PSC 204B LECTURE OUTLINES

In parentheses are indicated the pages in your textbook that roughly correspond with the lectures.

Part One: Multiple Correlation/Regression Analysis

I. Introduction
   A. Syllabus: Schedule, Content, and Grading
   B. Course Content: Correlations and Causal Models

II. Review and Overview: Critical Distinctions (pp. 1-16)
   A. Constants versus Variables
   B. Dependent versus Independent Variables
      1. Experimental versus Correlational Data
      2. Endogenous versus Exogenous Variables
   C. Measured versus Unmeasured Variables
      1. Observed versus Latent Variables
      2. Model Misspecification versus Measurement Error
   D. Levels of Measurement: Nominal, Ordinal, Interval, and Ratio Scales
      1. Contrasts Concerning:
         a. Central Tendency
         b. Variation
         c. Distribution
         d. Transformation
      2. Complications and Simplifications:
         a. Rank-Category Measures and Ordinal Data with Tied Ranks
         b. Categorical (Qualitative, Nominal) versus Numerical (Quantitative, Continuous) Measures
   E. Simple versus Complex Causal Theories
      1. Bivariate versus Multivariate Causality
      2. Linear versus Nonlinear Relations
      3. Additive versus Multiplicative Functions
      4. Recursive versus Nonrecursive Models
      5. Single-Equation versus Multiple-Equation Systems
   F. Descriptive versus Inferential Statistics

III. Bivariate Correlation: The Pearson Product-Moment Coefficient (*r*) between 2 Numerical Measures (pp. 19-50)
   A. How is *r* derived? - Three Derivations
      1. Cross-Products and Covariances
      2. Differences and Prediction
      3. Least Squares and Regression
   B. Are there other coefficients besides *r*?
      1. Incognito *r*'s (ϕ, point-biserial, and ρ)
      2. Pseudo-*r*'s (tetrachoric, polychoric, and biserial)
   C. What does *r* mean?
      1. Prediction
      2. Explanation
      3. Estimation
   D. What influences the size of *r*? (pp. 53-62)
      1. Bivariate Distributions
      2. Curvilinear Relations
      3. Outliers
      4. Range Restrictions
      5. Variable Reliabilities
   E. How big must *r* be to infer a sizable causal effect?

IV. Multiple Regression Analysis for Numerical Measures (pp. 64-92, 98-99)
   A. Two Problems
      1. How to estimate a causal effect between two variables controlling for a third
         a. First solution: The Partial Correlation $r_{12.3}$
         b. Second solution: The Semipartial (Part) Correlation $r_{1(2.3)}$
         c. Third solution: The Partial Regression Coefficients $B_{12.3}$ and $B_{13.2}$
      2. How to estimate the total causal effect of two causal variables on a single effect variable: R and R^2
   B. Precautions
      1. Descriptive Statistics: Suppression
      2. Inferential Statistics:
         a. Multicollinearity (pp. 419-430)
         b. Inflated R^2
   C. Generalization to $k > 2$
   D. Significance tests (pp. 151-176)
      1. Individual Variables
         a. Simultaneous Model
         b. Hierarchical Model
         c. Stepwise "Model"
      2. Variable Sets
   E. Computer Execution
      1. Input
      2. Output

V. Review and Exam I