

## STAT 217: Warpbreaks In-Class 2-4

This data set gives the number of warp breaks per loom, where a loom corresponds to a fixed length of yarn. The loom is set at a tension of low, medium or high. 54 measurements are taken. The researcher wants to know if the machine tension is related to the number of warp breaks.

```
anova(lm.model)

## Analysis of Variance Table
##
## Response: breaks
##           Df Sum Sq Mean Sq F value Pr(>F)
## tension    2   2034    1017    7.21 0.0018 **
## Residuals 51   7199     141
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
lm.cellmeans <- lm(breaks~tension-1)
summary(lm.cellmeans)

##
## Call:
## lm(formula = breaks ~ tension - 1)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -22.39  -8.14  -2.67   6.33  33.61
##
## Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
## tensionH      21.7         2.8   7.74 3.7e-10 ***
## tensionM      26.4         2.8   9.42 9.4e-13 ***
## tensionL      36.4         2.8  12.99 < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 11.9 on 51 degrees of freedom
## Multiple R-squared:  0.862, Adjusted R-squared:  0.853
## F-statistic: 106 on 3 and 51 DF, p-value: <2e-16
```

```
lm.refcoded <- lm(breaks~tension)
summary(lm.refcoded)

##
## Call:
## lm(formula = breaks ~ tension)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -22.39  -8.14  -2.67   6.33  33.61
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    21.67      2.80    7.74 3.7e-10 ***
## tensionM        4.72      3.96    1.19  0.2386
## tensionL       14.72      3.96    3.72  0.0005 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 11.9 on 51 degrees of freedom
## Multiple R-squared:  0.22, Adjusted R-squared:  0.19
## F-statistic: 7.21 on 2 and 51 DF, p-value: 0.00175
```

```
##
## Call:
## lm(formula = Score ~ Handicap, data = handicap.data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -3.643 -1.209  0.114  1.329  2.900
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    4.429      0.436   10.15 5e-15 ***
## HandicapCrutches  1.493      0.617    2.42  0.018 *
## HandicapHearing  -0.379      0.617   -0.61  0.542
## HandicapNone      0.471      0.617    0.76  0.448
## HandicapWheelchair 0.914      0.617    1.48  0.143
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.63 on 65 degrees of freedom
## Multiple R-squared:  0.15, Adjusted R-squared:  0.0974
## F-statistic: 2.86 on 4 and 65 DF, p-value: 0.0301
```