Lesson 14: Inference for Several Means (ANOVA)

Preparation

Directions: Please fill in Part I as you study the Reading Assignment. Once you finish the reading, complete the questions on Part II. You may use your notes, the key, and the help videos. Be sure to take this completed assignment to your group meeting where you can ask and help answer questions on this assignment.

Problems

Part I: Use the information in the reading assignment to complete these questions.

1. What are the null and alternative hypotheses for ANOVA?

2. For one of the assumptions for ANOVA, what is the rule for examining the variance of each of the samples?

3. What are the differences between the test of hypothesis for ANOVA and the other tests of hypothesis that we have covered to this point of the class (open-ended)?

Part II:

ANOVA–According to William Butler Yeats, "She is the Gaelic muse, for she gives inspiration to those she persecutes. The Gaelic poets die young, for she is restless, and will not let them remain long on earth." One study designed to investigate this issue examined the age of death for writers from different cultures and genders. Three categories of writers examined were novelists, poets, and nonfiction writers. The ages at death for female writers in these categories from North America are given in the womenpoet.xls / womenpoet.sav data. You would like to determine if the mean age at death is different from any of the categories of writers. Use $\alpha = 0.05$ as a level of significance

1. **Design the Study:**

    a. What is the research question?
    b. State the null and alternative hypothesis.

2. **Collect the Data**:

    a. Describe the data collection procedures.

3. **Describe the Data**:

    a. In a short paragraph use summary statistics to describe the data. After the paragraph insert an appropriate and well labeled graph to illustrate the data.

4. **Make Inferences:**

    a. What type of hypothesis test is appropriate?

b. What are the requirements for this test?

c. Are the requirements met for this test? Explain (this will require plots and simple calculations).

d. Compute the test statistic.

e. State the degrees of Freedom.

f. Compute the P-value and compare it to the alpha level.

g. Make a decision. Do you reject the null hypothesis or fail to reject it?

h. Present your conclusions in the form of an English statement.

5. **Take Action:** With further study we find the poets die earlier than the novelist and non-fiction writers. What significance can you conclude from this?

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## `geom_smooth()` using formula 'y ~ x'
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