PART II. FEDERATION STATISTICS (Questions provided, but illustrative tables not available here)

Spring 2000

A. Define and **relate** each of the following to one another as they apply to conducting a test of statistical significance (it must be shown how they relate to one another in order to correctly answer the question).
   1. Research and null hypothesis
   2. Simple random sample
   3. Sampling distribution and standard error
   4. Level of significance and critical region
   5. One-tail and two-tail test
   6. Type I and Type II error (be sure to address why we are concerned with these)

B. Define and distinguish between the terms in five of the following pairs. Use examples to illustrate.
   1. Measures of association and tests of significance
   2. Conditional relationship and partial relationship
   3. Zero order and partial correlation
   4. Independent and related samples
   5. Probability and nonprobability samples
   6. Conceptual and operational definitions
   7. Ordinal and interval level measurement
   8. Correlation and regression analysis

C. Below are five tables presenting data from research journal articles. Select four of the tables. For each, answer the following questions:
   1. Identify the measures of association and/or tests of significance used. If you were to review an article containing this table, what comments would you make about the appropriateness of the statistical techniques used?
   2. What meaningful substantive conclusions can you draw from this table?

Fall 1999

A. Define and RELATE each of the following to one another as they apply to conducting a test of statistical significance (it must be shown how they relate to one another in order to correctly answer the question).
   1. Research and null hypothesis
   2. Simple random sample
   3. Sampling distribution and standard error
   4. Level of significance and critical region
   5. One-tail and two-tail test
   6. Type I and Type II error (be sure to address why we are so concerned with these)

B. Choose four of the following pairs of terms. For each pair, define the terms and compare/contrast them, citing similarities and differences.
   1. Zero order and partial correlations
   2. Normal curve and central limit theorem
   3. Measures of association and tests of significance
   4. Descriptive and inferential statistics
   5. Independent and related samples
   6. Correlation and regression analysis

C. Choose one of the following

   1. Empirical analysis of causal models is an important development in sociology. What are the similarities between path analysis and multiple regression? What are the differences between direct and indirect effects? Identify all the direct effects in the diagram below. What is the indirect effect of GINI on HEALTH in the diagram below?

   2. Compare the general properties of Path analysis with that of structural equation (LISREL) modeling.

Spring 1999

A. For six of the following pairs discuss what factor(s) must be taken into consideration in choosing between these two statistical techniques for use in the analysis of data.

1. T test and z test
2. Chi square and lambda
3. PRE and non-PRE measures of association
4. Pearson's r and Spearman's rho
5. Eta and Pearson's r
6. Lambda and c
7. R and partial r
8. Discriminant analysis and loglinear
9. Linear correlation and linear regression

B. Answer each of the following questions

1. What assumptions must be made to use regression analysis in the analysis of data? Provide a brief description of each assumption. How does one know that the assumptions have been met?
2. What do each of the following tell us
   Unstandardized regression coefficients (b)
   Standardized regression coefficients (Beta)
   Level of significance (p)
   Coefficient of determination (R^2)
3. Write a brief essay substantively interpreting Table 1 below.

C: *Interpretation of Tables*

Write a brief essay substantively interpreting the tables below:

Fall 1998

A. Define and relate each of the following to one another as they apply to conducting a test of statistical significance

1. Research and null hypothesis.
2. Simple random sample
3. Sampling distribution and standard error
4. Level of significance and critical region
5. One-tail and two tail test
6. Type 1 and Type II error

B. Answer three of the following questions.

1. Answer the following questions about Table 1 below.
   a. What assumptions must be made to use regression analysis in the analysis of data? Provide a brief description of each.

b. What do each of the following tell us?

1. Unstandardized regression coefficients (b's not shown in table)

2. Standardized regression coefficients (Beta)

3. Level of significance (p)

4. Coefficient of determination (R^2)

c. Write a brief essay substantively interpreting the table

2. Note that this question is made up of more than one table. Write an essay substantively interpreting the findings.

3. Write a brief essay substantively interpreting this table. Identify all of the statistical procedures used and interpret them, including the percentages.

