Best Practices in Academic/Clinical Department Administration and Scholarship of Discovery

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Best Practices in Academic/Clinical Department Administration and Scholarship of Discovery

Venue: University of Medical Sciences, Ondo City

Date: July 9 and 10, 2018

CHICAGO STATE UNIVERSITY

Shout out to My Friends in Chi-Town

12 noon – 1:00 pm: Demonstration

Scholarship of Discovery -

Discussion and Demonstration

1:00 pm – 2:00 pm: Review and Closing Discussion and Questions

Presentation Overview

Covers the demonstration of the following 5 topics:

1. Searches for the Scholarship of Discovery Impact by Country and for Journal Ranking
2. Sample size estimation
3. Determination of the readability of a questionnaire
4. Statistical vs. practical significance – Effect size
5. Testing the basic assumptions of parametric tests - outliers, normality, homogeneity of variance

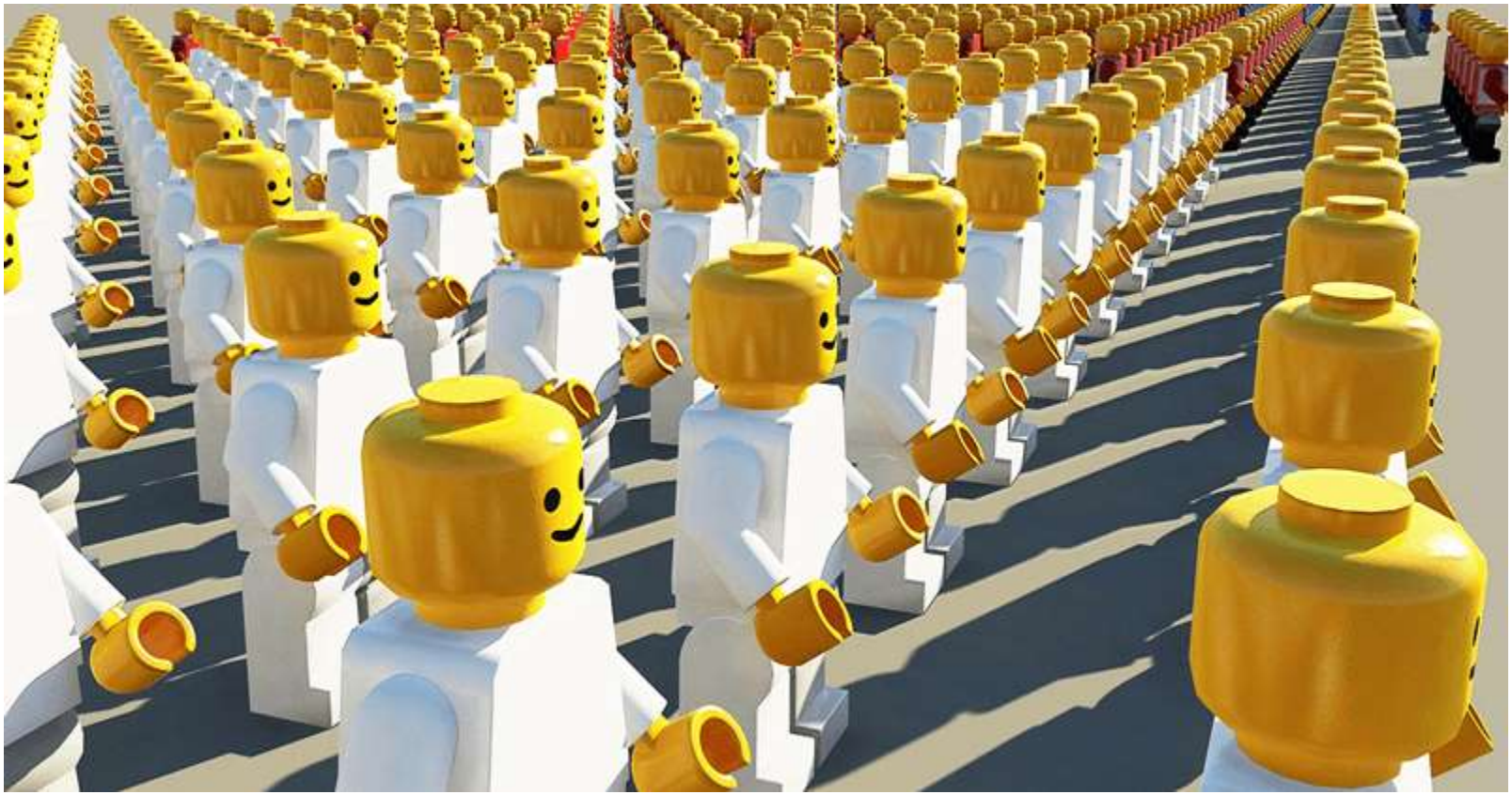
How to Search for the Scholarship of Discovery Impact by Country and for Journal Ranking

