# STAT 217: Two-Way Anova, Interaction vs Additive Models 2-18

```
## Analysis of Variance Table
##
## Response: responses
##             Df Sum Sq Mean Sq F value Pr(>F)
## brand        1   4.33    4.33   10.52 0.0035
## drops        2   4.86    2.43    5.90 0.0083
## brand:drops  2   1.58    0.79    1.92 0.1687
## Residuals   24   9.88    0.41
##
## Call:
## lm(formula = responses ~ brand * drops, data = pt)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -1.210 -0.277  0.105  0.436  0.804
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)        1.599      0.287    5.57  9.9e-06
## brandB2            1.253      0.406    3.09    0.005
## drops20           -0.281      0.406   -0.69    0.495
## drops30           -0.433      0.406   -1.07    0.297
## brandB2:drops20   -0.373      0.574   -0.65    0.522
## brandB2:drops30   -1.105      0.574   -1.93    0.066
##
## Residual standard error: 0.642 on 24 degrees of freedom
## Multiple R-squared:  0.521,Adjusted R-squared:  0.422
## F-statistic: 5.23 on 5 and 24 DF,  p-value: 0.00218
```

```
##
## Call:
## lm(formula = responses ~ brand + drops, data = pt)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -1.456 -0.459  0.130  0.443  0.970
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)    1.845      0.242    7.61  4.4e-08
## brandB2        0.760      0.242    3.13   0.0042
## drops20       -0.468      0.297   -1.58   0.1271
## drops30       -0.985      0.297   -3.32   0.0027
##
## Residual standard error: 0.664 on 26 degrees of freedom
## Multiple R-squared:  0.445,Adjusted R-squared:  0.381
## F-statistic: 6.95 on 3 and 26 DF,  p-value: 0.00138
```

```
intplot(responses~brand*drops,data=pt)
```

Interaction plot of responses based on drops and brand
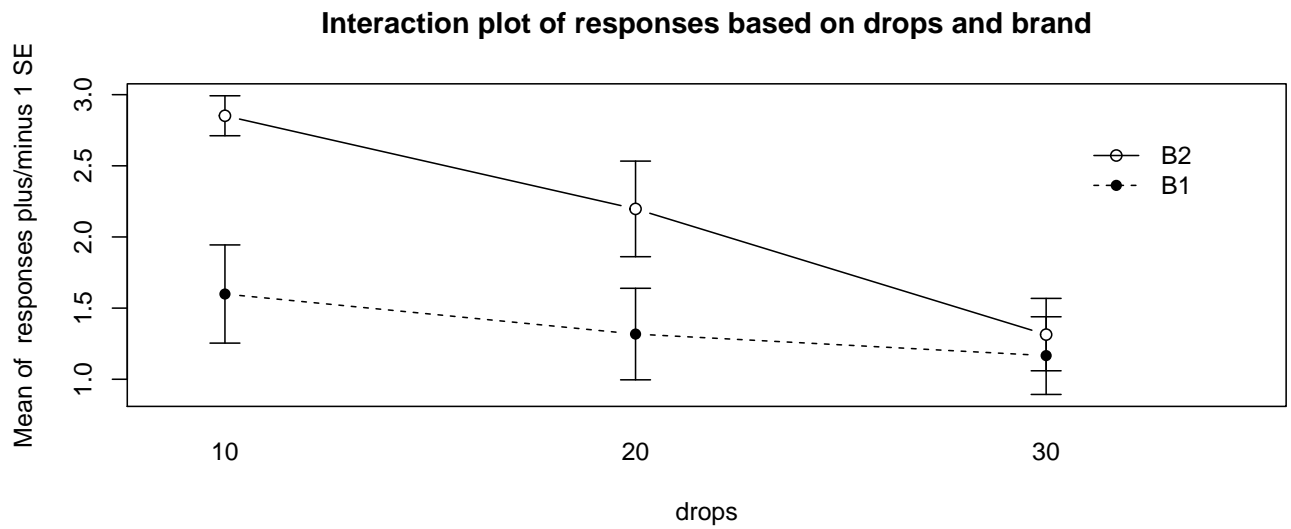

```
Anova(lm.add)

## Anova Table (Type II tests)
##
## Response: responses
##           Sum Sq Df F value Pr(>F)
## brand       4.33  1    9.83 0.0042
## drops       4.86  2    5.51 0.0101
## Residuals  11.46 26
```