Analysis for OSC Data - Birth Experience

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```
require("knitr")
knitr::opts_chunk$set(echo = TRUE)
knitr::opts_chunk$set(tidy.opts=list(width.cutoff=50),tidy=TRUE)

library(data.table)
library(tidyverse)
library(magrittr)
library(car)
library(gridExtra)
library(psych)
library(ggplot2)
library(multcomp)
library(plotly)
library(apaTables)
library(dplyr)
library(rstatix)
library(plyr)
```

Import Datasets - Full data and Data of correct trials only

```
data <- read.csv ("OSC_Full_Data.csv")
data_cue <- read.csv ("OSC_cue_trials.csv")
data_nocue <- read.csv ("OSC_nocue_trials.csv")
```

Descriptives/ Preliminary Analyses

```
data1 <- select (data, ID, AGE, BIRTH_EXP, DIS,TRIAL_TYPE, REAC_TIME, ACCURACY, REAC_TIME_CT)
head (data1)
```

```
##   ID AGE BIRTH_EXP DIS TRIAL_TYPE REAC_TIME  ACCURACY REAC_TIME_CT
## 1  2  15         V   N        Cue 0.9796674 0.7301587    0.9161324
## 2  4  12         C   N        Cue 0.4209360 0.6666667    0.4528049
## 3  5   8         V   N        Cue 0.6351466 0.6101695    0.6239025
## 4  6  11         V   N        Cue 0.6718099 0.7031250    0.7070149
## 5  8  11         C   Y        Cue 0.4581741 0.6031746    0.5135898
## 6  9   8         V   N        Cue 0.5110753 0.5396825    0.5184743
```

```r
summary (data1)
```

```
##        ID              AGE         BIRTH_EXP             DIS
##  Min.   :  2.0   Min.   : 6.00   Length:621         Length:621
##  1st Qu.: 87.0   1st Qu.: 8.00   Class :character   Class :character
##  Median :173.0   Median :10.00   Mode  :character   Mode  :character
##  Mean   :183.2   Mean   :10.05
##  3rd Qu.:284.0   3rd Qu.:11.00
##  Max.   :367.0   Max.   :17.00
##   TRIAL_TYPE          REAC_TIME         ACCURACY       REAC_TIME_CT
##  Length:621         Min.   :0.2657   Min.   :0.2459   Min.   :0.2664
##  Class :character   1st Qu.:0.5625   1st Qu.:0.6714   1st Qu.:0.5890
##  Mode  :character   Median :0.7013   Median :0.8125   Median :0.7176
##                     Mean   :0.7461   Mean   :0.7822   Mean   :0.7618
##                     3rd Qu.:0.8846   3rd Qu.:0.9091   3rd Qu.:0.8998
##                     Max.   :1.6369   Max.   :1.0000   Max.   :1.6369
```

```r
describe (data1)
```

```
##              vars   n   mean     sd median trimmed    mad  min    max  range
## ID              1 621 183.21 109.51 173.00  182.60 146.78 2.00 367.00 365.00
## AGE             2 621  10.05   2.23  10.00    9.93   1.48 6.00  17.00  11.00
## BIRTH_EXP*      3 621   1.76   0.43   2.00    1.82   0.00 1.00   2.00   1.00
## DIS*            4 621   1.12   0.32   1.00    1.02   0.00 1.00   2.00   1.00
## TRIAL_TYPE*     5 621   1.50   0.50   2.00    1.50   0.00 1.00   2.00   1.00
## REAC_TIME       6 621   0.75   0.24   0.70    0.72   0.22 0.27   1.64   1.37
## ACCURACY        7 621   0.78   0.16   0.81    0.80   0.16 0.25   1.00   0.75
## REAC_TIME_CT    8 621   0.76   0.24   0.72    0.74   0.23 0.27   1.64   1.37
##                skew kurtosis   se
## ID             0.07    -1.29 4.39
## AGE            0.47    -0.06 0.09
## BIRTH_EXP*    -1.20    -0.55 0.02
## DIS*           2.39     3.73 0.01
## TRIAL_TYPE*    0.00    -2.00 0.02
## REAC_TIME      1.01     0.99 0.01
## ACCURACY      -0.67    -0.36 0.01
## REAC_TIME_CT   0.95     0.87 0.01
```

