# Computation of Significance between Model Evaluations

**Imports**

**ALL MODELS**

**Data**

```
databs <- read.csv("database.csv", header=TRUE)
head(databs)
```

```
##   Participant Model Genre Liking Curiosity Human Complexity GenreAcc
## 1           1     3     5      5         4     3          4        0
## 2           1     3     8      6         3     5          5        0
## 3           1     0     4      5         5     6          4        1
## 4           1     0     3      6         5     6          4        1
## 5           1     2     8      4         3     5          3        0
## 6           1     1     6      2         3     4          2        0
```

```
databs$Model <- as.factor(databs$Model)
databs$Genre <- as.factor(databs$Genre)
```

**Liking**

```
mod_liking <- mixed(Liking ~ Model * Genre + (1 | Participant), data = databs, method = "KR")
```

```
## Contrasts set to contr.sum for the following variables: Model, Genre
```

```
mod_liking
```

```
## Mixed Model Anova Table (Type 3 tests, KR-method)
##
## Model: Liking ~ Model * Genre + (1 | Participant)
## Data: databs
##        Effect       df         F p.value
## 1       Model  4, 882 23.58 ***   <.001
## 2       Genre  9, 882  8.67 ***   <.001
## 3 Model:Genre 36, 882  2.06 ***   <.001
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '+' 0.1 ' ' 1
```

```
emmeans(mod_liking, pairwise ~ Model, p.adjust.method = "tukey")
```

```
## NOTE: Results may be misleading due to involvement in interactions
```

```
## $emmeans
##  Model emmean    SE   df lower.CL upper.CL
##  0       3.84 0.157 45.3     3.52     4.15
##  1       4.28 0.157 45.3     3.97     4.60
##  2       3.69 0.157 45.3     3.37     4.01
```

```
##  3          3.16 0.157 45.3     2.85     3.48
##  4          4.49 0.157 45.3     4.17     4.81
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## Confidence level used: 0.95
##
## $contrasts
##  contrast          estimate    SE  df t.ratio p.value
##  Model0 - Model1    -0.447 0.152 882  -2.948  0.0271
##  Model0 - Model2     0.147 0.152 882   0.971  0.8682
##  Model0 - Model3     0.674 0.152 882   4.439  0.0001
##  Model0 - Model4    -0.653 0.152 882  -4.300  0.0002
##  Model1 - Model2     0.595 0.152 882   3.919  0.0009
##  Model1 - Model3     1.121 0.152 882   7.387  <.0001
##  Model1 - Model4    -0.205 0.152 882  -1.353  0.6583
##  Model2 - Model3     0.526 0.152 882   3.468  0.0050
##  Model2 - Model4    -0.800 0.152 882  -5.271  <.0001
##  Model3 - Model4    -1.326 0.152 882  -8.739  <.0001
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## P value adjustment: tukey method for comparing a family of 5 estimates
```

### Curiosity

```r
mod_curiosity <- mixed(Curiosity ~ Model * Genre + (1 | Participant), data = databs, method = "KR")
```

```
## Contrasts set to contr.sum for the following variables: Model, Genre
```

```r
mod_curiosity
```

```
## Mixed Model Anova Table (Type 3 tests, KR-method)
##
## Model: Curiosity ~ Model * Genre + (1 | Participant)
## Data: databs
##         Effect       df          F p.value
## ## 1        Model   4, 882 30.37 ***   <.001
## ## 2        Genre   9, 882 13.60 ***   <.001
## ## 3 Model:Genre  36, 882   3.19 ***   <.001
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '+' 0.1 ' ' 1
```

```r
emmeans(mod_curiosity, pairwise ~ Model, p.adjust.method = "tukey")
```

```
## NOTE: Results may be misleading due to involvement in interactions

## $emmeans
##  Model emmean    SE   df lower.CL upper.CL
##  0       4.17 0.192 33.1     3.78     4.56
##  1       4.29 0.192 33.1     3.90     4.68
##  2       3.57 0.192 33.1     3.18     3.97
##  3       3.22 0.192 33.1     2.82     3.61
##  4       4.76 0.192 33.1     4.37     5.15
##
## Results are averaged over the levels of: Genre
```

```
## Degrees-of-freedom method: kenward-roger
## Confidence level used: 0.95
##
## $contrasts
##  contrast        estimate     SE   df t.ratio p.value
##  Model0 - Model1   -0.121 0.156 882  -0.775  0.9379
##  Model0 - Model2    0.595 0.156 882   3.806  0.0014
##  Model0 - Model3    0.953 0.156 882   6.096  <.0001
##  Model0 - Model4   -0.589 0.156 882  -3.772  0.0016
##  Model1 - Model2    0.716 0.156 882   4.580  0.0001
##  Model1 - Model3    1.074 0.156 882   6.870  <.0001
##  Model1 - Model4   -0.468 0.156 882  -2.997  0.0234
##  Model2 - Model3    0.358 0.156 882   2.290  0.1490
##  Model2 - Model4   -1.184 0.156 882  -7.577  <.0001
##  Model3 - Model4   -1.542 0.156 882  -9.868  <.0001
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## P value adjustment: tukey method for comparing a family of 5 estimates
```

