

POS 3713 Fall 1999  
Homework #5  
Review problems for final exam

1. Several scholars in political science have examined the question of whether people align their issue beliefs along an ideological continuum. That is, do people who consider themselves to be conservative also have issue beliefs that can be characterized as conservative? Is the same true of liberals and moderates? To test this relationship, a random sample of 180 people was collected. A measure of issue ideology was created by counting the number of liberal positions taken on 5 issue stands (balanced budget, abortion rights, prayer in schools, affirmative action, restricting rights for the environment). The cross-tabulation of ideology and issue stands is presented below.

ISSUE STANDS	IDEOLOGY			Total
	Conservative	Moderate	Liberal	
Conservative	30	12	2	44
Moderate	26	59	20	105
Liberal	1	11	19	31
Total	57	82	41	180

Kendall's Tau-b = .49256

- Calculate Gamma for the data above. What does Gamma tell us about the relationship between ideology and issue stands, i.e., how do you interpret your results?
  - Conduct a statistical hypothesis test for the value of Gamma calculated in (a). State the null and alternative hypotheses. The critical Z value for a 95% level of confidence ( $\alpha = .05$ ) is +/- 1.96. What can you conclude about the relationship between ideology and issue stands based on this result?
  - What does the reported Kendall's Tau-b value tell you about the relationship between ideology and issue stands? Is this consistent with what you found in (a) and (b)?
2. Does the American electorate really have a tendency, as is sometimes alleged, to vote for physically attractive candidates regardless of competence? A random sample of adult voters were shown photographs of a physically attractive male or an unattractive male and asked if the individual pictured "seems like he would be a competent elected official". The results are presented below. The calculated  $\chi^2$  (chi-square) = 1.069. Is there an association between attractiveness and electability? Calculate  $\phi$  (phi) and interpret your results. Conduct a  $\chi^2$  test for independence. State the null and alternative hypotheses. Assume a 95% level of confidence, i.e.,  $\alpha = .05$ .

Would he be competent?	Attractiveness		Total
	Attractive	Unattractive	
Yes	15	12	27
No	17	15	32
Can't say	18	23	41
Total	50	50	100

3. Dr. Guns is interested in explaining why countries spend money on military arms. He believes that a country's level of arms expenditures is a function of the level of threat a nation faces from its primary enemy. He argues that the relationship between external threat and the level of military expenditures is positive, i.e., as the level of threat increases, the level of arms expenditures will increase. To test his theory, Dr. Guns collects data on US arms expenditures from 1950-1985 (measured in thousands of U.S. dollars). He measures the level of threat faced by the US as the level of USSR arms expenditures per year (measured in thousands of U.S. dollars). The results of his regression analysis are presented below.

Model:  $Y = a + bX$ ; US Arms = Constant +  $b$ \*USSR Arms

Variable	Estimated Coefficient	Standard Error	$t = b/s.e.$
Constant	76215.91	12043.95	6.328
USSR Arms Expenditures	0.762	0.118	6.466

$R^2 = 0.551$

- Write down the appropriate null and alternative hypotheses for Dr. Guns' model. Do the results support Dr. Guns' theory (Conduct a t-test for the USSR Arms variable)?
- What is the substantive impact of threat (USSR arms) on US arms spending? In other words, for every additional 1000 dollars (1 unit) the USSR spends on its military, how much does the U.S. spend in response to this threat?
- What does the reported  $R^2$  tell you about the overall fit of Dr. Guns' model? Does his model do a good job in explaining U.S. arms expenditures?