

Appendix N

Interaction analysis for limited edition vs rating

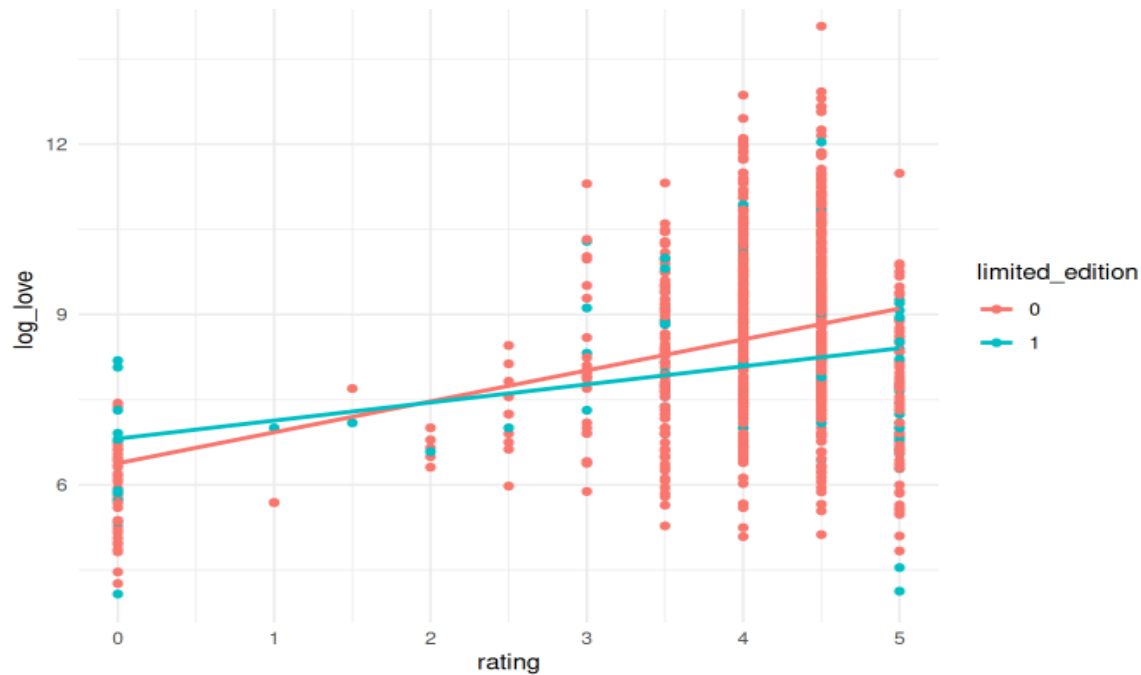
The interaction test between limited edition and rating predictors suggests no statistically significant interaction effect. The F-test yielded an F-value of 4.46, with a corresponding p-value of 0.037. We fail to reject the null hypothesis at a significance level of $\alpha = 0.01$, indicating no significant interaction effect between these two predictors on log love. Therefore, the regression lines for limited edition vs. rating are parallel across different levels of these predictors.

```

```{r}
ggplot(data = sephoraData, aes(y = log_love, x = rating, color =
limited_edition)) +
 geom_point() +
 geom_smooth(se = FALSE, method = "lm") +
 theme_minimal()
```

```

Interaction plot of limited edition vs rating



Analysis of variance

```

```{r}
inter_model1 <- lm(log_love ~ rating*limited_edition, data = sephoraData)

anova_model1 <- anova(inter_model1)
kbl(anova_model1) %>%
kable_classic_2(full_width = F)
```

```

| | Df | Sum Sq | Mean Sq | F value | Pr(>F) |
|--------------------------|-----|---------|---------|---------|--------|
| rating | 1 | 290.27 | 290.27 | 132.07 | 0.00 |
| limited_edition | 1 | 12.36 | 12.36 | 5.62 | 0.02 |
| Rating * limited_edition | 1 | 9.80 | 9.80 | 4.46 | 0.03 |
| Residuals | 996 | 2189.05 | 2.20 | NA | NA |

F-test Analysis

```

```{r}
F_start <- round(qf(.99, anova_model1$Df[3], anova_model1$Df[4]), 3)
```

```

$H_0 : \beta_1 = 0$
 $H_A : \beta_1 \neq 0$
 $\alpha = 0.05$
 Reject if $F^* > F(0.99, 1, 996) = 6.66$
 $F^* = 4.46$
 $P_{value} = 0.035$

From the ANOVA output, we have $F^* = 4.46$, we fail to reject H_0 and conclude that the interaction terms should be dropped from the model. The p-value associated with this test is 0.035.