```r
data2 <- select (data_cue, ID, AGE, BIRTH_EXP, DIS, REAC_TIME, ACCURACY, REAC_TIME_CT)
head (data2)
```

```
##   ID AGE BIRTH_EXP DIS REAC_TIME  ACCURACY REAC_TIME_CT
## 1  2  15         V   N 0.9796674 0.7301587    0.9161324
## 2  4  12         C   N 0.4209360 0.6666667    0.4528049
## 3  5   8         V   N 0.6351466 0.6101695    0.6239025
## 4  6  11         V   N 0.6718099 0.7031250    0.7070149
## 5  8  11         C   Y 0.4581741 0.6031746    0.5135898
## 6  9   8         V   N 0.5110753 0.5396825    0.5184743
```

```r
summary (data2)
```

```
##        ID              AGE         BIRTH_EXP            DIS
##  Min.   :  2.00   Min.   : 6.00   Length:310         Length:310
##  1st Qu.: 87.25   1st Qu.: 8.00   Class :character   Class :character
##  Median :173.50   Median :10.00   Mode  :character   Mode  :character
##  Mean   :183.50   Mean   :10.04
##  3rd Qu.:283.75   3rd Qu.:11.00
##  Max.   :367.00   Max.   :16.00
##    REAC_TIME         ACCURACY       REAC_TIME_CT
##  Min.   :0.2657   Min.   :0.3214   Min.   :0.2664
##  1st Qu.:0.5380   1st Qu.:0.6392   1st Qu.:0.5581
##  Median :0.6660   Median :0.7878   Median :0.6858
##  Mean   :0.7167   Mean   :0.7674   Mean   :0.7359
##  3rd Qu.:0.8475   3rd Qu.:0.9028   3rd Qu.:0.8750
##  Max.   :1.6369   Max.   :1.0000   Max.   :1.6369
```

```
describe (data2)
```

```
##              vars   n   mean     sd median trimmed    mad  min    max  range
## ID              1 310 183.50 109.45 173.50  182.89 146.78 2.00 367.00 365.00
## AGE             2 310  10.04   2.21  10.00    9.93   1.48 6.00  16.00  10.00
## BIRTH_EXP*      3 310   1.76   0.43   2.00    1.82   0.00 1.00   2.00   1.00
## DIS*            4 310   1.12   0.32   1.00    1.02   0.00 1.00   2.00   1.00
## REAC_TIME       5 310   0.72   0.24   0.67    0.69   0.22 0.27   1.64   1.37
## ACCURACY        6 310   0.77   0.16   0.79    0.78   0.19 0.32   1.00   0.68
## REAC_TIME_CT    7 310   0.74   0.24   0.69    0.71   0.22 0.27   1.64   1.37
##                skew kurtosis   se
## ID             0.07    -1.30 6.22
## AGE            0.44    -0.13 0.13
## BIRTH_EXP*    -1.20    -0.56 0.02
## DIS*           2.38     3.70 0.02
## REAC_TIME      1.08     1.15 0.01
## ACCURACY      -0.46    -0.83 0.01
## REAC_TIME_CT   1.01     1.02 0.01
```

```
data3 <- select (data_nocue, ID, AGE, BIRTH_EXP, DIS, REAC_TIME, ACCURACY, REAC_TIME_CT)
head (data3)
```

```
##   ID AGE BIRTH_EXP DIS REAC_TIME  ACCURACY REAC_TIME_CT
## 1  2  15         V   N 0.9596258 0.7656250    0.9151427
## 2  4  12         C   N 0.5371515 0.7719298    0.5566072
## 3  5   8         V   N 0.6982125 0.6181818    0.6966902
## 4  6  11         V   N 0.7284208 0.7656250    0.7648201
## 5  8  11         C   Y 0.5083103 0.5714286    0.5450339
## 6  9   8         V   N 0.6811256 0.5806452    0.7103940
```

