FINAL REPORT STRUCTURE Outline Due: 8/10/2020
(Length: 15-20 pages narrative; Tables-Charts-Figures separate) Report Due: 8/12/2020

PROJECT TITLE (SEPARATE TITLE PAGE WITH AUTHORS' NAMES)

Submitted to:
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Statistics 467/567
August 12, 2020

Name of Author (s) – Your name and Co-Author (if applicable)

I. **Abstract** n = 250 words - brief description of proposed study **(update from previous with new bivariate and multivariate methods and results).**

II. **Introduction: Brief** (2-3 pages):
   a. Again state the problem based on existing empirical evidence;
   b. **Add to literature review** – new sources relevant to the **recent bivariate and multivariate testing**.

III. **Methods** (5-6 pages):
   a. **Univariate analysis** – descriptive statistics for **NEW or additional variables only**;
   b. Report which type of bi- multi- variate statistics selected;
   c. Explain use of transformed variables in bivariate and multivariate analysis;
   d. Present equations in text if relevant to application of method.
   e. Bivariate Testing (**do at least three** including residual diagnostic plot):
      i. ANOVA /MANOVA – F-Distribution - Kruskall-Wallis Test; (at least three (3) groups, since ANOVA is comparing means or multiple t-test);
      ii. Chi-square Test of Homogeneity or Goodness of Fit Test
      iii. Simultaneous Confidence Intervals;
      iv. Testing for Equality of Covariance Matrices.
      v. Canonical Correlations - Proportions of Sample Variance Explained by Canonical Correlations - Relevance of The Variable Combinations
   f. Multivariate Regression **(must do regression analysis and all significance tests below)** :
      a. Classical Linear Regression Analysis -
         i. Likelihood Ratio Tests for the Regression Parameters (Predictors);
         ii. Report R square and significance as p value or confidence interval;
         iii. Model Checking and Fit - Residual Plots;
         iv. Forward or Backward Stepwise Regression;
         v. **Optional**: Leverage and Influence Statistic (analysis with and without outlier)
      b. **Optiona**l: Logistic Regression – confidence intervals for odds ratios; maximum likelihood model differences;
   g. Multivariate Methods **(must do two methods below and compare to the classic linear regression):**
      a. Classification Methods (pick two and compare)
         i. Factor Analysis – Principal Components Analysis;
            1. Which factors selected and why to create new variable;
            2. If used as variable in ANOVA and/or regression analyses, justify why the composite versus single variable.
         ii. Discriminant – predict profile membership (outcome) of three (3) groups;
         iii. Cluster – partition into segments (**one method** either: Hierarchical or k-means)

IV. **Results** (5-6 pages):
   a. Describe findings: Univariate, Bivariate, Multivariate as presented in the methods section;
   b. Identify the table and/or figure, chart or graph as a reference point for illustration;
   c. Number tables and number figures separately (with title, sample size n=?; labeled axes)
   d. Report <u>ONLY</u> significant results from bi- and multi-variate analyses.

V. **Discussion** (3-5pages):
   a. How do the bivariate and multivariate relationships extend the univariate analysis?
   b. Do differences exist between bivariate and/or multivariate results?
   c. What is the broader impact of the study? What are the policy implications? Why are there differences between groups? How can the gap between groups be addressed?

VI. **References** – Bibliography (18-24 references at least 50% from last five years):
   a. Citations with mathematical underpinnings of formula;
   b. Scholarly articles discussing application of statistical method.