Learning Tool to Assist with Understanding of
Common Statistical Tests in Quantitative Research Studies

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Introduction

healthcare professionals are engaged in evidence-based
improve patient care in many settings. Nurses in the hospital
embers of teams to develop policies based on EBP. Quantitative
(non-random and randomized controlled trials) are frequently
for EBP. A barrier to reading published quantitative research
ck of understanding of statistics and the data analysis used in
ies. I developed a learning tool which is a simple diagram to help
etter understand the relationship between common statistical
ppropriate use based on the research hypothesis. Feedback from
in the hospital and outpatient settings indicate this tool is
g a better understanding of statistical tests presented in reports
research studies. This diagram can be used for teaching in the
ith nurses and healthcare professionals on interdisciplinary
ergraduate and graduate nursing courses as well as other

Literature

or many nurses to employ EBP practice daily in their work
ulty understanding the statistics in published research articles
, Ubbink, & Vermeulen, 2013). In a five-step approach to
research study for use in EBP, Berndt (2009) noted in step 4
to be satisfied "the chosen analysis provides information that
swer the research question" (p. 560). Having a tool that
ic use of common statistical tests for data analysis will assist
que research studies. Additional computations such as
o treat (NNT) and Risk Ratio (RR) are not included in this
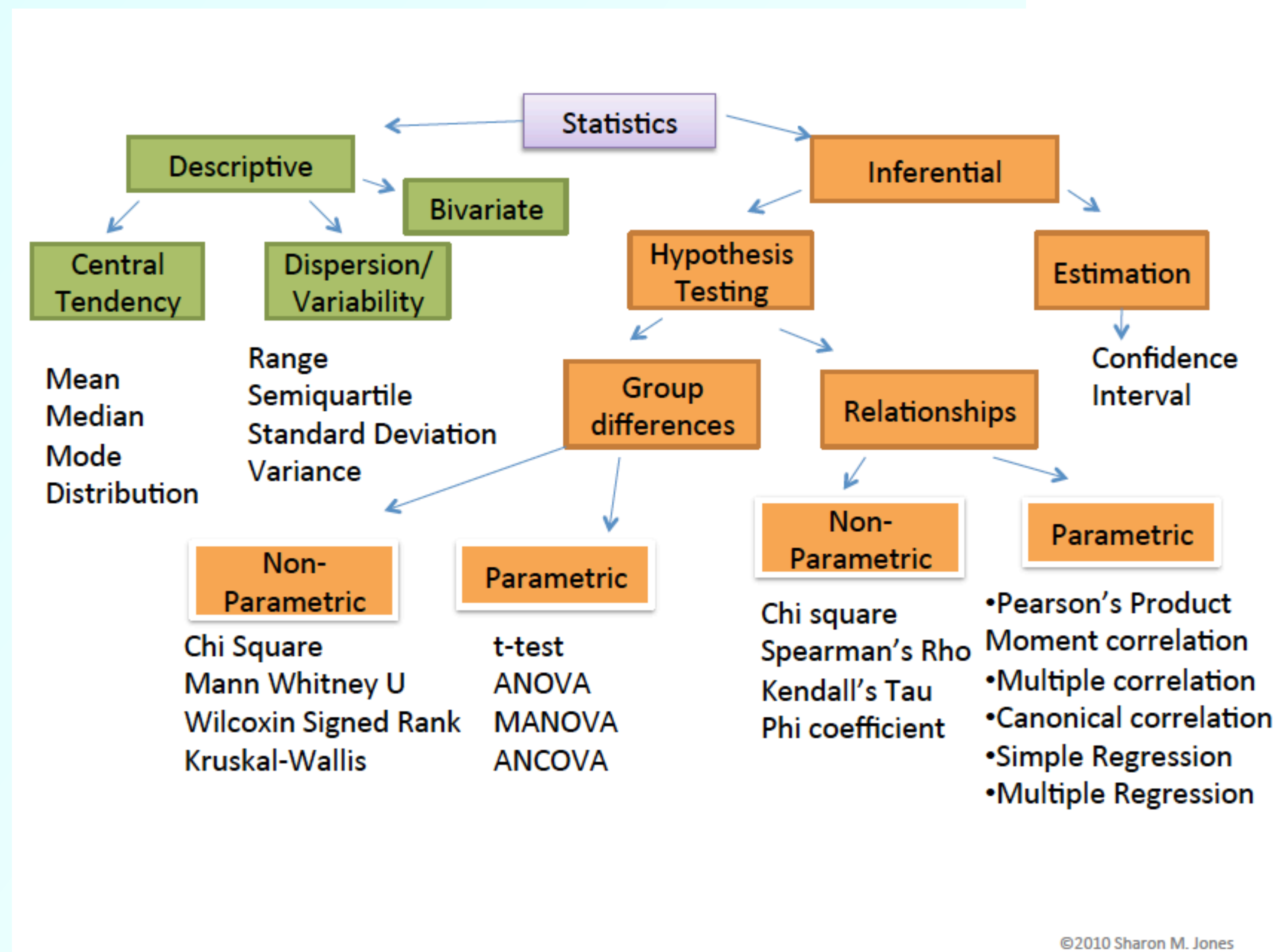007) provides an excellent description of these terms in a brief
nce list).

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Statistics diagram: Descriptive — Central Tendency (Mean, Median, Mode, Distribution); Dispersion/Variability (Range, Semiquartile, Standard Deviation, Variance); Bivariate. Inferential — Hypothesis Testing — Group differences: Non-Parametric (Chi Square, Mann Whitney U, Wilcoxin Signed Rank, Kruskal-Wallis), Parametric (t-test, ANOVA, MANOVA, ANCOVA); Relationships: Non-Parametric (Chi square, Spearman's Rho, Kendall's Tau, Phi coefficient), Parametric (•Pearson's Product Moment correlation •Multiple correlation •Canonical correlation •Simple Regression •Multiple Regression). Estimation — Confidence Interval.

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How to Use Diagram

This diagram provides a visual approach to understanding if the statistical tests used in data analysis are appropriate to answer the research question or hypothesis presented in a quantitative research study.

Step 1 Review levels of measurement: nominal (marital status), ordinal (level of education), interval (temperature), ratio (weight).

Step 2 Review normal distribution (bell curve) in the population.

Step 3 Explain Diagram starting at top left corner, basic descriptive statistics give brief reminder about terms.

Step 4 Explain right side inferential statistics, is the study comparing difference between groups (ex. an intervention with mean scores) or relationship between variables (ex. social support and depression)

Step 5 Review basic criteria to determine if use Parametric or non-Parametric tests (See excellent article by Hoskin**).**

Key difference is parametric tests a) assume normal distribution in the population or used random assignment and b) interval or ratio level data (Hoskin). Non-parametric tests are used if not normal distribution or did not use random assignment, also if used nominal or ordinal level data. Note: **Likert**-*type scale is an ordinal scale (ranking) but for purposes of data analysis considered interval level to use more powerful parametric tests (Polit & Beck, 2012).*

Step 6 Provide an example of a research question/hypothesis, data collection method (random assignment?) and data analysis information.

Step 7 Determine if the research question addresses a relationship between variables, difference between groups, or simply a description of a variable. Identify the appropriate area on the diagram. *Note: nearly every study reports descriptive statistics of the data set such as demographics of the sample.*

Step 7 Based on level of measurement and whether random assignment was used, determine if the data analysis should use parametric or non-parametric tests.

Step 8 Identify the list of tests appropriate. When reviewing a published article, ***did the author report use of an appropriate test?***