```
summary (data3)
```

```
##        ID              AGE         BIRTH_EXP            DIS
##  Min.   :  2.00   Min.   : 6.00   Length:310         Length:310
##  1st Qu.: 87.25   1st Qu.: 8.00   Class :character   Class :character
##  Median :173.50   Median :10.00   Mode  :character   Mode  :character
##  Mean   :183.50   Mean   :10.04
```

```
##  3rd Qu.:283.75   3rd Qu.:11.00
##  Max.   :367.00   Max.   :16.00
##    REAC_TIME         ACCURACY       REAC_TIME_CT
##  Min.   :0.3786   Min.   :0.2459   Min.   :0.3752
##  1st Qu.:0.6023   1st Qu.:0.7031   1st Qu.:0.6167
##  Median :0.7277   Median :0.8279   Median :0.7416
##  Mean   :0.7760   Mean   :0.7967   Mean   :0.7884
##  3rd Qu.:0.9144   3rd Qu.:0.9190   3rd Qu.:0.9206
##  Max.   :1.6128   Max.   :1.0000   Max.   :1.6092
```

```
describe (data3)
```

```
##              vars   n   mean     sd median trimmed    mad  min    max  range
## ID              1 310 183.50 109.45 173.50  182.89 146.78 2.00 367.00 365.00
## AGE             2 310  10.04   2.21  10.00    9.93   1.48 6.00  16.00  10.00
## BIRTH_EXP*      3 310   1.76   0.43   2.00    1.82   0.00 1.00   2.00   1.00
## DIS*            4 310   1.12   0.32   1.00    1.02   0.00 1.00   2.00   1.00
## REAC_TIME       5 310   0.78   0.23   0.73    0.75   0.21 0.38   1.61   1.23
## ACCURACY        6 310   0.80   0.15   0.83    0.81   0.14 0.25   1.00   0.75
## REAC_TIME_CT    7 310   0.79   0.23   0.74    0.76   0.21 0.38   1.61   1.23
##                skew kurtosis   se
## ID             0.07    -1.30 6.22
## AGE            0.44    -0.13 0.13
## BIRTH_EXP*    -1.20    -0.56 0.02
## DIS*           2.38     3.70 0.02
## REAC_TIME      1.01     0.92 0.01
## ACCURACY      -0.90     0.31 0.01
## REAC_TIME_CT   0.95     0.77 0.01
```

Table : Number of Participants in each Group

Age_Group1 (6 to 8 yrs)	Age_Group2 (9 to 11 yrs)	Age_Group3 (12< yrs)	C-Vaginally_born	sec_born	Gen_dis
166	320	135	471	150	72

Graphs

Function to calculate mean and standard deviation of each group

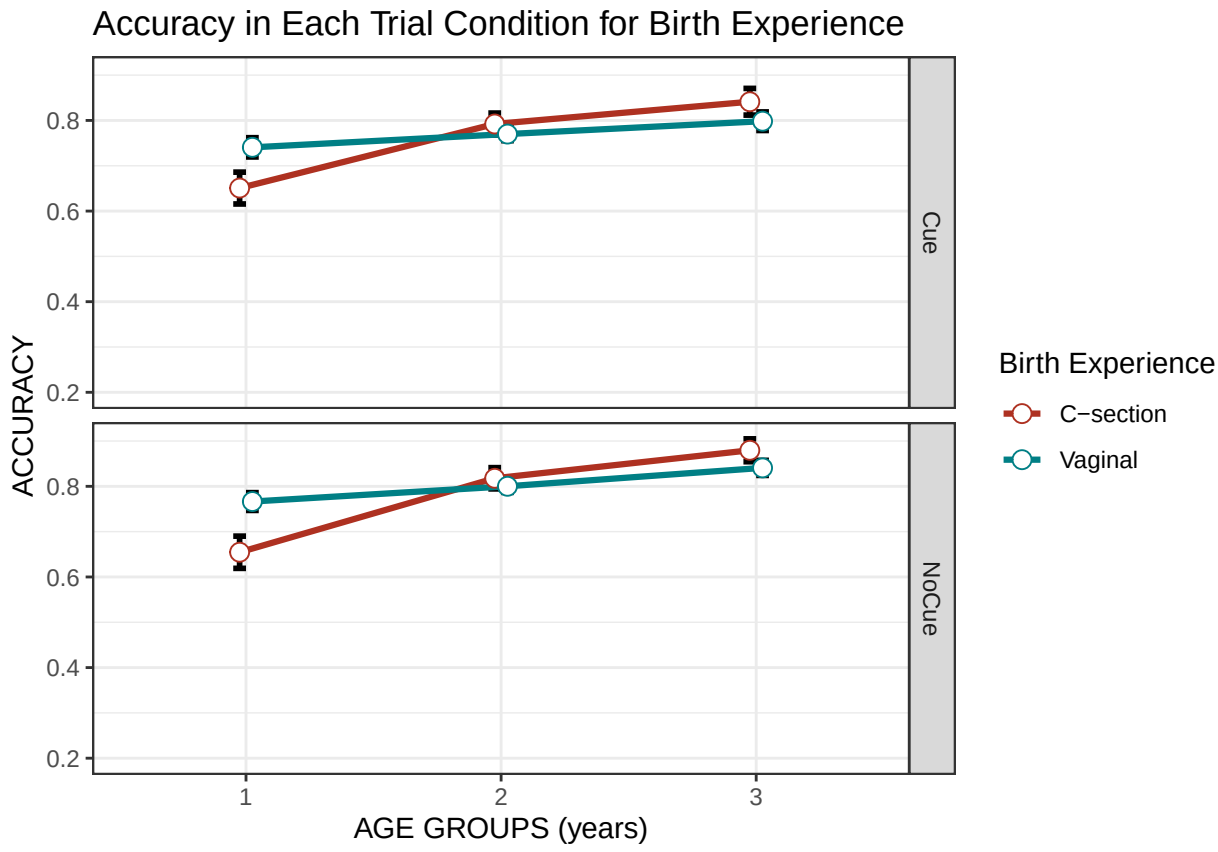
1. Accuracy

