One-Way ANOVA

Introduction

An online retailer wants to get the best from employees, as well as improve their working experience. Currently, employees in the retailer's order fulfilment center are not provided with any kind of entertainment whilst they work (e.g., background music, television, etc.). However, the retailer wants to know whether providing music, which a few employees have requested, would lead to greater productivity, and if so, by how much.

Therefore, a researcher recruited a random sample of 150 employees. This sample of 150 participants was randomly split into three independent groups with 50 participants in each group: (a) a "control group" that did not listen to music; (b) a "treatment group" who listened to music, but had no choice of what they listened to; and (c) a second treatment group who listened to music and had a choice of what they listened to.

The experiment lasted for one month. At the end of the experiment, the "productivity" of the three groups was measured in terms of the "average number of packages processed per hour". Therefore, the outcome variable was "productivity" (measured in terms of the average number of packages processed per hour during the one month experiment), whilst the explanatory variable was "condition", where there were three independent groups: "no_music" (control group), "music_no_choice" (treatment group A) and "music_choice" (treatment group B). It was the researchers hypothesis that entertainment would enhance productivity and that employees in the music and choice condition (treatment group B) would report the greatest levels of productivity, followed by music and no choice (treatment group A) followed by no music (control group). Your task is to address these questions from their dataset. In your answer, please provide details about:

1) The data analysis methodology and justification (approx. 15%)
   - How the student intends to analyze the data and why this approach is chosen.
2) The preliminary analyses (approx. 10%)
   - Data screening and distributions
3) The primary analyses (approx. 60%)
   - The primary data analysis with findings supplemented using relevant Tables and Figures
4) The interpretations for each research question (approx. 15%)
   - What do the analyses reveal in terms of each of the research questions?

Research Questions

1) Is there a statistically significant difference in productivity between the three conditions?
2) Which conditions differed from which, and what was the condition that had the greatest levels of productivity?

Writing structure

Please structure your writing using the following headings:

[TITLE]

[RESEARCH QUESTIONS AND HYPOTHESES]

[DATA ANALYSIS METHOD AND JUSTIFICATION]

[PRELIMINARY ANALYSES]

[PRIMARY ANALYSES]

[INTERPRETATIONS]

Data file

The data file is called ‘music_data’ and can be downloaded from here. It can also be accessed on GitHub in PB4A7 → SDA → ANOVA → music_data.csv.