4. Write a brief essay substantively interpreting this table.

Spring 1998

A. Define and relate all of the following terms to one another as they apply to conducting a test of statistical significance
1. Simple random sample
2. Sampling distribution and standard error
3. Level of significance and critical region
4. Research and null hypotheses
5. Type I and Type II error

B. Below are six tables presenting data from research journal articles. Answer the following questions for Table 1. Then select three of the other tables and answer the same questions about them.
1. Identify the measures of association and/or tests of significance used. If you were to review an article containing this table, what comments would you make about the appropriateness of the statistical techniques used?
2. What meaningful substantive conclusions can you draw from this table?

Summer (Fall) 1997

A. Define and Relate each of the following to one another as they apply to conducting a test of statistical significance (it must be shown how they relate to one another in order to correctly answer the question)
1. Research and null hypothesis
2. Simple random sample
3. Sampling distribution and standard error
4. Level of significance and critical region
5. One-tail and two-tail test
6. Type I and Type II error (be sure to address why we are so concerned with these).

B. Generate an appropriate table or chart with hypothetical data which would include variables at the following levels of measurement:

Nominal and nominal
Nominal and ordinal
Ordinal and ordinal

Interval and ratio

For each of the four tables or charts that you generate do the following:

Provide an appropriate operational definition for each variable
Identify appropriate measures of association and test of significance and explain why they are appropriate
Discuss the substantive relationships between the variables

C. Answer one of the following two questions

1. For table 1, answer the following:

What is a factor?
What are factor loadings? Interpret the loadings of x1 and x2 on Factor 1
What is communality? Interpret the commonalties of x1 and x2 in the table
What percentage of the total variance of the five variables does the first factor explain?

2. Answer the following questions and where possible relate your answers to Table 2 below.

a. What assumptions must be made to use regression analysis? Provide brief descriptions of each

b. What do each of the following tell us?

Unstandardized regression coefficients

Standardized regression coefficients (beta)

Level of significance

Write a brief essay substantively interpreting table 2.

Spring 1997

A. For four of the following pairs discuss what factor(s) must be taken into consideration in choosing between these two statistical techniques for use in the analyses of data.

T and Z test
Chi-square and lambda
Pre and non-PRE measures of association
Pearson's r and Spearman's rho
Eta and r
Lambda and c
r and partial r
Discriminant analysis and loglinear
Linear correlation and linear regression

B. Answer two of the following:

1. What does table 1 tell us? (To pass this portion of the exam, your answer must include a) a discussion of the relationship between the independent variables, b) the relationships between the independent variables and the dependent variable, c) the insights provided by the b coefficients , d) the total influence of the independent variables on the dependent variable.

What the implications are for full professors desiring to increase their salaries

2. For table 2 answer the following:

   What is a factor?

   What are factor loadings? Interpret the loadings of x1 and x2 on Factor 1

   What is communality? Interpret the communalities of x1 and x2 in the table.

   What percentage of the total variance of the five variables does the first factor explain?

3. Interpret table 3, an elaboration table

Fall 1996

A. Answer 1 or 2 below.

1. Define and relate each of the following to one another as they apply to conducting a test of statistical significance (it must be shown how they relate to one another in order to correctly answer the question)

   Research and null hypothesis
   Simple random sample
   Sampling distribution and standard error
   Level of significance and critical region
   One-tail and two-tail test
   Type I and Type II error (be sure to address why we are concerned with these)

2. For six of the following pairs discuss what factor(s) must be taken into consideration in choosing between these two statistical techniques for use in the analysis of data.
   T and Z test
   Chi-squared and lambda
   PRE and non-PRE measures of association
   Pearson's r and Spearman's rho
   Eta and r
   Lambda and c
   r and partial r
   Discriminant analysis and loglinear
   Linear correlation and linear regression

B. Answer the following questions and where possible relate your answers to the table below.

1. What assumptions must be made to use regression analysis? Provide a brief description of each.

2. What do each of the following tell us:
   Unstandardized regression coefficients (b)
   Standardized regression coefficients (Beta)
   Level of significance (p)
   Unadjusted Coefficient of determination (R2)
   Adjusted Coefficient of determination
   Constant (Intercept)

   Write a brief essay substantively interpreting this table.

C. Using the elaboration model, interpret tables 1.a and 1.b

Spring 1996 not available

Fall 1995

A. Define and relate each of the following to one another as they apply to conducting a test of statistical significance (it must be shown how they relate to one another in order to correctly answer the question).