```
# Graph 1 for Retrieval Phase 1
fd_graph <- summarySE(data1, measurevar="ACCURACY", groupvars=c("AGE_GROUPS","BIRTH_EXP","TRIAL_TYPE"))
head (fd_graph)
```

```
##   AGE_GROUPS BIRTH_EXP TRIAL_TYPE  N  ACCURACY        sd         se         ci
## 1          1         C        Cue 20 0.6507813 0.1571946 0.03514979 0.07356935
```

```
## 2          1         C      NoCue 20 0.6545466 0.1590150 0.03555683 0.07442130
## 3          1         V        Cue 63 0.7406540 0.1683451 0.02120949 0.04239716
## 4          1         V      NoCue 63 0.7664660 0.1557145 0.01961819 0.03921619
## 5          2         C        Cue 40 0.7921827 0.1524245 0.02410043 0.04874773
## 6          2         C      NoCue 40 0.8177710 0.1481761 0.02342870 0.04738902
```

```
pd <- position_dodge(0.1)
ggplot(fd_graph, aes(x=AGE_GROUPS , y= ACCURACY, group=BIRTH_EXP, color=BIRTH_EXP)) +
  facet_grid(TRIAL_TYPE~.)+
    geom_errorbar(aes(ymin=ACCURACY-se, ymax=ACCURACY+se), colour="black", width=.1, position=pd, size =
    geom_line(position=pd, size = 1.1) +
    geom_point(position=pd, size=3, shape=21, fill="white") + # 21 is filled circle
    xlab("AGE GROUPS (years)") +
    ylab("ACCURACY") +
    scale_colour_hue(name = "Birth Experience",