Searches for the Scholarship of Discovery Impact by Country and for Journal Ranking

- Connect to the link below:
  - www.scimagojr.com

How to Estimate/Calculate Sample Size in a Survey Study

Sample Size Estimation
https://www.checkmarket.com/blog/how-to-estimate-your-population-and-survey-sample-size/



Determination of Sample Size

There are three general methods available:

- Manual calculation Method
- Estimation from Indicative Table
  - Margin of error +_ 5
  - Confidence level – 95% or 99%
- Computational platforms

Acceptable Response Rate

- For an online survey, a response rate of 20% is considered **“good”** A 30% response rate is considered to be “***really, really* good.”**

Estimation from Indicative Table

	Confidence level = 95%			Confidence level = 99%		
	Margin of error			Margin of error		
Population size	5%	2,5%	1%	5%	2,5%	1%
100	80	94	99	87	96	99
500	217	377	475	285	421	485
1.000	278	606	906	399	727	943
10.000	370	1.332	4.899	622	2.098	6.239
100.000	383	1.513	8.762	659	2.585	14.227
500.000	384	1.532	9.423	663	2.640	16.055
1.000.000	384	1.534	9.512	663	2.647	16.317

Computation Platform Method

- On the CheckMarket website, you find an easy sample size calculator to calculate the number of completes

https://www.checkmarket.com/sample-size-calculator/

How to Determine the Readability of a Questionnaire

Readability-Score.Com

https://readability-score.com/

- Copy and paste the web address into a browser and Open up the web page
- Cut and paste the text or questionnaire inside the rectangular space
- Example: I copied and pasted the:

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TEMPLATE CONSENT FORM – SOCIAL-BEHAVIORAL STUDY

CONSENT TO PARTICIPATE IN RESEARCH STUDY

Intervention Studies: Statistical Significance versus Practical Significance

How to Calculate Effect Size

- **Calculating the Effect size of ALL Designs with an Online Calculator**

- https://www.psychometrica.de/effect_size.html

- Comparison of groups with equal size (Cohen's d and Glass Δ)
- Comparison of groups with different sample size (*Cohen's d, Hedges' g*)
- Effect size for mean differences of groups with unequal sample size within a pre-post-control design
- Effect size estimates in repeated measures designs
- Calculation of d and r from the test statistics of dependent and independent t-tests
- Computation of d from the F-value of Analyses of Variance (ANOVA)
- Calculation of effect sizes from ANOVAs with multiple groups, based on group means
- Increase of intervention success: *The Binomial Effect Size Display (BESD)*and *Number Needed to Treat (NNT)*
- Risk Ratio, Odds Ratio and Risk Difference
- Effect size for the difference between two correlations
- Effect size calculator for non-parametric tests: Mann-Whitney-U, Wilcoxon-W and Kruskal-Wallis-H
- Computation of the pooled standard deviation
- Transformation of the effect sizes *d*, *r*, *f*, *Odds Ratio* and η^2
- Computation of the effect sizes *d*, *r* and η^2 from χ^2- and *z* test statistics
- Table of interpretation for different effect sizes

Lenhard, W. & Lenhard, A. (2016). Calculation of effect sizes. *Psychometrica*. DOI: 10.13140/RG.2.1.3478.4245
https://www.psychometrica.de/effect_size.html

Interpretation Criteria

- See the Table of Interpretation for Different Effect Sizes at:

https://www.psychometrica.de/effect_size.html

- Lenhard, W. & Lenhard, A. (2016). Calculation of effect sizes. *Psychometrica*. DOI: 10.13140/RG.2.1.3478.4245

