

**Working with Probability**

The purpose of this assignment is to give you experience with the mechanics of probabilities and with applying probability to different types of management and policy questions.

**Part I**

Complete exercises: 3.50 (binge drinking), 3.55 (civil trials), 3.82 (HS graduation).

**Part II**

Use the Washington State Population data to create a cross tabulation for two categorical variables with ANALYZE/ DESCRIPTIVE STATISTICS/ CROSSTABS.

To get row and column percentages go into "Cells" and check off row and column percentages then click on CONTINUE. [You can also try: ANALYZE / TABLES / BASIC TABLES/ With row and col % under "statistics".] Run by clicking on OK

Write a brief description of the results (about ½ page) including an interpretation of the row and column percentages. *Which set of probabilities are most useful for your variables? Who is included in your table? [Hint: look at the data dictionary "universe" and the total n for your questions.]*

**Part III**

The poverty rate is the proportion of people living in families with incomes less than a defined "poverty threshold." On the next page is a chart showing poverty rates for various groups in the U.S. and the proportion of the U.S. population made up by each group. The data come from the U.S. Census bureau for 2007 and 1993. The poverty threshold is based upon money income and varies by family size and composition. The average poverty threshold varied in 2007 from \$10,590 for a person living alone to \$42,739 for a family of nine or more. Use the chart, your knowledge of probability, and your common sense to answer the following questions. Please show your work.

1. What was the overall poverty rate for the nation in 1993 and in 2007? (Clue: what is the probability of living in poverty in 1993 and 2007?)
2. Just eyeballing the table, what might have contributed to the changes in the poverty rates between the two years?
3. Draw a Venn diagram of poverty, race, and Hispanic origin. Is poverty statistically independent of race? What is your statistical evidence?
4. In a recent speech, an activist said that half the persons in poverty were children. Restate the claim in terms of probabilities and evaluate the claim for 2007. Why might this probability change over time? [*Think about stocks and flows.*]
5. Labor market policies such as job training, job search seminars, and work expense subsidies are often used as anti-poverty policies. This type of policy is generally not considered to be appropriate for people under 18 or over 65. What is the probability

that a poor person could use these programs in 2007 and 1993? How effective do you think these strategies could be in lowering the overall poverty rate?

### US. Poverty Rates for Persons with Selected Characteristics, 1993 and 2007

(Source: U.S. Census Bureau )

Group	2007		1993	
	Poverty Rate	% of Population	Poverty Rate	% of Population
<b>Race/Ethnicity**</b>				
White	10.5	80.1	12.2	84
Black	24.5	12.6	33.1	12
Asian/Pacific Islander	10.2	4.4		
Other races/Multiracial*	18.2	2.9	18.8	4
Hispanic (of any race)	21.5	15.4	30.7	11
*In 1993 includes Asian/PI; In 2007 includes all multiracial individuals				
<b>Age</b>				
<18	18.0	24.8	22.7	26
18 to 64	10.9	62.9	12.3	62
>64	9.7	12.3	12.2	12
<b>Residence</b>				
Inside metropolitan areas	11.9	84.0		
Inside principal cities	16.5	32.4	21.5	29
Outside principal cities	9.0	51.7	10.3	48
Outside metropolitan areas	15.4	16.0	17.2	23
<b>Region</b>				
Northeast	11.4	18.1	13.3	21
Midwest	11.1	21.9	13.4	25
South	14.2	36.7	17.1	34
West	12.0	23.4	15.6	20
<b>Nativity</b>				
Native born	11.9	87.5	14.4	91.3
Foreign born	16.5	12.5	23.0	8.7
Naturalized citizen	9.5	5.0	10.1	2.7
Not a citizen	21.3	7.4	28.7	6.0

\*\*Note: Beginning in 2000 the survey allowed respondents to choose more than one race. The categories shown here indicate people who chose only one race. People choosing more than one race are included in the "other/multiracial" category for 2007.