**Genre Accuracy**

```
mod_genre <- mixed(GenreAcc ~ Model * Genre + (1 | Participant), data = databs, method = "KR")
```

```
## Contrasts set to contr.sum for the following variables: Model, Genre
```

```
mod_genre
```

```
## Mixed Model Anova Table (Type 3 tests, KR-method)
##
## Model: GenreAcc ~ Model * Genre + (1 | Participant)
## Data: databs
##        Effect        df         F p.value
## 1       Model   4, 882 10.79 ***   <.001
## 2       Genre   9, 882 34.53 ***   <.001
## 3 Model:Genre 36, 882  3.68 ***   <.001
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '+' 0.1 ' ' 1
```

```
emmeans(mod_genre, pairwise ~ Model, p.adjust.method = "tukey")
```

```
## NOTE: Results may be misleading due to involvement in interactions
```

```
## $emmeans
##  Model emmean     SE   df lower.CL upper.CL
##  0      0.632 0.0404 52.5    0.551    0.713
##  1      0.479 0.0404 52.5    0.398    0.560
##  2      0.400 0.0404 52.5    0.319    0.481
##  3      0.421 0.0404 52.5    0.340    0.502
##  4      0.553 0.0404 52.5    0.472    0.634
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## Confidence level used: 0.95
##
## $contrasts
```

```
##  contrast          estimate      SE  df t.ratio p.value
##  Model0 - Model1    0.1526 0.0413 882   3.700  0.0021
##  Model0 - Model2    0.2316 0.0413 882   5.614  <.0001
##  Model0 - Model3    0.2105 0.0413 882   5.103  <.0001
##  Model0 - Model4    0.0789 0.0413 882   1.914  0.3107
##  Model1 - Model2    0.0789 0.0413 882   1.914  0.3107
##  Model1 - Model3    0.0579 0.0413 882   1.403  0.6256
##  Model1 - Model4   -0.0737 0.0413 882  -1.786  0.3823
##  Model2 - Model3   -0.0211 0.0413 882  -0.510  0.9864
##  Model2 - Model4   -0.1526 0.0413 882  -3.700  0.0021
##  Model3 - Model4   -0.1316 0.0413 882  -3.190  0.0128
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## P value adjustment: tukey method for comparing a family of 5 estimates
```

