress
- Mortality

Goals of Research

- Description
- Prediction
- Understanding causes
- Creating change

Steps of Research (know the correct order)

1. Ask a clinically relevant question.
2. Search the literature to find the best available evidence to answer your question.
3. Appraise the evidence for validity and applicability to the clinical circumstances.
4. Apply the relevant evidence to the clinical situation.
5. Evaluate your effectiveness in carrying out steps 1 through 4 and revise if necessary.

Potential Research Confounders for Field Researchers

- Acquiescence (pt never formally consents to being part of study)
- placebo effects - all treatments have a placebo component.
 - confuse understanding of the true benefit of care.
 - placebo effects can be used to facilitate care.

Hypothesis vs Research Question

- Research Question: A general description about the purpose and goals of the study. Communicates to a lay audience what the research is examining and why it is important. Serves as the foundation for your research. Leads directly into the specific hypotheses that you will pose.
- Hypothesis: Specific prediction between 2 variables

What makes something “science”?

- Empiric – question can be answered w/ data
- Reproducible – by independent researchers
- Follows scientific method

Components of Scientific Method

- Theory
- Hypothesis
- Design
- Operational definitions/measurement
- Analysis
- Interpretation
- Publishing, etc.

Attributes of a good theory

- Ability to account for data
- Parsimonious
- Testable
- Falsifiable
- Explanatory relevance

Literature Searches/ Using search terms

- Literature searching – searching databases to find relevant articles.
 - Background information- broad knowledge about a condition regarding anatomy and physiological basis.
 - Foreground information-focused knowledge for best diagnostic and treatment strategies.
 - Unfiltered, filtered

Intention to Treat

- One way to maintain randomization is to keep subject participants in the same group throughout the study
- Ex: don't switch someone to the control group if the intervention is not working

Hierarchy of Evidence (know correct order)



IRB

- What is it?
 - Institutional Review Board
 - Committees at the university and sometimes department levels.
 - Exempt, expedited or full review.
- What is the purpose?
 - Ethics codes for experiments on humans and/or animals

What is subject bias?

- Participants in a study will act differently simply because they know they are a part of a study
- Subjects may be partial to a certain treatment or may be opposed to it
 - Ex: chiro treatments for chiro students vs med school students