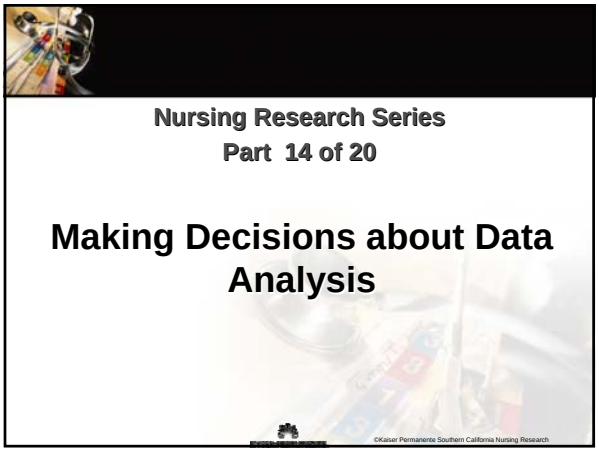

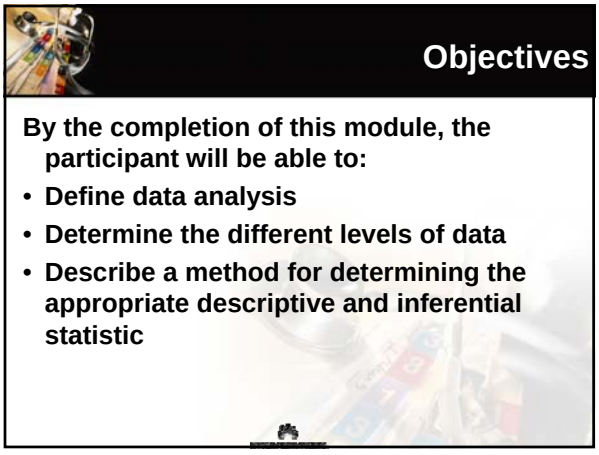

Data Analysis

- Data Analysis is:
  - A methodology by which individual data points are rendered into meaningful and intelligible information
- A product of data analysis in research is knowledge

Two Categories of Data Analysis

- Qualitative Analysis:
  - The systematic, rational process by which narrative (written data) are organized into meaningful descriptions, of themes, patterns, models or theories
- Quantitative Analysis:
  - Uses statistical procedures to reduce, summarize, organize, evaluate, interpret, and communicate numeric information

Qualitative Analysis

- Techniques will be different depending on the qualitative design- see Module 8 for Qualitative Designs
- All methods include:
  - Data Reduction
  - Data Display
  - Conclusion drawing/ Verification

Qualitative: Data Reduction

- The process of selecting, focusing, simplifying, abstracting and transforming the "raw data" (written narratives) into categories or themes

Qualitative: Data Display

- Organized assembly of the information using such forms such as tables or matching

Qualitative: Conclusion Drawing/ Verification

- Involves attaching meaning to the findings
- This could be a linear findings or may occur together

Quantitative Analysis

- Techniques will be different depending on the quantitative design- see Module 9 and 10 for Quantitative Designs
- Quantitative falls into two statistical categories:
  - Descriptive Statistics
    - Use to describe and synthesis data
  - Inferential Statistics
    - The use of a statistic created from a smaller group (sample) to draw a conclusion about a population

Choosing a Statistical Test

- An appropriate statistical procedure is a function of:
  - The research design
  - The level of data provided by the data collection instrument

The Research Design

- Descriptive Statistics
  - Exploratory Descriptive Designs (case studies)
  - Correlational Designs
- Inferential Statistics
  - Correlational Designs
  - Comparative Designs
  - Experimental and Quasi-Experimental Designs

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Levels of Data

- **Nominal Measurement**
- **Ordinal Measurement**
- **Interval Measurement**
- **Ratio Measurement**

  - **Responses of an instrument determine your level of data**

Nominal Measurement

- **The assignment of numbers to simply classify characteristics into categories**
- **Sometimes called "dummy variables" (Used to quantify variables)**

