DEPARTMENT OF POLITICAL SCIENCE
AND
INTERNATIONAL RELATIONS

Posc/Uapp 816

Assignment 7
STANDARDIZATION AND PARTIAL RELATIONSHIPS

Name______________________________
(Printed)
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(Social Security Number)
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The purpose of the questions in this assignment is to make sure everyone understands standardized variables and the concept of "statistical controls."

1. Here once again are the mobility and divorce data:

Region	Mobility rate	Divorce rate
New England	41	4.0
Middle Atlantic	37	3.4
East North Central	44	5.1
West North Central	46	4.6
South Atlantic	47	5.6
East South Central	44	6.0
West South Central	50	6.5
Mountain	57	7.6
Pacific	56	5.9

A. What is the estimated regression coefficient of divorce on mobility? ___________

B. What is the estimated regression constant? ______________

C. What is the estimate regression equation? _________________________________

D. What is the correlation coefficient between mobility and divorce rate?__________

E. What is R^2? ______________________

F. Now use MINITAB (or SPSS) to standardize mobility (X) and divorce rate (Y). Both the full and student versions have "calculating" procedures. In essence, you create new variables that are defined as

$$newX = (oldX - mean(oldX))/stand(oldX)$$

and

$$newY = (oldY - mean(oldY))/stand(oldY)$$

i. Where "newX" and "newY" are **names** or **column numbers** and "oldX" and "oldY" are **names** or **column numbers** of the original variables.

ii. "mean(oldX)" and "mean(oldY)" are functions that calculate the means of the data in columns old X and old Y. These are MINITAB functions that you can apply to columns of data.

iii. The same is true for "stand." It computes the standard deviations of the data in the old X and Y columns.

iv. Note that the right and left parentheses must match: for each left parenthesis there must be a "closing" right parenthesis.

v. Note that the numerator is divided by the standard deviation; don't divide just one term in the numerator. Make sure that you use parentheses to show the precedence and order of calculations.

vi. A simple procedure is to just type the commands in the **session** window at the MINITAB prompt (mtb>). Example, suppose the raw data are stored in columns labeled **mobile** and **divorce**. You could type:

```
mtb>let newmob = (mobile - mean(mobile))/stand(mobile)
mtb>let newdiv = (divorce - mean(divorce))/stand(divorce)
```

vii. These two commands create two new variables that are "standardized" versions of the old ones. **Note the "let" in each.**

viii. But of course you can use the menu calculators to do the same thing.

G. Now regress the transformed divorce rate. on the transformed mobility.

i. What is the estimated regression coefficient?______________

ii. Interpret it.

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iii. What is the estimated regression constant? _______________

iv. Write the estimated model be written? ___________________________

v. What is the correlation coefficient? _____________________

2. This question is based on Agresti and Finlay, Statistical Methods in the Social Sciences, 3rd edition, page 374. It gives an excellent illustration of an important concept in applied statistics, namely the distinction between total bivariate and partial (controlled) relationships. Note, that by setting up the table I have done most of the work.

A. Here's what the author write: "In murder trials in 20 Florida counties during 1976 and 1977, the death penalty was given in 19 out of 151 cases in which a white killed a white, in 0 out of 9 cases in which a white killed a black, in 11 out of 63 cases in which a black killed a white, and in 6 out of 103 cases in which a black killed a white. (M. Radelet, American Sociological Review, Vol. 46, 1981, pp. 918-927.)" (page 374)

Defendant's race				
	White		Black	
	Victim's race		Victim's race	
Death penalty?	White	Black	White	Black
Yes				
No				

B. Fill in the entries in this partial table that shows the relationship between death penalty and victim's race controlling for defendant's race.

C. Using the odds ratio describe the association between defendant's race and the death penalty verdict, controlling for victim's race. Is there an association?

D. Explain.

E. Now construct in the space below **a neatly** labeled “bivariate” (2 X 2) table between defendant’s race and the death penalty, ignoring the victim’s race.

F. Describe the association between the two variables and compare this association to the one obtained in the partial table above. That is, what is the relationship between death penalty and defendant’s race? You **can** use chi square as well as the odds ratio to make your points.

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