Data Project #6

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**Effect of Placement on Product Sales**

A study was conducted determine whether the iris color has an effect on the true mean critical flicker frequency (cff).[[1]](#footnote-1) Critical flicker frequency is highest flicker frequency for an individual to able to detect flicker from flickering light source. Any flicker frequency above this will cause the light from the source will appear to be uninterrupted to the individual observing it. For the study, a sample of 19 individuals were selected and placed in the appropriate iris color group. The three iris colors that were studied are brown, green, and blue. This study is important because it can be used within various applications that deal with artificial sources of lights. For instance, knowing the true mean cff could help companies, that develop electronics such as monitors and TVs, to ensure that their screen flicker frequency is reasonably higher than the true mean cff. This goal could lead these companies to various avenues such as choosing type of screen (LED or LCD), power input/output, etc. In addition, this study can be used in field of medicine to prevent reactions such as seizures and/or migraines. “For about 3% of people with epilepsy, exposure to flashing lights at certain intensities or to certain visual patterns...”[[2]](#footnote-2)

Analysis of data using descriptive statistics is crucial within every study including this one. The descriptive statistics can be taken as the brief summary (in numbers) of the data collected in the experiment. Some key descriptive statistics were calculated within the R code file, which is submitted along with this report. These descriptive statistics are:

* **Brown Iris**:
* **Green Iris**:
* **Brown Iris**:

A close up of a map

Description automatically generatedA screenshot of a cell phone

Description automatically generated**Plots**

For ANOVA test, it needs to be determined that the sample data is coming from a normally distributed population. A q-q plot was constructed to verify this assumption. It is evident that the data can approximately be modelled by a normal distribution.

One of the assumptions that is made before the ANOVA test is that there is homogeneity within variances. This is was tested using two methods which are a boxplot and a Bartlett test. It is evident from the boxplot that homogeneity of variances is present.

**Conclusion**

The null hypothesis is that the true mean cff for the three iris colors is the same. The alternate hypothesis is that at least two of the true mean cff ‘s is different. Normality is already evident from the boxplot analysis. The Bartlett’s test yielded the same result with a value of 0.44 and a p-value of 0.80. Thus, the homogeneity of variances is verified which resulted in the verification of normality of the data. The ANOVA test was conducted with . The test yielded -statistic value of 4.80 and a p-value of 0.02. Based on the ANOVA test, it can be concluded that there is strong evidence in support of the claim that at least two of the true mean cff ‘s is different. A post hoc test can be conducted to determine which two are different. In this case, Holm p-value adjustment method is used for the test. The Holm method is similar to the Bonferroni method. While both methods are used to keep **type I** error at bay, the Holm method reduces the risk of **type II** error as well when compared to its counterpart, the Bonferroni method. The Bonferroni method takes the and divides it by the number of tests conducted. The Holm method is the step-down correction of the Bonferroni method. It deals with the p-values at a sequential basis. From the post hoc test, it can be concluded that there is strong evidence to support the claim that the true mean cff’s are different for brown iris and blue iris.

1. Textbook problem 42 on page 436 [↑](#footnote-ref-1)
2. P. (2019, September 30). Photosensitivity and Seizures. Retrieved June 21, 2020, from https://www.epilepsy.com/learn/triggers-seizures/photosensitivity-and-seizures [↑](#footnote-ref-2)