Research and null hypothesis
Simple random sample
Sampling distribution and standard error
Level of significance and critical region
One-tail and two-tail test
Type I and Type II error (be sure to address why we are concerned with these)

B. Choose TWO of the following:

1. Define, compare, and discuss four of the following pairs of terms, using examples to illustrate.
   Primary data and secondary data

   Cross-sectional and longitudinal studies

   Unit of analysis and unit of observation

   Conceptual and operational definitions

   Internal and external validity in experiments

   Probability and non-probability sampling

   Unobtrusive and reactive measures

2. What are the four basic levels of measurement and their mathematical characteristics? Give an example of each level. What measures of central tendency and dispersion are appropriate for each?

3. Give an example of a test of significance and a measure of association that would be appropriate to use with each of the following combinations of independent and dependent variables and justify your choice:

Levels of measurement: Independent variable = nominal, Dependent variable = nominal
Levels of measurement: Independent variable = nominal, Dependent variable = interval/ratio
Levels of measurement: Independent variable = ordinal, Dependent variable = ordinal
Levels of measurement: Independent variable = interval/ratio, Dependent variable =

Interval/ratio

4. Answer the following questions and where possible relate your answers to table 1.
   A. What assumptions must be made to use regression analysis? Provide a brief description of each.

   B. What do each of the following tell us?

   Unstandardized regression coefficients (b)

   Standardized regression coefficients (Beta)

   Levels of significance (p)

   Coefficient of determination r squared)

c. Write a brief essay substantively interpreting this table

Spring 1995

A. Define and relate each of the following to one another as they apply to conducting a test of statistical significance (it must be shown how they relate to one another in order to correctly answer the question).

Research and null hypothesis
Simple random sample
Sampling distribution and standard error
Level of significance and critical region
One-tail and two-tail test
Type I and Type II error (be sure to address why we are concerned with these)

B. Choose TWO of the following:

1. Since simple random sampling gives the "deviant" case the same opportunity to be selected as the "typical" one, what is its justification?

2. Answer the following questions and where possible relate your answers to Table 1.

a. What assumptions must be made to use regression analysis? Provide a brief description of each.

b. What do each of the following tell us?

Unstandardized regression coefficients

Standardized regression coefficients

Level of significance (p)

Coefficient of determination r squared)

c. Write a brief essay substantively interpreting this table.

3. For each of the following four sets of data:

Choose the measure of association you consider most appropriate
Choose a test of significance you consider most appropriate
Justify your choices

(*NOTE: YOU DO NOT HAVE TO CALCULATE THE MEASURES OR TESTS*).

C. For each of the following four sets of data:

1. choose the measure of association you consider most appropriate
2. choose a test of significance you consider most appropriate
3. justify your choices (*YOU DO NOT HAVE TO CALCULATE THE MEASURES OR TESTS)*

Fall 1994

A. Define and relate each of the following to one another as they apply to conducting a test of statistical significance (it must be shown how they relate to one another in order to correctly answer the question)

1. Research and null hypothesis
2. Simple random sample
3. Sampling distribution and standard error

4. Level of significance and critical region
5. One-tail and two-tail test
6. Type I and Type II error (be sure to address why we are concerned with these)

B. Choose TWO of the following:

1. Identify all the statistical techniques used in Table 1. What meaningful conclusions can be drawn from the data presented in Table 1?
2. Answer the following questions and where possible relate your answers to Table 2.

    a. What assumptions must be made to use regression analysis? Provide a brief description of each
    b. What do each of the following tell us?
        1. Unstandardized regression coefficients (b)
        2. Standardized regression coefficient (Beta)
        3. Level of significance (p)
        4. Coefficient of determination (r squared)

c. Write a brief essay substantively interpreting this table

3. Below are four examples of descriptions of samples used in research. Choose three of the following four examples. For each of the examples chosen, discuss the following as much as possible based on the factual information you are given:
    a. population
    b. sampling frame
    c. sampling units
    d. unit of analysis
    e. generalizability of results

Spring 94

A. Define and relate each of the following to one another as they apply to conducting a test of statistical significance.
1. Research and null hypothesis
2. Simple random sample
3. Sampling distribution and standard error
4. Level of significance and critical region
5. One-tail and two-tail test
6. Type I and Type II error