                     breaks=c("C", "V"),
                     labels=c("C-section", "Vaginal"),
                     l=40) +
    theme(legend.position = "bottom")+
    ggtitle("Accuracy in Each Trial Condition for Birth Experience") + # Use darker colors, lightness=4
    expand_limits(y=c(0.2, 0.6)) +                          # Expand y range
    theme_bw()
```

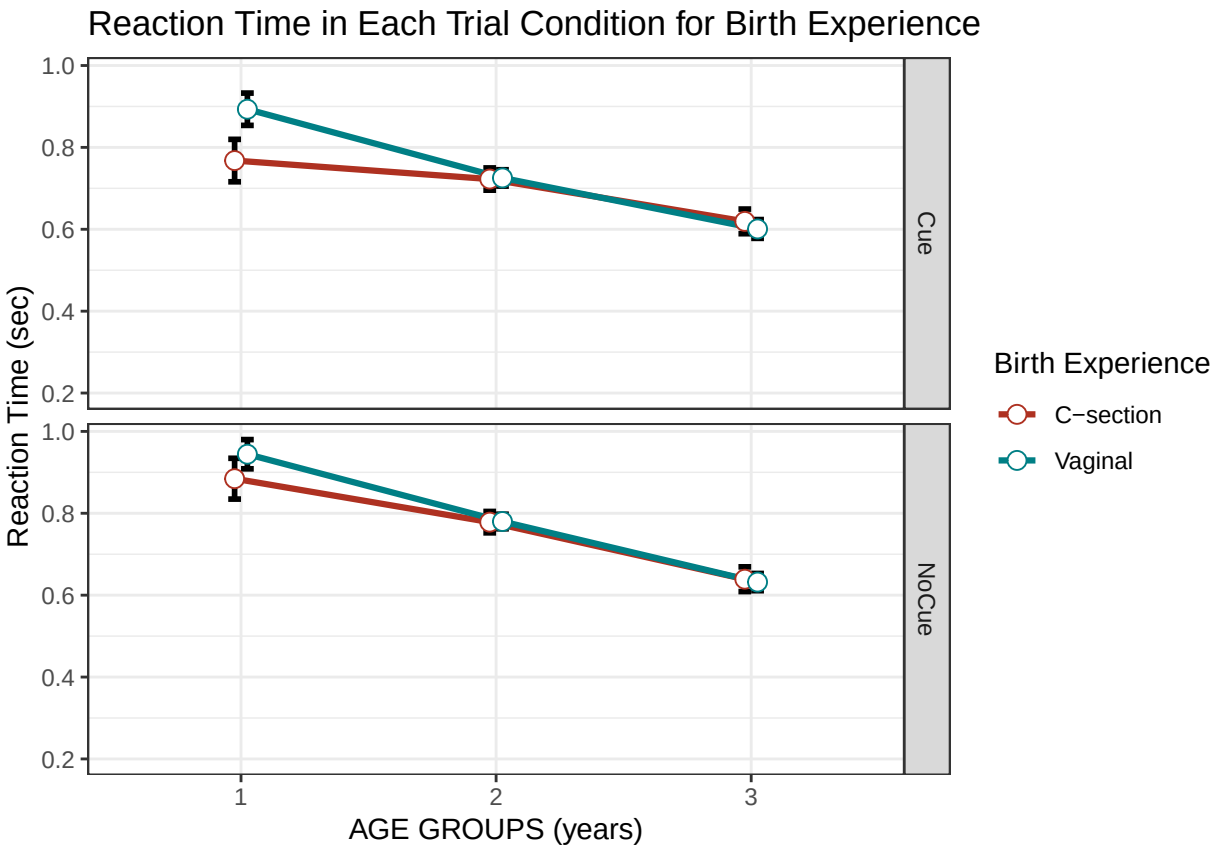


2. Reaction Time

```
# Graph 1 for Retrieval Phase 1
fd_graph <- summarySE(data1, measurevar="REAC_TIME_CT", groupvars=c("AGE_GROUPS","BIRTH_EXP","TRIAL_TYPE
head (fd_graph)
```

```
##   AGE_GROUPS BIRTH_EXP TRIAL_TYPE  N REAC_TIME_CT        sd         se
## 1          1         C        Cue 20    0.7678203 0.2317206 0.05181430
## 2          1         C      NoCue 20    0.8844895 0.2229181 0.04984601
## 3          1         V        Cue 63    0.8932149 0.3130608 0.03944195
## 4          1         V      NoCue 63    0.9442742 0.2834248 0.03570817
## 5          2         C        Cue 40    0.7226627 0.1716141 0.02713458
## 6          2         C      NoCue 40    0.7783631 0.1648390 0.02606334
##           ci
## 1 0.10844857
## 2 0.10432889
## 3 0.07884333
## 4 0.07137962
## 5 0.05488486
## 6 0.05271807
```

