BUS 230: Business and Economics Research and Communication
Instructor: Dr. James Murray
Practice Exam 2
Fall 2013

HYPOTHESIS TESTING: Conduct each of the hypothesis tests below. Remember for each hypothesis test to state the null and alternative hypotheses, report the p-value, report your rejection decision, and state your research conclusion in plain English (8 points each).

1. (14 points) A researcher is interested in determining whether there is a relationship between grade school children's interests and the class standing. The researcher asked 478 grade school children whether being good at sports, being popular, or getting good grades was their most important goal. Class standing is 1st grade, 2nd grade, 3rd grade, 4th grade, and 5th grade. Use the SPSS output below to test the hypothesis that there is a relationship between these two variables.

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Goals * Grades	478	100.0%	0	.0%	478	100.0%

Goals * Grades Crosstabulation

Count

		Grades				Total
		1	2	3	4	
Goals	1	10	24	33	23	90
	2	14	33	45	49	141
	3	70	66	55	56	247
Total		94	123	133	128	478

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	31.090[a]	6	.000
Likelihood Ratio	31.836	6	.000
N of Valid Cases	478		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 17.70.

2. (14 points) A researcher is interested in whether there is a difference in the unemployment rate of men ages 14-24 (Variable U1 is number of unemployed men aged 14-24 per 1000 men in the age group) and men ages 34-39 (Variable U2 is the number of unemployed men aged 35-39 per 1000 men in the age group). In 1960, the researcher collected data on the unemployment rate of men in these age groups for 47 U.S. states. Use the SPSS output below to test the hypothesis that there is a difference in the unemployment rate for these two groups.

T-Test

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	U1	95.47	47	18.029	2.630
	U2	33.98	47	8.445	1.232

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	U1 & U2	47	.746	.000

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	U1 - U2	61.489	13.008	1.897	57.670	65.309	32.407	46	.000

3. (14 points) A researcher is interested in determining whether there is a relationship between income inequality and crime rate. In 1960, researchers collected data on crime rate and income inequality for 47 U.S. states. The researcher estimates a Pearson Correlation Coefficient on crime rate and income inequality. Use the output from SPSS given below to test the hypothesis that there is a relationship between crime and income inequality.

Correlations

Correlations

		R	X
R	Pearson Correlation	1	-.179
	Sig. (2-tailed)		.229
	N	47	47
X	Pearson Correlation	-.179	1
	Sig. (2-tailed)	.229	
	N	47	47

4. (14 points) Data was collected from a sample of men in a study to determine factors related to the incidence of coronary heart disease. The variables considered were **CGT58** (The number of cigarettes smoked per day in 1958) and **CHD** (Incidence of Coronary Heart Disease), which had possible responses of either CHD (had incident of coronary heart disease) or None (no incident of coronary heart disease). The statistical test below was run using SPSS.

Group Statistics

	chd Incidence of Coronary Heart Disease	N	Mean	Std. Deviation	Std. Error Mean
cgt58 No of Cigarettes per Day in 1958	1 chd	120	13.53	12.070	1.102
	0 none	119	9.62	12.184	1.117

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
										95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference		Lower	Upper
cgt58 No of Cigarettes per Day in 1958	Equal variances assumed	.004	.950	2.488	237	.014	3.903	1.569		.812	6.994
	Equal variances not assumed			2.488	236.926	.014	3.903	1.569		.812	6.994

Test the hypothesis that there is a relationship between smoking and incidence of coronary heart disease (8 points).

5. Suppose you are interested in determining whether there is a relationship between academic performance (as measured by grade point average) and the number of times students attend office hours per semester. It is known that neither of these variables have a population that is normally distributed. You collect data on GPA and office hours attendance (number of visits) for 22 college students.

   (a) (5 points) What statistical test should you use the test the hypothesis?

   (b) (5 points) What is the null and alternative hypothesis are you testing?

6. Suppose an airline surveys its customers and measures their level of customer satisfaction on the following scale,

- Very satisfied
- Satisfied
- Unsatisfied
- Very unsatisfied

The airline is interested in whether there is a difference in average level of satisfaction between its vacation travelers and business travelers.

   (a) (5 points) What statistical test should you use the test the hypothesis?

   (b) (5 points) What is the null and alternative hypothesis are you testing?

7. Suppose an airline is interested in whether the average price paid for airline tickets is different for business travelers versus vacation travelers.

   (a) (5 points) What statistical test should you use the test the hypothesis?

   (b) (5 points) What is the null and alternative hypothesis are you testing?

8. Think about a specific question from your research project that you can answer definitely with a single statistical test.

   (a) (4 points) Describe the research question.

   (b) (5 points) Describe the variable(s) that you will use to answer the research question.

   (c) (5 points) What statistical test should you use the test the hypothesis?