



**BALL STATE**  
**UNIVERSITY**

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# **Practical Assignment IV**

## **Analysis of Variance**

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## 1 Pre-assignment Reminders

- Prior to attempting this homework, I strongly recommend that you have completed all other work through module 13, including:
  - Likely the most useful resource will be the video I specifically record for this assignment (near the assignment portal on Canvas)
  - Having watched all lectures thoroughly and taken notes (optionally with the guided notes)
  - Reading all assigned sections of the book, and completing practice examples as helpful and useful
  - Completing relevant lecture check-ins, and using answer key for review
  - Completing all quizzes, and reviewing correct answers at the end of the week
- This practical assignment will be graded for accuracy, please give yourself enough time to complete your best work
  - You may use your notes, book, SPSS software, provided data, and lectures to aid you in completing this
  - Where possible, **include more detail** to ensure you fully explain your rationale for a question
  - You should **include ALL relevant SPSS output to support your work**, please make clear where in the output you get your answers from
- This practical assignment is cumulative to the modules and practical assignment(s) prior, please review your previous work and notes to help you accomplish this work
  - You may need to use prior walk-through videos for data preparation steps
- All syllabus and university policies on academic integrity, plagiarism, and other forms of misconduct apply to this assignment. Please review them if you are unfamiliar

## 2 Context

*The following information will be useful for answer some questions on the homework, please ensure you read and understand the following context*

### Important

This last practical assignment was inspired by the work of my cinnamon role of a partner, Marian, who works as a community health worker and helps people find ways to help their families during this holiday season. Don't lose sight of the important human side of the work we do!

You have been contracted by a public health non-profit to help work a study on increasing resource knowledge among families with children in the area. Specifically, they want to analyze information that helps better understand resource utilization like use of libraries, food banks, shelters, and free school supports. They also would like to know how families

donate or give to the community as well.

The organization has gathered the following data on families in the area:

- Their annual household gross income (in dollars)
- The number of children they have
- The rough annual amount that they donate to organizations in the area (in dollars)
- Average amount of time spent volunteering annually (in hours)
- Distance to the nearest community resource center (in miles)
- Whether they live in District A, B, or C
- Whether or not they report going to food banks
- Whether or not they report going to the library
- Whether or not they report being below the poverty line

Your job is to use the information from this data to do some preliminary analyses that *you* think will be interesting for informing the mission of the understanding the community's interaction with resources.

Please use the provided dataset on Canvas, health\_data.sav, to complete this assignment.

### 3 Instructions

*Please double-check you have provided all necessary detail to **every** question below. Remember that, when in doubt, I want more detail, rather than less!*

This practical assignment will be more “choose-your-own-adventure” than the prior ones - please get creative and do the analyses you are interested in and can explain!

Effectively, you will be setting up 3 analyses that you will prepare, explain, conduct, and interpret, as part of this practical assignment. Your 3 analyses do not necessarily need to be related to one another, but all should be derived from the provided dataset and [Context](#) above.

Please try to stay organized in your write-up so I can tell where each part is!

#### 3.1 Knowledge Checks (5 pts)

1. (1pt) Please identify *three* (3) inferential tests you'd like to use on the above data. However, at least *one* (1) must be from the last *four* (4) on this list. You may choose from the following:
  - One-sample z-test
  - One-sample t-test
  - Independent-samples t-test
  - Paired/dependent-samples t-test
  - $\chi^2$  goodness-of-fit test

- $\chi^2$  test of independence
  - Simple linear regression (i.e., one predictor, one criterion variable)
  - One-way ANOVA
2. (1pt) For *each* of the *three* (3) tests you choose, identify what variables from the dataset you will use and in what way. You do not need to use every variable. Make sure you justify why each variable is appropriate to be used in the test, i.e., how is its scale of measurement appropriate. Identify whether each variable involved is categorical, numeric-discrete, or numeric-continuous.
  3. (3pts) For *each* of the *three* (3) tests above, use your variables and write out what the null and alternative hypothesis will be for each one. Be mindful of how different tests require you set up the null and alternative hypotheses differently.

### 3.2 SPSS Applied Work (15 pts)

*For each of the following questions, please provide any and all relevant SPSS output (or syntax when indicated). Some questions may be review from previous practical assignments - consider re-watching the old walkthrough videos if necessary.*

For this applied work, you are expected to complete steps 4, 5, 6, 7, and 8 for *each* of the 3 analyses you planned above. So, in total, you will have 5 steps for each of your analyses, resulting in 15 points total. For your analyses use  $\alpha = 0.05$

#### For each analysis:

- (1pt) For all of the variables you are using in the analysis show the following descriptive statistics:
  - If categorical show a frequency table
  - If numeric-discrete, show a frequency table
  - If numeric-continuous, show mean, median, and standard deviation,
- (1pt) For all of the variables you are using in the analysis show the following plots:
  - If categorical show a bar plot
  - If numeric-discrete, show a bar plot
  - If numeric-continuous, show a histogram
- (1pt) For the analysis you are running, please prepare it and show me the syntax you will use to run it
- (1pt) Identify your test statistic (e.g., t, F,  $\chi^2$ , etc.) and your p-value for your analysis
- (1pt) State whether you reject or retain the null hypothesis, based upon your answers in the [Knowledge Checks]