Assignment 3

Research Question

Is there an age group that shows a higher interest in sci-fi posters?

Method

Apparatus: room with chairs in nature sound, Tobii Pro Glasses 3, 9 9-panels grid images(81 movie posters, including nine sci-fi movie posters with different design styles)
Conditions: Three different age groups

Measures: Fixation time on sci-fi posters based on eye-tracker

Procedure: There are nine nine-panel grid images, each with one panel for a sci-fi poster and eight different types of film posters in other places. The sci-fi posters are placed in different panels in each of the nine images, and the nine sci-fi posters have different design styles. Thirty participants will be divided into three groups according to age range and everyone will bring an eye tracker to view the nine images. The viewing time will be limited to one minute and the eye tracker will record the length of time every participant spends on the sci-fi posters.

Participants: Thirty participants were randomly recruited from the street and divided into three groups of ten people aged 15-30, 31-45 and 46-60, every group with a gender ratio of 1:1. The participants are neither colour-blind, nor colour-weak, nor have any other eye disease.

Results

Hypothesis: There will be significant differences in the fixation time spent by three groups on the sci-fi posters.

Plots and statistical tests:

I will collect eye tracker data to determine how much time each participant spent viewing the sci-fi poster, then use a ANOVA to compare the means for each genre, as this was a between subjects experiment with 3 conditions. Successful results in the test will indicate that people in one age group tend to be more interested in sci-fi movie posters than the other two.
P-value will be calculated. If the p-value of <0.05 returned from the test, it will allow us to reject the null hypothesis that that the all the means are equal between every group. There is a 95% chance our difference is real, thus we can say with reasonable confidence that the independent variable (three different age) effected our dependent variable (fixation time on sci-fi movie posters).
A histogram of data will be plotted with x coordinates showing fixation time and y coordintates showing numbers of the same fixation time.
A scatter plot indicating the fixation time of three different groups will be demonstrated too.

An error bar will also be included, while the error is based on the standard deviation of each group.

Analysis

Confounding variables:

1. Cultural background
2. Mood
3. Educational level
4. Occupation
5. Testing environment

Errors:

1. Gross errors: The experimenter may observe or record data incorrectly.
2. Random errors: All confounding variables can be considered as random errors.
3. Systematic errors: Sample size

The balance between internal and external validity：

For the internal validity, I keep the consistency of testing environment, ensure the same sex ration of each group and try to exclude the influence of design style. Besides, I also ensure the participants have no visual problems. For the external validity, I use random sampling to improve the universality of the results.

Ethical issues:

The experiment is voluntary and participants are free to opt in or out of the study at any point in time. Personal information of participants will be kept confidential and participants will be able to participate anonymously. In addition, participants will be informed of the purpose, the risks and possible benefits of the experiment before the experiment.

Github link: https://github.com/22015680/STEM_Assignments.git