#Two-Way ANOVA in R

#Two-way ANOVA comparing Academic Standing and Major Type to Question 7 Statements

#This section of code uses variable Q2NV1, where majors are only split between 0==Arts and Humanities, 1==Social Sciences or Business, and 2==STEM

```
> twowayANOVA1 <- aov(Q7.1N ~ RankedQ1N + RankedQ2NV1)
> summary(twowayANOVA1)
             Df Sum Sq Mean Sq F value Pr(>F)
RankedQ1N     4  0.865  0.2163   0.273  0.893
RankedQ2N     2  0.584  0.2922   0.369  0.694
Residuals    37 29.278  0.7913
12 observations deleted due to missingness
```

```
> twowayANOVA2 <- aov(Q7.2N ~ RankedQ1N + RankedQ2NV1)
> summary(twowayANOVA2)
             Df Sum Sq Mean Sq F value Pr(>F)
RankedQ1N     4  0.411  0.1028   0.121  0.974
RankedQ2N     2  1.985  0.9926   1.166  0.323
Residuals    37 31.490  0.8511
12 observations deleted due to missingness
```

```
> twowayANOVA3 <- aov(Q7.3N ~ RankedQ1N + RankedQ2NV1)
> summary(twowayANOVA3)
             Df Sum Sq Mean Sq F value Pr(>F)
RankedQ1N     4   0.76  0.1910   0.221  0.925
RankedQ2N     2   0.44  0.2187   0.253  0.778
Residuals    37  31.98  0.8643
12 observations deleted due to missingness
```

#This section of code uses variable Q2NV2, where majors are only split between 0==Arts and Humanities, 1==Social Sciences, 2== Business related majors, and 3==STEM

```
> BizANOVATwoWay1 <- aov(Q7.1N ~ RankedQ1N + RankedQ2NV2)
> summary(BizANOVATwoWay1)
             Df Sum Sq Mean Sq F value Pr(>F)
RankedQ1N     4  0.865  0.2163   0.269  0.896
RankedQ2NV2   3  0.933  0.3111   0.387  0.763
Residuals    36 28.929  0.8036
12 observations deleted due to missingness
>
```

```
> BizANOVATwoWay2 <- aov(Q7.2N ~ RankedQ1N + RankedQ2NV2)
> summary(BizANOVATwoWay2)
             Df Sum Sq Mean Sq F value Pr(>F)
RankedQ1N     4  0.411  0.1028   0.119  0.975
RankedQ2NV2   3  2.277  0.7591   0.876  0.463
Residuals    36 31.198  0.8666
12 observations deleted due to missingness

> BizANOVATwoWay3 <- aov(Q7.3N ~ RankedQ1N + RankedQ2NV2)
> summary(BizANOVATwoWay3)
             Df Sum Sq Mean Sq F value Pr(>F)
RankedQ1N     4  0.764  0.1910   0.218  0.927
RankedQ2NV2   3  0.815  0.2718   0.310  0.818
Residuals    36 31.603  0.8778
12 observations deleted due to missingness
```

