**POLS 095**

**Methods in Politics**

**Spring 2022  
Dr. Gregory J. Wolf**

**Homework 4: Bivariate Hypothesis Testing**

**NOTE: It is highly recommend that you read Chapter 8 thoroughly and reference it as you work on the questions. Please show how you get to your responses, as it may allow us more latitude to offer partial credit even if the final answer is incorrect. This homework is work a total of 345 points; your score on the homework is recorded as the percent of points out of 345 you earn.**

***Part I: Conceptual Questions (85 pts. total)***

1. A civics education organization wants to know whether Americans know enough about the U.S. Constitution. To gauge how much American adults know about the U.S. Constitution, the organization gives a 10-question quiz to a random sample of 1,788 American adults. According to the organization, the benchmark is getting 6.5 or more questions correct (i.e. if someone gets 6.5 or more correct, they are deemed to have enough information about the U.S. Constitution). The mean score on the quiz is 6.83. The standard deviation of quiz scores is 3.35 correct answers.
2. Calculate and write down the 95% CIs for the mean number of correct answers on the quiz. Based on your analysis, can the organization be 95% confident that Americans exceed the benchmark? Explain your answer. [25 pts.]
3. Suppose that a group of U.S. election reformers argues that switching to a system based on proportional representation (PR) would significantly increase voter turnout. Skeptics claim that the reform would not have a significant effect on turnout. The following table, which reports mean turnouts and accompanying standard errors for PR and non-PR countries, will help you determine which side – the reformers or the skeptics – is more correct.

|  |  |  |
| --- | --- | --- |
| Electoral System | Mean Turnout | Standard Error |
| PR | 69.5 | 1.9 |
| Non-PR | 61.2 | 1.7 |

1. State the null hypothesis for the relationship between type of electoral system (PR or non-PR) and turnout. [5 pts.]
2. (i) Calculate and write down the 95% CIs for turnouts in PR and non-PR countries. [20 pts.]

(ii) Based on a comparison of the 95% CIs, should the null hypothesis be rejected or not be rejected? [15 pts.]

(iii) Explain how you know. [20 pts.]

***Part II: R Questions (260 pts. total)***

For this section, use the ANES to better understand two different types of relationships: (1) relationships between two categorical variables and (2) relationship between a categorical variable and interval variable. First, Use the ANES to better understand who holds the two different opinions about voter id laws (V201357). Examine the relationships between support for voter id laws and sex (V201600) and union membership (V201544). Second assess the relationships between feeling thermometer scores for Dr. Anthony Fauci (V202158) and the FBI (V202181) by passport status (V201590).

Chapter 8 of the R Companion, which we worked on in class, will aid you in completing this section of the homework.

*Part A: Opening and cleaning the data (120 pts.)*

* 1. Open the ANES data.
  2. Select the data including only the variables of interest that you need (V201357, V201600, V201544, V202158, V202181, and V201590).
  3. Using the ANES codebook as a guide, clean the variables so they have clear variable names, category labels, and missing value coding.
  4. Compute the appropriate descriptive statistics to examine the relationships between the voter id variable and sex, marital status, union membership, the Fauci feeling thermometer, the FBI feeling thermometer, and passport status.

*Part B: Chi-square tests (50 pts.)*

* 1. Test whether or not there is a relationship between opinion on voter id laws by sex and union membership.
  2. Write up a brief summary of the results that explain the relationship between (1) attitudes about voter id by sex and (2) attitudes about voter id by union membership.

*Part C: Difference of means tests (90 pts.)*

* 1. Use graphics and create a boxplot to examine the thermometer for Dr. Fauci on its own and by passport status.
  2. Use graphics and create a boxplot to examine the thermometer for the FBI on its own.
  3. Based on the graphs from Questions 7 and 8, make predictions about what you would find when you compare thermometer scores by passport status.
  4. Conduct a difference of means test compare Fauci thermometer for those with and without passports, then interpret your results using the test statistics and p-value along with a graph showing the two groups.
  5. Conduct a difference of means test compare the means of thermometers for Fauci and the FBI, then interpret your results using the test statistics and p-value.