```
pd <- position_dodge(0.1)
ggplot(fd_graph, aes(x=AGE_GROUPS , y= REAC_TIME_CT , group=BIRTH_EXP, color=BIRTH_EXP)) +
  facet_grid(TRIAL_TYPE~.)+
    geom_errorbar(aes(ymin=REAC_TIME_CT -se, ymax=REAC_TIME_CT+se), colour="black", width=.1, position=p
    geom_line(position=pd, size = 1.1) +
    geom_point(position=pd, size=3, shape=21, fill="white") + # 21 is filled circle
    xlab("AGE GROUPS (years)") +
    ylab("Reaction Time (sec)") +
    scale_colour_hue(name = "Birth Experience",
                     breaks=c("C", "V"),
                     labels=c("C-section", "Vaginal"),
                     l=40) +
    theme(legend.position = "bottom")+
    ggtitle("Reaction Time in Each Trial Condition for Birth Experience") + # Use darker colors, lightn
    expand_limits(y=c(0.2, 0.6)) +                        # Expand y range
    theme_bw()
```



For the Full Data

Check assumptions

```
# Outliers - Accuracy
data1 %>%
  group_by(AGE_GROUPS, TRIAL_TYPE, BIRTH_EXP) %>%
  identify_outliers(ACCURACY)
```

```
## # A tibble: 5 x 11
##   BIRTH_EXP TRIAL_TYPE AGE_GROUPS    ID   AGE DIS   REAC_TIME ACCURACY
##   <fct>     <fct>      <fct>      <int> <int> <chr>     <dbl>    <dbl>
## 1 C         NoCue      1            344     8 N         1.02     0.246
## 2 C         Cue        2            323    10 N         0.308    0.389
## 3 C         NoCue      2            187     9 N         0.605    0.417
## 4 V         NoCue      2            349    10 N         0.768    0.353
## 5 V         NoCue      3             21    12 N         0.462    0.417
## # ... with 3 more variables: REAC_TIME_CT <dbl>, is.outlier <lgl>,
## #   is.extreme <lgl>
```

```
# Normality  - Accuracy
data1 %>%
```

```
  group_by(AGE_GROUPS, TRIAL_TYPE, BIRTH_EXP) %>%
  shapiro_test(ACCURACY)
```

```
## # A tibble: 12 x 6
##    BIRTH_EXP TRIAL_TYPE AGE_GROUPS variable statistic          p
##    <fct>     <fct>      <fct>      <chr>        <dbl>      <dbl>
##  1 C         Cue        1          ACCURACY     0.964 0.630
##  2 V         Cue        1          ACCURACY     0.958 0.0309
##  3 C         NoCue      1          ACCURACY     0.934 0.183
##  4 V         NoCue      1          ACCURACY     0.946 0.00788
##  5 C         Cue        2          ACCURACY     0.920 0.00791
##  6 V         Cue        2          ACCURACY     0.941 0.0000500
##  7 C         NoCue      2          ACCURACY     0.874 0.000367
##  8 V         NoCue      2          ACCURACY     0.921 0.00000274
##  9 C         Cue        3          ACCURACY     0.915 0.164
## 10 V         Cue        3          ACCURACY     0.922 0.00225
## 11 C         NoCue      3          ACCURACY     0.922 0.203
## 12 V         NoCue      3          ACCURACY     0.916 0.00122
```

```
# Outliers - Reaction Time
data1 %>%
  group_by(AGE_GROUPS, TRIAL_TYPE, BIRTH_EXP) %>%
  identify_outliers(REAC_TIME_CT)
```

