

Working with Probability

The purpose of this assignment is to give you some experience both the mechanics of working with probabilities and with applying probability to different types of management and policy questions. We recommend you do Part I as you go through the chapter learning the concepts.

Part I

Complete Exercises 3.18, 3.32, 3.46, 3.67, 3.80

Part II

Use the Washington State Population data to create a cross tabulation for two categorical variables with ANALYZE / CUSTOM TABLES/ BASIC TABLES—STATISTICS (row% and column%) or ANALYZE / DESCRIPTIVE STATISTICS / CROSSTABS. In either case, you have to put the appropriate row and column variables in the appropriate boxes in the variable pane. Write a brief description of the results (about ½ page) including an interpretation of the row and column percentages.

Part III

The poverty rate is the proportion of people living in families with incomes less than a defined “poverty threshold.” On page two 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 2003 and 1993. The poverty threshold is based upon money income and varies by family size and composition. The average poverty threshold varied in 2003 from \$9,393 for a person living alone to \$40,948 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 2003? (Clue: what is the probability of living in poverty in 1993 and 2003?)
2. Draw a Venn diagram of poverty, race, and Hispanic origin. Is poverty statistically independent of race? What is your statistical evidence?
3. 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 2003. Why might this probability change over time?
4. Labor market policies such as job training, job search seminars, and childcare 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 2003 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 2003

(source: U.S. Census Bureau Current Population Surveys)

Group	2003		1993	
	Poverty Rate	% of Population	Poverty Rate	% of Population
Race/Ethnicity**				
White	10.5	81	12.2	84
Black	24.4	13	33.1	12
Asian/PI	11.8	4		
Other races/Multiracial*	17.9	3	18.8	4
Hispanic (of any race)	22.5	14	30.7	11
*In 1993 includes Asian/PI; In 2003 includes all multiracial individuals				
Age				
<18	17.6	25	22.7	26
18 to 24	16.5	10		
25 to 34	12.8	14		
35 to 44	9.6	15		
45 to 54	7.6	14		
55 to 59	8.2	6		
60 to 64	9.7	4		
****18 to 64	10.8	63	12.3	62
>64	10.2	12	12.2	12
Residence				
Metropolitan Areas	11.6	82		
***Central Cities	16.7	29	21.5	29
***Outside Central Cities	8.9	53	10.3	48
Outside Metropolitan Area	14.2	19	17.2	23
Region				
Northeast	10.9	19	13.3	21
Midwest	10.3	23	13.4	25
South	13.8	36	17.1	34
West	12.4	23	15.6	20

**Note: Beginning in 2003 the CPS 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 2003.