How to Evaluate the Basic Assumptions of Parametric Test

Basic Assumptions for Parametric Tests

	Assumptions	Test
1	The observations in the two groups must be independent	
2	Optimum sample size	
3	The scale of measurement must be interval or ratio.	
4	The DV should not contain any outliers.	Box Plot
5	The DV should be normally distributed.	K-S or SW
6	The distribution of the two groups should be homogenous.	Levene Test

http://www.statisticssolutions.com/manova-analysis-one-sample-t-test

Guide for Selecting the Appropriate Inferential Statistics

	Assumptions/Criteria	Parametric Test	Non-Parametric Test
1	The observations are	Independent on one another; groups	Dependent on one another; pre/post test or matched
2	Scale of measure'nt of DV	Interval/ratio	Nominal/Ordinal
3	Sample size	Large	Small
4	DV are normally distributed – Draw histogram, Q-Q plot. Test with Fisher's measures of Skewness/ Kurtosis; K-S/S-W	Ho accepted; data is Mesokurtic	Ho rejected; data is skewed or Kurtotic
5	Groups are of equal variance; Levene's Test	Ho accepted homogeneity	Ho rejected Heterogeneity
6	Outliers -Draw Box plot	No outlier	Outlier present

When one or more of the conditions are not met, proceed to use nonparametric stats

How to Generate Outliers in the Dependent Variable:

Reading a Box-and-Whisker Plot

How to Use SPSS to Generate Outliers in the DVs

- Look for the header menu and select ANALYSE
- Chose DESCRIPTIVE STATISTICS and select EXPLORE option below
- A major dialogue box will open; Left column contains the list of your dependent and independent variables. On the right side is the Dependent list dialogue box and statistics, plots and options
- Move the dependent variables (on the left dialog box) that you want to identify Outliers to the dialog box called DEPENDENT LIST
- Open the Statistics box; Inside the box check off only:
  - Outliers
- click on Continue
- Next Click “OK” Plots will be displayed the Box-and-Whisker Plot

How to Test for Normality of the Dependent Variable

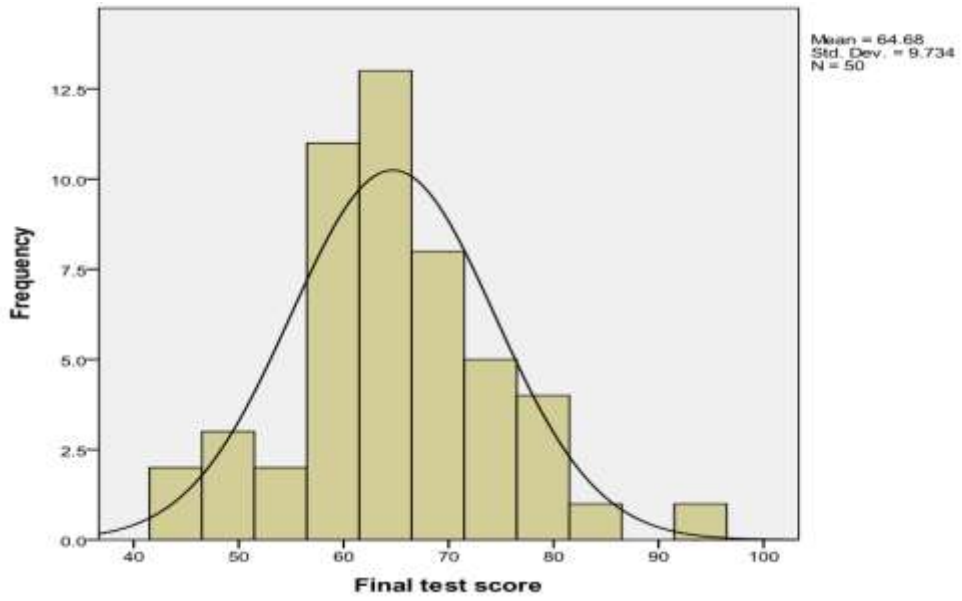
How to Use SPSS to Plot Histogram Showing Normal Curve

- Look for the header menu and select ANALYSE
- Chose DESCRIPTIVE STATISTICS and select Frequencies option below
- A major dialogue box will open; Left column contains the list of your dependent and independent variables. On the right side is the Dependent list dialogue box and statistics, plots and options
- Move the dependent variables (on the left dialog box) that you want to test the normality to the dialog box called DEPENDENT LIST
- Open the Charts box; Inside check Histograms and below it also check off “Show normal curve on histogram”
- Click on Continue
- Next Click “OK” and Plot will be displayed

Plot Histogram Curve

First, always plot the histogram with the normal distribution curve to inspect for skewness and kurtosis

Then proceed to test for normality to confirm or refute your speculation.