```
## # A tibble: 7 x 11
##   BIRTH_EXP TRIAL_TYPE AGE_GROUPS    ID   AGE DIS   REAC_TIME ACCURACY
##   <fct>     <fct>      <fct>      <int> <int> <chr>     <dbl>    <dbl>
## 1 V         Cue        2            136    10 N          1.48    0.983
## 2 V         Cue        2            248    11 N          1.30    1
## 3 V         NoCue      2            136    10 N          1.46    0.962
## 4 V         NoCue      2            248    11 N          1.40    1
## 5 V         Cue        3             85    12 N          1.00    0.901
## 6 V         Cue        3            205    12 N          1.10    0.65
## 7 V         NoCue      3            205    12 N          1.14    0.612
## # ... with 3 more variables: REAC_TIME_CT <dbl>, is.outlier <lgl>,
## #   is.extreme <lgl>
```

```
# Normality - Reaction Time
data1 %>%
  group_by(AGE_GROUPS, TRIAL_TYPE, BIRTH_EXP) %>%
  shapiro_test(REAC_TIME_CT)
```

```
## # A tibble: 12 x 6
##    BIRTH_EXP TRIAL_TYPE AGE_GROUPS variable     statistic        p
##    <fct>     <fct>      <fct>      <chr>            <dbl>    <dbl>
##  1 C         Cue        1          REAC_TIME_CT     0.937 0.212
##  2 V         Cue        1          REAC_TIME_CT     0.954 0.0197
##  3 C         NoCue      1          REAC_TIME_CT     0.944 0.282
##  4 V         NoCue      1          REAC_TIME_CT     0.962 0.0473
##  5 C         Cue        2          REAC_TIME_CT     0.980 0.703
##  6 V         Cue        2          REAC_TIME_CT     0.969 0.00718
##  7 C         NoCue      2          REAC_TIME_CT     0.955 0.110
```

```
##  8 V         NoCue      2          REAC_TIME_CT     0.959 0.000962
##  9 C         Cue        3          REAC_TIME_CT     0.948 0.494
## 10 V         Cue        3          REAC_TIME_CT     0.906 0.000598
## 11 C         NoCue      3          REAC_TIME_CT     0.921 0.202
## 12 V         NoCue      3          REAC_TIME_CT     0.906 0.000523
```

Participant 205 - extreme outlier for Vaginal, cue, age group 3

ANOVA - ACCURACY - Full data

```
# IV- Birth Experience and Age Groups, DV - Accuracy

model1 <- aov(ACCURACY~BIRTH_EXP+AGE_GROUPS+TRIAL_TYPE, data = data1)
summary (model1)
```

```
##              Df Sum Sq Mean Sq F value   Pr(>F)
## BIRTH_EXP     1  0.009  0.0090   0.394   0.5307
## AGE_GROUPS    2  0.776  0.3881  16.947 6.84e-08 ***
## TRIAL_TYPE    1  0.134  0.1345   5.874   0.0157 *
## Residuals   616 14.105  0.0229
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
int_mod1 <- aov (ACCURACY~ BIRTH_EXP*AGE_GROUPS*TRIAL_TYPE, data= data1)
summary (int_mod1)
```

```
##                                 Df Sum Sq Mean Sq F value   Pr(>F)
## BIRTH_EXP                        1  0.009  0.0090   0.400 0.527447
## AGE_GROUPS                       2  0.776  0.3881  17.215 5.34e-08 ***
## TRIAL_TYPE                       1  0.134  0.1345   5.966 0.014866 *
## BIRTH_EXP:AGE_GROUPS             2  0.364  0.1822   8.084 0.000343 ***
## BIRTH_EXP:TRIAL_TYPE             1  0.003  0.0025   0.112 0.737516
## AGE_GROUPS:TRIAL_TYPE            2  0.008  0.0040   0.179 0.835757
## BIRTH_EXP:AGE_GROUPS:TRIAL_TYPE  2  0.002  0.0009   0.038 0.962597
## Residuals                      609 13.728  0.0225
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
TukeyHSD(int_mod1)
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = ACCURACY ~ BIRTH_EXP * AGE_GROUPS * TRIAL_TYPE, data = data1)
##
## $BIRTH_EXP
##            diff         lwr        upr     p adj
## V-C 0.008900079 -0.01874401 0.03654417 0.5274467
##
## $AGE_GROUPS
```

