

STAT 424: PROJECT PROPOSAL

1. INTRODUCTION

Cosmetic items exist in order to promote self-grooming for a better first impression. An item that has become a staple in my daily life is liquid eyeliner. This item enhances and brightens the eyes as well as help them to appear larger but the problem with liquid eyeliners is that although many companies claim that their eyeliners are waterproof, after a certain time period, the eyeliner often smudges and become very unappealing which defeats its purpose.

In this experiment, I would like to take the opportunity to test two different famous drugstore eyeliner brands to determine its **resistance to water**. The **response variable** would be **the number of swipes taken to remove the eyeliner completely**. Removed completely is defined by when the skin is back to it's original state. The **treatment factor** will be the **brand of the eyeliner**. I decided to limit the brands to two drugstore brands since they are more accessible and affordable. I will draw a filled in square of the same size on my test subjects' skin. I determined **two blocking factors** in this experiment which are the **skin-type** of the test subjects and the **location** of the experiment. This is because a lot of companies claim that the eyeliners work on different skin types and works well in all enviroments.

A. Dictionary

i. Treatment factor:

- **Brand:** The brand of liquid eyeliner used | Levels: A – Maybelline, B – TooFaced.

ii. Blocking factor(s):

- **Location:** Location where experiment is conducted | Levels: 1 – Indoors, 2 – Outdoors.
- **Skin-type:** Whether the skin-type tested on is oily or dry | Levels: 1 – Dry, 2 – Oily.

2. STATISTICAL ANALYSIS

Given the fact that I have three blocks; one treatment factor and two blocking factors, for now I will be using the **Latin Square design** in order to perform my statistical analysis. I will run an **ANOVA analysis** and perform an **F-test** to compare if the two brands have equal treatment effect or not. If my F-test is rejected, I will proceed with the **Tukey multiple comparisons method**. All the tests will be controlled for Type-1 error at an $\alpha = 0.05$ significance level.