No= 0	Female= 1
Yes= 1	Male= 0

Ordinal Measurement

- **Permits the sorting of objects on the basis of their standing on an attribute relative to each other**
- **A higher score is better (or worse), but how much better (or worse) is not known**

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
5	4	3	2	1

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Interval Measurement

- Determines both the rank ordering of objects on an attribute and the distance between those objects
- Example:
  - Scores on an intelligence test
  - Temperature

Ratio Measurement

- Determines the rank ordering of objects on the attribute and the absolute magnitude of the attribute for the object as there is a rational, absolute zero
- Examples:
  - Weight (0,1,2 lbs)
  - Length – confidently say that an object is twice as long as another object

Robustness of Test

- Ability of the test to analyze data that is critically accepted than other tests
- Assumptions are violated when you run tests on data that is not appropriate
  - Non Parametric vs. Parametric Statistics

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Non- Parametric

- Not as robust as parametric
- Assumptions:
  - Observations are independent – each member of the sample is their own
  - Ordinal or Nominal data

Parametric

- Most powerful/ robust of statistical test
- Assumptions:
  - Observations are independent
  - Data are normally distributed
  - Populations are homogeneous- are in all other ways alike
  - Interval or Ratio data

Statistical Choices Matrix

Descriptive ⟵ ⟶ ..... ⟵ ⟶ *Inferential*

	Case Studies, Exploratory Descriptive Designs	**Correlational Designs**	**Comparative Designs**	**Experimental and Quasi-Experimental Designs**
Nominal or Categorical Data	Counts Frequencies Percentiles	Tetrachloric phi	Chi-Square	Chi-Square
Ordinal Data	*Measures of Central Tendency* Mean Median Mode	Spearman's rho Kentall's Tau	*Two Groups:* Mann-Whitney U Wilcoxin Rank *Three or More Groups:* Kruskall-Wallis	*Two Groups:* Mann-Whitney U Wilcoxin Rank *Three or More Groups:* Kruskall-Wallis
Interval or Ratio Data	Measures of Variation Range Standard Deviation Standard Error of the Mean	Pearson's Moment Correlation (r) Coefficient of Determination(r^2)	*Two Groups:* t-test *Three or More Groups:* Analysis of Variance (ANOVA)	*Two Groups:* t-test *Three or More Groups:* Analysis of Variance (ANOVA)

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Case Studies, Exploratory Descriptive Designs

	Case Studies, Exploratory Descriptive Designs
Nominal or Categorical Data	Counts Frequencies Percentiles
Ordinal Data	*Measures of Central Tendency* Mean Median Mode
Interval or Ratio Data	Measures of Variation Range Standard Deviation Standard Error of the Mean

Ex: 75 females, 25 males

Average scores

50% above/50% below

Most frequent

Majority of the population fell around the mean

Correlational Designs

All of these are Correlational techniques, and come to a single number that can give you the strength of the relationship

	Correlational Designs
Nominal or Categorical Data	Tetrachloric phi Biserial
Ordinal Data	Spearman's rho Kentall's Tau
Interval or Ratio Data	Pearson's Moment Correlation (r) Coefficient of Determination(r^2)

Comparative Designs

	Comparative Designs
Nominal or Categorical Data	Chi-Square
Ordinal Data	*Two Groups:* Mann-Whitney U Wilcoxin Rank *Three or More Groups:* Kruskall-Wallis
Interval or Ratio Data	*Two Groups:* t-test *Three or More Groups:* Analysis of Variance (ANOVA)

You will want to find statistical significance between the groups

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Experimental and Quasi-Experimental Designs

	Experimental and Quasi-Experimental Designs
Nominal or Categorical Data	Chi-Square
Ordinal Data	*Two Groups:* Mann-Whitney U Wilcoxin Rank *Three or More Groups:* Kruskall-Wallis
Interval or Ratio Data	*Two Groups:* t-test *Three or More Groups:* Analysis of Variance (ANOVA)

To Review

- **Data analysis may be quantitative or qualitative**
- **Quantitative analysis uses statistical procedures**
  - **Descriptive**
  - **Inferential**
- **Choice of test is a function of:**
  - **The research design**
  - **The level of data provided by your data collection procedures**

References to Consider

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