How to Use SPSS to Test for Normality

- Look for the header menu and select ANALYSE
- Chose DESCRIPTIVE STATISTICS and select EXPLORE option below
- A major dialogue box will open; Left column contains the list of your dependent and independent variables. On the right side is the Dependent list dialogue box and statistics, plots and options
- Move the dependent variables (on the left dialog box) that you want to test the normality to the dialog box called DEPENDENT LIST
- Open the Statistics box; Inside check Descriptives and click on Continue
- Open the Plots box; Inside check "Normality Plots with Tests" and click on Continue. Click on Both (default).
- Next Click "OK" Kolmogorov-Smirnov (K-S) and Shapiro-Wilk (SW) tests will be printed

Manual Testing for Normality of a Distribution from SPSS Print out

- An easier Manual method of determining if a Skewness or Kurtosis of a distribution is significantly different from normal (Mesokurtic) distribution is to run the EXPLORE procedure with SPSS for the variable to obtain the Skewness Coefficient (SKC) or Kurtosis Coefficient (KtC) values and their respective standard error (SE) & proceed:

  Test for Skewness: Fisher's Measures of Skewness

  - Compute SKC/SE
  - Compare the sample statistic value obtained with the population critical parameter of 1.96 at .05 alpha level; 2.58 at .01 alpha level and 3.29 at .001 alpha level

  Test for Kurtosis: Fisher's Measures of Kurtosis

  - Compute KtC/SE
  - Compare the sample statistic value obtained with the population critical parameter of 1.96 at .05 alpha level; 2.58 at .01 alpha level and 3.29 at .001 alpha level

How to Evaluate the Homogeneity (Equality) of Variance with Levene's Test

https://www.youtube.com/watch?v=XrG1HZo77U4

How to Run Normality and Levene's Test in SPSS

- Go to Analyze look for Descriptives and then Explore.
- Click and drag the continuous outcome variable, into the "Dependent List" panel.
- Click and drag the categorical predictor variable, into the "Factor" panel.
- Click Plots.
- Check the box "Untransformed" under the panel "Spread vs. Level with Levene Test"
- Click Continue. And Click OK.
- Both Test of Normality (K-S/SW) Test and Homogeneity of Variance Levene Tests will be displayed

How to Evaluate the Homogeneity (Equality) of Variance in an Independent T-Test Design with Levene's Test

How to Use SPSS to Test Differences between 2 groups and Test for Homogeneity of Variance

- Look for the header menu and select ANALYSE
- Chose Compare Means and select Independent Samples T test option below
- A major dialogue box will open; Left column contains the list of your dependent and independent variables.
- Move the dependent variable (on the left dialog box) to the dialog box called Test Variable(s)
- Move the independent /categorical variable (on the left dialog box) to the dialog box called Grouping Variable; and Press on “Define groups” Enter matching coded values
- Click on Continue and the ” Click on “OK”
- Levene Test for Equality of variance, the Independent Sample T- Test, and 95% CI will be displayed

How to Evaluate the Homogeneity (Equality) of Variance in an ANOVA Design with Levene's Test

https://www.youtube.com/watch?v=XrG1HZo77U4

How to Use SPSS to Test Differences between 3> groups ANOVA and Test for Homogeneity of Variance

- Look for the header menu and select ANALYSE
- Chose Compare Means and select One Way ANOVA option below
- A major dialogue box will open; Left column contains the list of your dependent and independent variables. On the right side is the Dependent list dialogue box and statistics, plots and options
- Move the dependent variable (on the left dialog box) to the dialog box called DEPENDENT LIST
- Move the independent /categorical variable (on the left dialog box) to the dialog box called Factor
- Open the Post Hoc box; Inside check One of the Tests and click on Continue
- Open the Options box; Inside check "Homogeneity of Variance Test" and click on Continue. Next Click "OK" Levene Test, ANOVA and Post Hoc Tests will be displayed