#Two-way ANOVA comparing Academic Standing <u>and</u> whether a respondent *heard about* a research data service to Question 7 Statements

```
> twoway1 <- aov(Q7.1N ~ RankedQ1N + RankedQ3N)
> summary(twoway1)
             Df Sum Sq Mean Sq F value Pr(>F)
RankedQ1N     5   2.00   0.400   0.445 0.8141
RankedQ3N     1   5.11   5.105   5.686 0.0218 *
Residuals    41  36.81   0.898
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
8 observations deleted due to missingness
> twoway2 <- aov(Q7.1N ~ Q1N + RankedQ3N)
> summary(twoway2)
             Df Sum Sq Mean Sq F value Pr(>F)
Q1N           1   0.08   0.084   0.097 0.7564
RankedQ3N     1   5.13   5.125   5.958 0.0186 *
Residuals    45  38.71   0.860
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
8 observations deleted due to missingness
> twoway3 <- aov(Q7.1N ~ Q1N + Q3N)
> summary(twoway3)
             Df Sum Sq Mean Sq F value Pr(>F)
Q1N           1   0.08   0.084   0.097 0.7564
```

```
Q3N             1   5.13   5.125   5.958 0.0186 *
Residuals   45  38.71   0.860
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
8 observations deleted due to missingness

> twoway4.1 <- aov(Q7.2N ~ RankedQ1N + RankedQ3N)
> summary(twoway4.1)
            Df Sum Sq Mean Sq F value Pr(>F)
RankedQ1N    5   1.21   0.243   0.248 0.9386
RankedQ3N    1   6.12   6.121   6.251 0.0165 *
Residuals   41  40.15   0.979
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
8 observations deleted due to missingness

> twoway4 <- aov(Q7.2N ~ Q1N + RankedQ3N)
> summary(twoway4)
            Df Sum Sq Mean Sq F value Pr(>F)
Q1N             1   0.07   0.067   0.073 0.7883
RankedQ3N    1   6.10   6.100   6.644 0.0133 *
Residuals   45  41.31   0.918
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
8 observations deleted due to missingness

> twoway4.2 <- aov(Q7.2N ~ RankedQ1N + RankedQ3N)
> summary(twoway4.2)
            Df Sum Sq Mean Sq F value Pr(>F)
RankedQ1N    5   1.21   0.243   0.248 0.9386
RankedQ3N    1   6.12   6.121   6.251 0.0165 *
Residuals   41  40.15   0.979
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
8 observations deleted due to missingness

> twoway5 <- aov(Q7.3N ~ Q1N + RankedQ3N)
> summary(twoway5)
            Df Sum Sq Mean Sq F value  Pr(>F)
Q1N             1   0.30   0.298   0.350 0.55724
RankedQ3N    1   6.97   6.974   8.174 0.00642 **
Residuals   45  38.39   0.853
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

8 observations deleted due to missingness

```
> twoway6 <- aov (Q7.3N ~ Q1N + Q3N)
> summary(twoway6)
             Df Sum Sq Mean Sq F value  Pr(>F)
Q1N           1   0.30   0.298   0.350 0.55724
Q3N           1   6.97   6.974   8.174 0.00642 **
Residuals    45  38.39   0.853
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
8 observations deleted due to missingness
```

```
> twoway6.1 <- aov(Q7.3N ~ RankedQ1N + RankedQ3N)
> summary(twoway6.1)

             Df Sum Sq Mean Sq F value Pr(>F)
RankedQ1N     5   1.90   0.380   0.418 0.8338
RankedQ3N     1   6.42   6.423   7.052 0.0112 *
Residuals    41  37.34   0.911
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
8 observations deleted due to missingness
```

#Multivariable ANOVA comparing Academic Standing and Hearing about a Data Service and whether or not someone is also FSU Libraries staff to Question 7 Statements

```
> twoway7 <- aov(Q7.1N ~ Q1N + Q3N + RankedLibStaff)
> summary(twoway7)
             Df Sum Sq Mean Sq F value Pr(>F)
Q1N           1   0.08   0.084   0.096 0.7583
Q3N           1   5.13   5.125   5.868 0.0196 *
RankedLibStaff  1   0.28   0.281   0.321 0.5736
Residuals      44  38.43   0.873
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
8 observations deleted due to missingness
```

```
> twoway8 <- aov(Q7.2N ~ Q1N + Q3N + RankedLibStaff)
> summary(twoway8)
             Df Sum Sq Mean Sq F value Pr(>F)
Q1N           1   0.07   0.067   0.073 0.7889
```

```
Q3N             1   6.10   6.100   6.603 0.0136 *
RankedLibStaff  1   0.67   0.666   0.721 0.4006
Residuals       44  40.65   0.924
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
8 observations deleted due to missingness

> twoway9 <- aov(Q7.3N ~ Q1N + Q3N + RankedLibStaff)
> summary(twoway9)
            Df Sum Sq Mean Sq F value  Pr(>F)
Q1N             1   0.30   0.298   0.354 0.55498
Q3N             1   6.97   6.974   8.271 0.00619 **
RankedLibStaff  1   1.29   1.294   1.534 0.22207
Residuals       44  37.10   0.843
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
8 observations deleted due to missingness
```