B. Choose one of the following:

1. Generate an appropriate table or chart with hypothetical data which would include variables at the following levels of measurement:
    a. nominal and nominal
    b. nominal and ordinal
    c. ordinal and ordinal
    d. ratio and ratio

For each of the four tables or charts do the following:

a. Provide an operation definition for each variable

b. Identify appropriate measures of association and test of significance and explain

c. Discuss the substantive relationships between the variables

OR

2. Choose four of the following pairs of terms. For each pair, define the terms and compare/contrast them, citing similarities and differences.

a. Zero order and partial correlations
b. Normal curve and central limit theorem
c. Measures of association and tests of significance
d. Descriptive and inferential statistics
e. Independent and related samples
f. Correlation and regression analysis

C. Choose one of the following:

1. Provided on the next page is a copy of Table 1. Answer the following questions and where possible relate your answers to the table.

   a. What assumptions must be made to use regression analysis? Provide a brief description of each.
   b. What do each of the following tell us:
      1. Unstandardized regression coefficients (b)
      2. Standardized regression coefficient (Beta)
      3. Level of significance (p)
      4. Coefficient of determination ® squared)

c. Write a brief essay substantively interpreting this table.

OR

2. What are the similarities and differences between the use of regression to conduct path analysis and structural equation modeling (LISREL)

Fall 1993

A. Define and relate each of the following to one another as they apply to conducting a test of statistical significance.

1. Research and null hypothesis
2. Simple random sample
3. Sampling distribution and standard error
4. Level of significance and critical region
5. One-tail and two-tail test
6. Type I and Type II error

B. Choose one of the following:

1. Describe the basic levels of measurement. Give an example of each type of measurement. What measure of central tendency and what measure of dispersion are appropriate for each.

2. Choose four of the following pairs of terms. For each pair, define the terms and compare/contrast them, citing similarities and differences.

   a. Zero order and partial correlations
   b. Normal curve and central limit theorem
   c. Measures of association and tests of significance
   d. Descriptive and inferential statistics
   e. Independent and related samples
   f. Correlation and regression analysis

C. Choose one of the following

1. Provided on the next page is a copy of Table 1. Answer the following questions and where possible relate your answers to the table.
   a. What assumptions must be made to use regression analysis? Provide a brief description of each.
   b. What do each of the following tell us:
      1. Unstandardized regression coefficients (b)
      2. Standardized regression coefficient (Beta)
      3. Level of significance (p)
      4. Coefficient of determination (r squared)

c. Write a brief essay substantively interpreting this table.

OR

2. Compare and contrast path analysis and LISREL.

Spring 1993

A. Define and relate each of the following to one another as they apply to conducting a test of statistical significance.
1. Research and null hypothesis
2. Simple random sample
3. Sampling distribution and standard error
4. Level of significance and critical region
5. One-tail and two-tail test
6. Type I and Type II error

B. Provided below is a copy of Table 1. Answer the following questions about this table. .

1. What assumptions must be made to use regression analysis? Provide a brief description of each.

2. What do each of the following tell us:
   a. Unstandardized regression coefficients (b)
   b. Standardized regression coefficient (Beta)
   c. Level of significance (p)
   d. Coefficient of determination (r squared)

3. Write a brief essay substantively interpreting this table.

C. Below are five tables presenting data from research journal articles.

Select four of the tables. For each, answer the following questions:

1. Identify the measures of association and/or tests of significance used. If you were to review an article containing this table, what comments would you make about the appropriateness of the statistical techniques used?
2. What meaningful substantive conclusions can you draw from this table?

Fall 1993

A. Define and relate each of the following to one another as they apply to conducting a test of statistical significance.

1. Research and null hypothesis

2. Simple random sample

3. Sampling distribution and standard error

4. Level of significance and critical region

5. One-tail and two-tail test

6. Type I and Type II error

B. Define and distinguish between each of the following:

1. Correlation and regression
2. Measure of association and test of significance
3. Non-parametric and parametric
4. Ordinal and interval level data
5. Reliability and validity in measurement

D. Attached is a copy of Table 1. Answer the following questions about this table.

1. What assumptions must be made to use regression analysis in the analysis of data? Provide a brief description of each.

2. What do the following tell us?
   a. Standardized regression coefficient (Beta)
   b. Level of significance (p)
   c. Coefficient of determination (r squared))

3. Write a brief essay substantively interpreting this table.