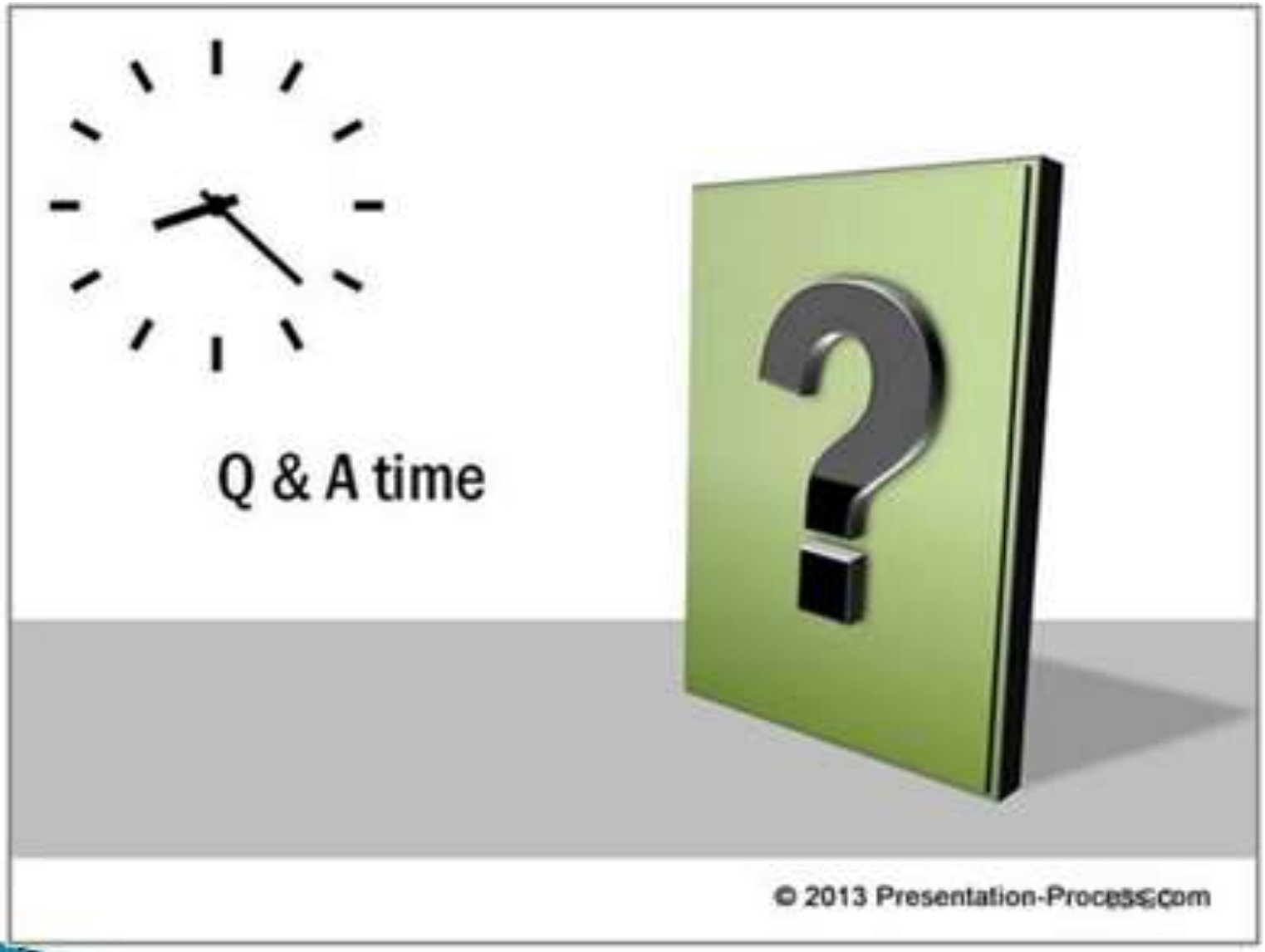
1:00 pm – 2:00 pm: Review and Closing Discussion and Questions

Feel free to contact me by email at jbalogun@csu.edu

Workshop Learning Objectives

At the end of the training, the learner will be able to:

- Create an academic culture of using evidence to make administrative decisions within their department.
- Design and implement a comprehensive assessment program for an academic department.
- Articulate evidence-based teaching strategies and recipe for high quality education.
- Construct measurable course objectives, and student learning outcomes for an academic program.
- Discuss different types of research approaches, experimental designs and quantitative data analysis, testing for the assumptions of parametric and non-parametric statistics.
- Discern areas of weakness in published manuscripts.
- Identify inappropriate use of statistics.
- Determine the clinical significance of an intervention study.



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