**Human**

```r
mod_human <- mixed(Human ~ Model * Genre + (1 | Participant), data = databs, method = "KR")
```

```
## Contrasts set to contr.sum for the following variables: Model, Genre
```

```r
mod_human
```

```
## Mixed Model Anova Table (Type 3 tests, KR-method)
##
## Model: Human ~ Model * Genre + (1 | Participant)
## Data: databs
##        Effect       df        F p.value
## 1       Model  4, 882 33.83 ***   <.001
## 2       Genre  9, 882 18.65 ***   <.001
## 3 Model:Genre 36, 882  2.61 ***   <.001
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '+' 0.1 ' ' 1
```

```r
emmeans(mod_human, pairwise ~ Model, p.adjust.method = "tukey")
```

```
## NOTE: Results may be misleading due to involvement in interactions

## $emmeans
##  Model emmean    SE   df lower.CL upper.CL
##  0       4.14 0.185 27.2     3.76     4.52
##  1       4.28 0.185 27.2     3.90     4.66
##  2       3.56 0.185 27.2     3.18     3.94
##  3       3.17 0.185 27.2     2.79     3.55
##  4       4.39 0.185 27.2     4.01     4.77
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## Confidence level used: 0.95
##
## $contrasts
##  contrast          estimate     SE  df t.ratio p.value
##  Model0 - Model1     -0.137 0.127 882  -1.080  0.8168
##  Model0 - Model2      0.584 0.127 882   4.611  <.0001
##  Model0 - Model3      0.968 0.127 882   7.644  <.0001
```

```
##  Model0 - Model4    -0.247 0.127 882   -1.953  0.2904
##  Model1 - Model2     0.721 0.127 882    5.692  <.0001
##  Model1 - Model3     1.105 0.127 882    8.724  <.0001
##  Model1 - Model4    -0.111 0.127 882   -0.872  0.9070
##  Model2 - Model3     0.384 0.127 882    3.033  0.0210
##  Model2 - Model4    -0.832 0.127 882   -6.564  <.0001
##  Model3 - Model4    -1.216 0.127 882   -9.597  <.0001
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## P value adjustment: tukey method for comparing a family of 5 estimates
```

**Complexity**

```r
mod_complexity <- mixed(Complexity ~ Model * Genre + (1 | Participant), data = databs, method = "KR")
```

```
## Contrasts set to contr.sum for the following variables: Model, Genre
```

```r
mod_complexity
```

```
## Mixed Model Anova Table (Type 3 tests, KR-method)
##
## Model: Complexity ~ Model * Genre + (1 | Participant)
## Data: databs
##        Effect       df        F p.value
## 1       Model  4, 882 19.84 ***   <.001
## 2       Genre  9, 882 10.28 ***   <.001
## 3 Model:Genre 36, 882  1.68 **     .008
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '+' 0.1 ' ' 1
```

```r
emmeans(mod_complexity, pairwise ~ Model, p.adjust.method = "tukey")
```

```
## NOTE: Results may be misleading due to involvement in interactions

## $emmeans
##  Model emmean    SE   df lower.CL upper.CL
##  0       3.32 0.211 31.8     2.89     3.75
##  1       3.74 0.211 31.8     3.31     4.17
##  2       3.07 0.211 31.8     2.64     3.50
##  3       2.66 0.211 31.8     2.23     3.09
##  4       3.97 0.211 31.8     3.54     4.40
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## Confidence level used: 0.95
##
## $contrasts
##  contrast       estimate    SE  df t.ratio p.value
##  Model0 - Model1   -0.416 0.166 882  -2.503  0.0908
##  Model0 - Model2    0.247 0.166 882   1.489  0.5698
##  Model0 - Model3    0.663 0.166 882   3.992  0.0007
##  Model0 - Model4   -0.653 0.166 882  -3.929  0.0009
##  Model1 - Model2    0.663 0.166 882   3.992  0.0007
##  Model1 - Model3    1.079 0.166 882   6.496  <.0001
##  Model1 - Model4   -0.237 0.166 882  -1.426  0.6111
```

```
##  Model2 - Model3     0.416 0.166 882    2.503  0.0908
##  Model2 - Model4    -0.900 0.166 882   -5.418  <.0001
##  Model3 - Model4    -1.316 0.166 882   -7.921  <.0001
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## P value adjustment: tukey method for comparing a family of 5 estimates
```

