

STAT200 Introduction to Statistics

Assignment #3: Inferential Statistics Analysis and Writeup

Purpose:

The purpose of this assignment is to develop and carry out an inferential statistics analysis plan and write up the findings. There are two main parts to this assignment:

- Part A: Inferential Statistics Data Plan and Analysis
- Part B: Write up of Results

Part A: Prepare Data Plan, Analyze Data, and Complete Part A of the Assignment #3 Template

- **Task 1: Select Variables.** Review the variables you used for assignments #1 and #2. Select your qualitative socioeconomic variable as your grouping variable and the two expenditure variables from the variables used in these previous assignments. Fill in **Table 1: Variables Selected for Analysis** with name, description, and type of variable (i.e., qualitative or quantitative).
- **Task 2: Select and Run a One Sample Confidence Interval Analysis.** For one expenditure variable, select and run the appropriate method for estimating a parameter, based on a statistic (i.e., confidence interval method). Complete **Table 2: Confidence Interval Information and Results**, which follows the format outlined by Kozak and the course's problem-solving approach, including:
 - Random variable stated in words
 - Confidence interval method, including rationale and assumptions
 - Method used for analyzing data (i.e., web applets, Excel, TI calculator, etc.).
 - Results obtained
 - Interpretation
- **Task 3: Select Two Sample Hypothesis Test.** Using the second expenditure variable (with the socioeconomic variable as the grouping variable), select and run the appropriate method for making decisions about two parameters relative to observed statistics (i.e., two sample

hypothesis test method). Complete **Table 3: Two Sample Hypothesis Test Analysis**, which follows the format outlined by Kozak and the course's problem-solving approach, including:

- Hypotheses (null and alternative).
- Two sample hypothesis testing method, including rationale and assumptions
- Method used for analyzing data (i.e., web applets, Excel, TI calculator, etc.).
- Results obtained.
- Interpretation (i.e., Reject the null hypothesis OR Fail to reject null hypothesis)

Step 2: Write Up Results and Complete Part B of the Assignment #3 Template

For this 1 to 2 page section, refer to the inferential statistics data plan and computations done for Part A of this assignment. Address the following area:

- **Introduction.** Based on the scenario you submitted for the second assignment, provide a brief description of scenario, including the variables that were used in this analysis. Include a completed “**Table 1: Variables Selected for Analysis** to show the variables you selected for analysis.
- **Data Set Description and Method Used for Analysis.** Briefly describe the data set, using information provided with data set and write up in Assignment #2. Also describe what method(s) (i.e., free web applets, Excel, TI Calculator) you used to analyze the data.
- **Results.** In this section, you will report the results of your inferential statistics data analysis.

For the **Confidence Interval Analysis**, write one paragraph that includes:

- **Statistical method used**, including rationale and whether assumptions were met.
- **Statistical Interpretation.** The statistical interpretation is that the confidence interval has a probability ($1-\alpha$, where α is the complement of the confidence level) of containing the population parameter.
- **Real World Interpretation.** Explain the results in everyday language. *Recommend reviewing the text and information from the classroom for examples on how to report results in everyday language.*

For the **Two Sample Hypothesis Test Analysis**, write one paragraph that includes:

- **Hypotheses that were assessed.** See below table for example format:

Examples Format for Writing Null and Alternative Hypotheses, in Words
Null Hypothesis: <i>There is no significant difference in [insert variable name] between [insert group 1 name] and [insert group 2 name] households.</i>
Alternative Hypothesis: <ul style="list-style-type: none">➤ For two-tailed (\neq): <i>There is a significant difference in [insert variable name] between [insert group 1 name] and [insert group 2 name] households.</i>➤ For one-tailed ($>$): <i>[Insert group 1 name] has statistically significantly higher [insert variable name] than [insert group 2 name].</i>➤ For one-tailed ($<$): <i>[Insert group 1 name] has statistically significantly lower [insert variable name] than [insert group 2 name].</i>

- **Statistical method used**, including rationale and whether assumptions were met. See below table for example format:

Example Format for Writing Statistical Method with Rationale
<i>To determine whether there was a difference in [insert household expenditure] between [insert names of two groups], a [insert name of hypothesis test used] was used. It was the appropriate statistical method, because [insert rationale]. The assumptions were assessed [insert information about the assumptions assessed and whether they were met].</i>

- **Conclusion from the Results.** This is where you state whether to reject H_0 or fail to reject H_0 including the p-value that was obtained. The rule is: if the p-value $< \alpha$, then reject H_0 . If the p-value $\geq \alpha$, then fail to reject H_0 .

- **Real World Interpretation.** Explain, in everyday language, the results. If any of the assumptions were not met, describe how it might affect conclusions. Address issues of Type I and/or Type II Error, where appropriate. *Recommend reviewing the text and information from the classroom for examples on how to report results in everyday language.*
- **Discussion–** Write one paragraph that summarizes the results of your findings and how they may be helpful to the person described in the scenario, when making a household budget.

Assignment Submission: Name the file that contains your **completed Assignment #3 Inferential Statistics Analysis - Template** using the following format: “Assignment3-StudentLastName.” Submit it via the Assignments area in the LEO classroom in the “Assignment #3: Inferential Statistics Analysis and Writeup” folder.

Grading Rubric for Assignment #3

Part A: Prepare Data Plan, Analyze Data, and Complete Part A of the Template	
Selection of variables and completion of table	10%
Selection and Calculation of Confidence Interval Analysis: <ul style="list-style-type: none"> ● Selection of Appropriate Test and Rationale ● Assumptions ● Method Used and Calculation ● Conclusion ● Statistical Interpretation 	20%
Selection and Calculation of Two Sample Hypothesis Test: <ul style="list-style-type: none"> ● Research Question and Hypotheses ● Selection of Appropriate Test and Rationale ● Assumptions ● Method Used and Calculation ● Conclusion, including p-value ● Statistical Interpretation 	20%
Part B: Write Up of Results	
Introduction and Description of Data Set	5%

Confidence Interval. Summarized: <ul style="list-style-type: none"> • Statistical method used, including rationale and whether assumptions were met • Statistical Interpretation • Real World Interpretation. 	15%
Two Sample Hypothesis Test. Summarized: <ul style="list-style-type: none"> • Hypotheses • Statistical method used, including rationale and whether assumptions were met. • Conclusion from the Results. • Real World Interpretation. 	15%
Discussion	5%
Wrote clearly, concisely, and with few errors. Easy to understand.	10%