

**Marshall University Department of Sociology & Anthropology**  
**Spring 2015 Sample Comprehensive Exam Questions for Quantitative Methods (Sociology MA Program)**

1. Complete a principal components analysis (PCA) using twelve variables (identified below) from Dr. Martin Monto's 1996-1999 survey of male participants in "john" schools of the Western United States. Every subject had been arrested for propositioning an undercover female police officer for sexual services and, as an option for sentence reduction, opted into a diversion program designed to discourage repeat sex offense behavior. The dataset is used with permission from the National Archive of Criminal Justice Data. [Data and codebook available through ICPSR.]

Your goal is to use PCA to reduce the set of 12 variables into a few underlying factors. The items look at reasons why males (in the given population) solicit female street prostitutes. Even though items were measured using a Likert scale (1 = strongly disagree to 4 = strongly agree), treat their data's level of measurement as *near-interval*.

**SOCIAL** (subject has difficulty meeting women)

**UNATTRACTIVE** (subject perceives that most women find him unattractive)

**DIFFERENTSEX** (subject wants different kinds of sex)

**SHY** (subject feels shy and awkward with women in social relationships)

**PREFERPRO** (subject prefers prostitution to being in a relationship)

**EXCITED** (subject is excited by the process of approaching a prostitute),

**NOTIME** (subject does not have time for a relationship)

**NORESPONSIBILITY** (subject does not want the responsibilities that come with being in a relationship)

**MULTIPARTNERS** (subject likes having a variety of sexual partners)

**CONTROL** (subject likes to have control during sex)

**ROUGH** (subject likes rough sex)

**NASTY** (subject likes having sex with women who "get nasty")

a. Preparatory Steps

- i. Clean the data, paying close attention to the values of the responses.
- ii. Examine and report on the normality of the distribution.
- iii. Examine the  $n$  and discuss any issues related to missing data. Do you have an adequate sample size? Discuss in light of documented heuristics.

b. Analytic Steps

- i. What can you conclude about the data from KMO & Bartlett's Test as well as the Correlation Matrix?
- ii. Finally, taking into account any differences resulting from rotations, how many factors would you retain? Give each one a unique name and propose an explanation for how the original variables converged to create each category.

- c. Discuss the overarching purpose/goal of running a PCA. (In this case, *why* would you want to reduce the given variables into a few categories?)

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2. The Behavioral Risk Factor Surveillance System (BRFSS) is a telephone health survey cosponsored by the Centers for Disease Control and Prevention (CDC) and the Kentucky Department for Public Health. Using limited data (six variables only, listed below) from the 2009 Kentucky complete the following steps and answer all questions regarding binary logistic regression and path modeling.

[Data available on Graduate Program website.]

- a. Transform the data so they are in the required format before analyzing
  - MEDCOST → MEDCOST2, coded 1= yes, 0= no
  - HLTHPLAN → NOPLAN, a dummy indicating no healthcare plan
  - EDUCA → ED\_YRS, coded to show approximate years of education, rather than the ordered categories from 1 to 7
  - SEX → MALE, a dummy
  - EMPLOY → NOWORK, a dummy coded 1= not employed, 0= employed
  - INCOME2 → DOLLARS, coded to show approximate income in 1000s
- b. Use binary logistic regression to examine the effects on MEDCOST2 of the following independent variables:
  - NOPLAN
  - MALE
  - ED\_YRS
  - NOWORK
  - DOLLARS
- c. Does the model fit the data? Which variables are significant predictors of MEDCOST2? Discuss their effects on MEDCOST2 as revealed by  $\beta$  and  $\text{Exp}(\beta)$ .
- d. Place the variables in a path model—but do not actually estimate the path model. Instead, use the path model to assist you in giving an overall interpretation of how the five variables are or are not related to MEDCOST2. Feel free to treat some of the five predictors as endogenous variables in your path model. MEDCOST2 ought to be the last variable, of course, since your regression treated it as such.

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3. Read the program evaluation conducted by Marcell et al. and write a thorough critique of the quantitative methods of the study. [Article is available on Graduate Program website.]
  - a. Address the study design itself, the choice of variables (independent and dependent) both in terms of substance and measurement, reliability issues, validity and any potential threats, the results (descriptive statistics and the inferential statistical analyses), and the conclusions of the evaluation.
  - b. What was done well? In your opinion, what are some weaknesses of the study design and/or analysis? What would you have done differently? Be specific.
  - c. Compare and contrast this article to another scholarly article of your choice that quantitatively evaluates a similar<sup>1</sup> program.

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<sup>1</sup>“Similar” can be interpreted in a broad sense. You may select a program that addresses adolescents regarding some other area, a program that addresses proactive sexual protection behaviors in any given population, etc. Just make sure there is a common thread among the two programs evaluated by the articles to give you a basis for comparison.