# TOP 3

**Data**

```
databs <- read.csv("database_top3.csv", header=TRUE)
head(databs)
```

```
##   Participant Model Genre Liking Curiosity Human Complexity GenreAcc
## 1           1     0     4      5         5     6          4        1
## 2           1     0     3      6         5     6          4        1
## 3           1     1     6      2         3     4          2        0
## 4           1     4     6      5         3     5          4        0
## 5           1     1     5      4         4     4          2        0
## 6           1     1     7      6         4     6          6        0
```

```
databs$Model <- as.factor(databs$Model)
databs$Genre <- as.factor(databs$Genre)
```

**Liking**

```
mod_liking <- mixed(Liking ~ Model * Genre + (1 | Participant), data = databs, method = "KR")
```

```
## Contrasts set to contr.sum for the following variables: Model, Genre
```

```
mod_liking
```

```
## Mixed Model Anova Table (Type 3 tests, KR-method)
##
## Model: Liking ~ Model * Genre + (1 | Participant)
## Data: databs
##        Effect       df        F p.value
## 1       Model   2, 522 9.53 ***   <.001
## 2       Genre   9, 522 7.64 ***   <.001
## 3 Model:Genre 18, 522   1.55 +     .070
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '+' 0.1 ' ' 1
```

```
emmeans(mod_liking, pairwise ~ Model, p.adjust.method = "tukey")
```

```
## NOTE: Results may be misleading due to involvement in interactions
```

```
## $emmeans
##  Model emmean   SE   df lower.CL upper.CL
##  0       3.84 0.15 41.9     3.53     4.14
##  1       4.28 0.15 41.9     3.98     4.59
##  4       4.49 0.15 41.9     4.19     4.79
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## Confidence level used: 0.95
##
## $contrasts
##  contrast        estimate    SE  df t.ratio p.value
##  Model0 - Model1   -0.447 0.153 522  -2.926  0.0100
##  Model0 - Model4   -0.653 0.153 522  -4.268  0.0001
##  Model1 - Model4   -0.205 0.153 522  -1.342  0.3723
##
```

```
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## P value adjustment: tukey method for comparing a family of 3 estimates
```

**Curiosity**

```
mod_curiosity <- mixed(Curiosity ~ Model * Genre + (1 | Participant), data = databs, method = "KR")
```

```
## Contrasts set to contr.sum for the following variables: Model, Genre
mod_curiosity
```

```
## Mixed Model Anova Table (Type 3 tests, KR-method)
##
## Model: Curiosity ~ Model * Genre + (1 | Participant)
## Data: databs
##          Effect       df         F p.value
## 1         Model   2, 522  7.79 ***   <.001
## 2         Genre   9, 522 14.12 ***   <.001
## 3 Model:Genre  18, 522     1.65 *    .045
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '+' 0.1 ' ' 1
```

```
emmeans(mod_curiosity, pairwise ~ Model, p.adjust.method = "tukey")
```

```
## NOTE: Results may be misleading due to involvement in interactions

## $emmeans
##  Model emmean   SE   df lower.CL upper.CL
##  0       4.17  0.2 28.6     3.76     4.58
##  1       4.29  0.2 28.6     3.88     4.70
##  4       4.76  0.2 28.6     4.35     5.17
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## Confidence level used: 0.95
##
## $contrasts
##  contrast        estimate    SE  df t.ratio p.value
##  Model0 - Model1   -0.121 0.158 522  -0.767  0.7232
##  Model0 - Model4   -0.589 0.158 522  -3.737  0.0006
##  Model1 - Model4   -0.468 0.158 522  -2.970  0.0087
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## P value adjustment: tukey method for comparing a family of 3 estimates
```

