Model without Log love variable

```{r}

# Fit model without love

model.without.love <- glm(online_only ~ limited_edition + exclusive + log_price
+ log_value_price, family = binomial, data = sephora)



sum_model.without.love <- summary(model.without.love)



sum_model.without.love

```

```
Call:
glm(formula = online_only ~ limited_edition + exclusive + log_price +
    log_value_price, family = binomial, data = sephora)

Coefficients:
                 Estimate Std. Error z value Pr(>|z|)
(Intercept)      -2.04209    0.14452 -14.130  < 2e-16 ***
limited_edition1  0.64966    0.08707   7.461 8.56e-14 ***
exclusive1       -0.46109    0.06397  -7.208 5.68e-13 ***
log_price        -0.84595    0.22326  -3.789 0.000151 ***
log_value_price   1.07869    0.21876   4.931 8.18e-07 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 9791.0  on 8986  degrees of freedom
Residual deviance: 9569.2  on 8982  degrees of freedom
AIC: 9579.2

Number of Fisher Scoring iterations: 4
```

Likelihood ratio test without Log love

```{r}

# residual deviance for model without love
```

```r
residual_deviance_without_love <- round(model.without.love$deviance,2)


G <- residual_deviance_without_love - residual_deviance_full_model


p <- 1-pchisq(G, df = 4)
```

$H_0 : \beta_1 = 0$

$H_a : \text{at least one } \beta \neq 0$

$G = 9569.19 - 8649.08 = 920.11$

$p = 0$

The "love" variable is statistic significant because its p-value is close to zero

Percent change of beta

```{r}
#Percent change of beta for limited_edition

beta_change_limited_edition <- round(100 *(model.without.love$coefficients[2] -
model.multiv1$coefficients[2]) / model.multiv1$coefficients[2],2)


#Percent change of beta for exclusive

beta_change_exclusive <- round(100 * (model.without.love$coefficients[3] -
model.multiv1$coefficients[3]) / model.multiv1$coefficients[3],2)


#Percent change of beta for price

beta_change_price <- round(100 * (model.without.love$coefficients[4] -
model.multiv1$coefficients[4]) / model.multiv1$coefficients[4],2)


#Percent change of beta for value_price
```

```
beta_change_value_price <- round(100 * (model.without.love$coefficients[5] -
model.multiv1$coefficients[5]) / model.multiv1$coefficients[5],2)

```

$$\triangle\hat{\beta_{limited_edition}} = 54.45$$
$$\triangle\hat{\beta_{exclusive}} = 50.73$$
$$\triangle\hat{\beta_{price}} = -6.77$$
$$\triangle\hat{\beta_{value_price}} = 13.56$$

Although love predictor was dropped from the model, the exclusive predictor is an important confounder because it has percent changes of more than 15%.