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Stat 528: Final

Q1

1. Yes, since there are no unblocked backdoor paths.
2. …
3. The performances are pretty similar.

Q2

An Analysis of Schizophrenia Treatment Effectiveness

**Part I: Introduction**

Schizophrenia is a severe mental disorder that affects millions of people worldwide. It is a chronic condition that can significantly impair an individual's ability to function in daily life. Treatment for schizophrenia typically involves a combination of medication and therapy, but there is still much debate about the effectiveness of these treatments.

There have been a wide range of literature on this topic. For example, The paper "Schizophrenia - An Overview" published in JAMA Psychiatry in 2020 is a comprehensive review of the current understanding of schizophrenia, including its symptoms, diagnosis, etiology, and treatment options. Also, "Rethinking Schizophrenia" is an opinion piece written by Thomas R. Insel, the former Director of the National Institute of Mental Health (NIMH), which appeared in the journal Nature in 2010. In the article, Insel argues that current research on schizophrenia is not adequately addressing the underlying biology of the disorder. He suggests that rather than focusing on diagnostic categories, researchers should be exploring the genetic and neural mechanisms that contribute to the complex array of symptoms that make up schizophrenia.

The volume of the literature and wide range of topics related to schizophrenia make it important to conduct meaning analysis and draw insights to improve knowledge of the topic. In this paper, I will provide data analysis on a dataset from the National Institute of Mental Health Schizophrenia Collaborative Study on treatment-related changes in overall symptom severity in a sample of schizophrenic patients. In the dataset, subjects were assigned to one of four treatments: placebo, chlorpromazine, fluphenazine, and thioridazine. In this version of the data set, the three non-placebo drug groups have been combined into one treatment group. Severity of schizophrenic symptomatology was tracked during the course of the study. Measurements were taken in Weeks 0, 1, 3, and 6.

Due to the limitations of the data, I will only keep the observations for Weeks 0, 1, 3, and 6. In the following analysis, I will perform some EDA on the dataset, generate a few summary plots, and conduct some analysis on the data. I will then discuss the implications of my analysis and talk about the presence of missing values.

**Part II: Analysis**

First, we perform EDA to understand the structure of the dataset. The following table displays a summary of the dataset.

Table

Description automatically generated

From observation, there is no missing values in the dataset, and the dataset seems clean as all variables correspond with logical sense. A closer look into the dataset will generate the following visualizations.

Chart, bar chart

Description automatically generatedChart, bar chart

Description automatically generated

There are slightly more female than male in the dataset (Figure 1), and the treatment is about 3 times the amount of placebo (Figure 2). This aligns with the design of the study since three treatments have been used proportionally compared with the placebo. Also, the visualizations below show that the distribution of illness is centered around level 3.5 – 6, namely moderately, markedly, and severely ill (Figure 3). Moreover, over the weeks, the illness does seem to decrease overall (Figure 4). However, it is possible that the trend if affected by the fact that some data are missing, such as in times when the testing subject exit the study due to dissatisfaction or death (Figure 5).

Chart, histogram

Description automatically generatedChart, box and whisker chart

Description automatically generated

Chart, bar chart, histogram

Description automatically generated

Given the results,

**Part III: Conclusion**

**Part IV: Appendix**

**Part V: References**

Insel, Thomas R. "Rethinking schizophrenia." *Nature* 468, no. 7321 (2010): 187-193.

McCutcheon, Robert A., Tiago Reis Marques, and Oliver D. Howes. "Schizophrenia—an overview." *JAMA psychiatry* 77, no. 2 (2020): 201-210.