**Genre Accuracy**

```
mod_genre <- mixed(GenreAcc ~ Model * Genre + (1 | Participant), data = databs, method = "KR")
```

```
## Contrasts set to contr.sum for the following variables: Model, Genre
mod_genre
```

```
## Mixed Model Anova Table (Type 3 tests, KR-method)
##
```

```
## Model: GenreAcc ~ Model * Genre + (1 | Participant)
## Data: databs
##         Effect       df          F p.value
## 1        Model   2, 522    6.82 **    .001
## 2        Genre   9, 522   25.54 ***  <.001
## 3 Model:Genre  18, 522    2.42 ***  <.001
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '+' 0.1 ' ' 1
```

```
emmeans(mod_genre, pairwise ~ Model, p.adjust.method = "tukey")
```

```
## NOTE: Results may be misleading due to involvement in interactions

## $emmeans
##  Model emmean     SE   df lower.CL upper.CL
##  0      0.632 0.0386 46.4    0.554    0.709
##  1      0.479 0.0386 46.4    0.401    0.557
##  4      0.553 0.0386 46.4    0.475    0.630
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## Confidence level used: 0.95
##
## $contrasts
##  contrast        estimate     SE  df t.ratio p.value
##  Model0 - Model1   0.1526 0.0413 522   3.693  0.0007
##  Model0 - Model4   0.0789 0.0413 522   1.910  0.1369
##  Model1 - Model4  -0.0737 0.0413 522  -1.783  0.1764
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## P value adjustment: tukey method for comparing a family of 3 estimates
```

**Human**

```
mod_human <- mixed(Human ~ Model * Genre + (1 | Participant), data = databs, method = "KR")
```

```
## Contrasts set to contr.sum for the following variables: Model, Genre
```

```
mod_human
```

```
## Mixed Model Anova Table (Type 3 tests, KR-method)
##
## Model: Human ~ Model * Genre + (1 | Participant)
## Data: databs
##         Effect       df        F p.value
## 1        Model   2, 522     1.86    .157
## 2        Genre   9, 522   18.40 *** <.001
## 3 Model:Genre  18, 522     2.14 **   .004
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '+' 0.1 ' ' 1
```

```
emmeans(mod_human, pairwise ~ Model, p.adjust.method = "tukey")
```

```
## NOTE: Results may be misleading due to involvement in interactions

## $emmeans
```

```
## Model emmean    SE   df lower.CL upper.CL
## 0        4.14 0.186 25.4     3.76     4.53
## 1        4.28 0.186 25.4     3.90     4.66
## 4        4.39 0.186 25.4     4.01     4.77
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## Confidence level used: 0.95
##
## $contrasts
##  contrast        estimate    SE  df t.ratio p.value
##  Model0 - Model1   -0.137 0.129 522  -1.064  0.5369
##  Model0 - Model4   -0.247 0.129 522  -1.923  0.1331
##  Model1 - Model4   -0.111 0.129 522  -0.859  0.6662
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## P value adjustment: tukey method for comparing a family of 3 estimates
```

**Complexity**

```
mod_complexity <- mixed(Complexity ~ Model * Genre + (1 | Participant), data = databs, method = "KR")
```

```
## Contrasts set to contr.sum for the following variables: Model, Genre
```

```
mod_complexity
```

```
## Mixed Model Anova Table (Type 3 tests, KR-method)
##
## Model: Complexity ~ Model * Genre + (1 | Participant)
## Data: databs
##         Effect       df       F p.value
## 1        Model  2, 522 7.59 ***   <.001
## 2        Genre  9, 522 9.25 ***   <.001
## 3 Model:Genre 18, 522      1.19    .265
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '+' 0.1 ' ' 1
```

```
emmeans(mod_complexity, pairwise ~ Model, p.adjust.method = "tukey")
```

```
## NOTE: Results may be misleading due to involvement in interactions
```

```
## $emmeans
##  Model emmean    SE   df lower.CL upper.CL
## 0        3.32 0.218 28.2     2.87     3.77
## 1        3.74 0.218 28.2     3.29     4.18
## 4        3.97 0.218 28.2     3.53     4.42
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## Confidence level used: 0.95
##
## $contrasts
##  contrast        estimate   SE  df t.ratio p.value
##  Model0 - Model1   -0.416 0.17 522  -2.452  0.0385
##  Model0 - Model4   -0.653 0.17 522  -3.849  0.0004
```

```
##  Model1 - Model4   -0.237 0.17 522  -1.397  0.3433
##
## Results are averaged over the levels of: Genre
## Degrees-of-freedom method: kenward-roger
## P value adjustment: tukey method for comparing a family of 3 estimates
```