**308A DA5: Chi-Square**

1. What challenges arise when interpreting or drawing conclusions from a chi-square goodness of fit test conducted on categorical data with unequal sample sizes in each category?

**Please solve questions 2-5 by hand:**

1. In July 2008, an NBC News poll asked a sample of Americans to state which issue (taken from a list) should be the top priority for the U.S. federal government. The following table lists the top three priorities cited most frequently according to those listed at PollingReport.com. Do Americans differ in their assessment of top issues?

|  | **Economic Growth** | **Energy** | **The War in Iraq** |  |
| --- | --- | --- | --- | --- |
|  | 231 | 201 | 161 |  |

1. A professor tests whether the loudness of noise during an exam (low, medium, high) is independent of exam grades (pass, fail). The following table shows the observed frequencies for this test.

|  | | **Noise Level** | | |  |
| --- | --- | --- | --- | --- | --- |
| **Low** | **Medium** | **High** |  |
| **Exam** | **Pass** | 20 | 18 | 8 |  |
| **Fail** | 8 | 6 | 10 |  |
|  |  |  |  |  |  |

* 1. Is there a relationship between noise level and performance on the exam?
  2. Compute AND interpret the appropriate effect size.

4. The Better Business Bureau (BBB) wants to determine whether a certain business is engaging in fair hiring practices. The BBB finds that a local business employs 66 men and 34 women. The general population of workers in this industry is 60% men and 40% women. Using a chi-square goodness-of-fit test, decide to retain or reject the null hypothesis that the distribution of men and women in the local business is consistent with, or proportional to, that in the general population of workers. Use a .05 level of significance.

5. A researcher tests whether the political affiliation of individuals is related to or independent of whether they have positive views of the economy. The researcher records the political affiliations and economic viewpoints of 105 participants. The following table lists the observed frequencies for this study.

|  | | **View of the Economy** | |
| --- | --- | --- | --- |
| Positive | Negative |
| **Political Affiliation** | Democrat | 35 | 32 |
| Republican | 20 | 18 |

1. Test the hypothesis that political affiliation and view of the economy are related.
2. Compute AND interpret the appropriate effect size

**The following prompts are for you to analyze in RStudio:**

A set of researchers from a marketing company conducted a survey to investigate reading habits of Americans (this is a real dataset). Although a study has been published on this already, it may be interesting to investigate it further in order to understand the relationships between certain demographic variables of their sampled readers, including sex, employment, marital status, race, and age.

Using the DA5a.csv dataset, answer questions 6-8:

6. Is there a significant relationship between sex and employment among the surveyed readers? If so, what specific employment categories show the most discrepancy between observed and expected values? Provide the relevant statistics per APA 7th edition.

7. Is there a significant relationship between sex and education in the surveyed population? Report the observed associations, as well as any notable discrepancies between observed and expected values. Ensure to present the statistical details following APA 7th edition guidelines.

8. In the analysis of sex and education, what is the strength of the association between the variables? Additionally, discuss any limitations of the analysis and suggest alternative measures that could provide further insights into the relationship between sex and education.

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9.

1. The purpose of 𝜒2 goodness of fit test is to test how well our **\_\_\_\_\_** frequencies in our sample FIT the frequencies we **\_\_\_\_\_.**
2. Your 7 year old niece is interested in what you are learning at school– how would you explain to her what a goodness of fit test does?

10.

1. The chi-square test for independence has how many categorical variables?
2. How many levels can each categorical variable have?