```
##           diff         lwr        upr     p adj
## 2-1 0.06084719 0.027106290 0.09458808 0.0000776
## 3-1 0.09935157 0.058469786 0.14023335 0.0000001
## 3-2 0.03850438 0.002302485 0.07470628 0.0339662
##
## $TRIAL_TYPE
##                 diff         lwr        upr     p adj
## NoCue-Cue 0.02943283 0.005768332 0.05309733 0.0148663
##
## $`BIRTH_EXP:AGE_GROUPS`
##                diff          lwr        upr     p adj
## V:1-C:1  0.10092480  0.023026964 0.17882264 0.0031551
## C:2-C:1  0.15231310  0.069193732 0.23543248 0.0000033
## V:2-C:1  0.13239208  0.059087683 0.20569648 0.0000049
## C:3-C:1  0.20784515  0.104177074 0.31151322 0.0000002
## V:3-C:1  0.16706074  0.087307936 0.24681355 0.0000001
## C:2-V:1  0.05138830 -0.009972348 0.11274896 0.1598151
## V:2-V:1  0.03146728 -0.015753840 0.07868840 0.3999601
## C:3-V:1  0.10692034  0.019723048 0.19411764 0.0064762
## V:3-V:1  0.06613594  0.009419016 0.12285287 0.0116700
## V:2-C:2 -0.01992103 -0.075333940 0.03549189 0.9085703
## C:3-C:2  0.05553204 -0.036359883 0.14742396 0.5139411
## V:3-C:2  0.01474764 -0.048951395 0.07844667 0.9859440
## C:3-V:2  0.07545307 -0.007666306 0.15857244 0.0999624
## V:3-V:2  0.03466866 -0.015553555 0.08489088 0.3588429
## V:3-C:3 -0.04078440 -0.129642749 0.04807394 0.7783354
##
## $`BIRTH_EXP:TRIAL_TYPE`
##                         diff          lwr        upr     p adj
## V:Cue-C:Cue     0.004146824 -0.047149461 0.05544311 0.9968044
## C:NoCue-C:Cue   0.022273676 -0.040888050 0.08543540 0.8003475
## V:NoCue-C:Cue   0.035859680 -0.015410305 0.08712966 0.2734268
## C:NoCue-V:Cue   0.018126852 -0.033169432 0.06942314 0.7993457
## V:NoCue-V:Cue   0.031712856 -0.003931449 0.06735716 0.1009905
## V:NoCue-C:NoCue 0.013586004 -0.037683981 0.06485599 0.9036996
##
## $`AGE_GROUPS:TRIAL_TYPE`
##                         diff          lwr         upr     p adj
## 2:Cue-1:Cue      0.05653163 -0.001530203 0.114593457 0.0614780
## 3:Cue-1:Cue      0.08878892  0.018294332 0.159283517 0.0046092
## 1:NoCue-1:Cue    0.02045907 -0.046169821 0.087087957 0.9517327
## 2:NoCue-1:Cue    0.08562181  0.027559984 0.143683644 0.0004103
## 3:NoCue-1:Cue    0.13006752  0.059860326 0.200274707 0.0000025
## 3:Cue-2:Cue      0.03225730 -0.030202728 0.094717323 0.6795244
## 1:NoCue-2:Cue   -0.03607256 -0.094134389 0.021989271 0.4820265
## 2:NoCue-2:Cue    0.02909019 -0.018898805 0.077079179 0.5104124
## 3:NoCue-2:Cue    0.07353589  0.011400418 0.135671361 0.0098731
## 1:NoCue-3:Cue   -0.06832986 -0.138824448 0.002164736 0.0635706
## 2:NoCue-3:Cue   -0.00316711 -0.065627136 0.059292915 0.9999911
## 3:NoCue-3:Cue    0.04127859 -0.032607321 0.115164506 0.6007484
## 2:NoCue-1:NoCue  0.06516275  0.007100916 0.123224576 0.0175567
## 3:NoCue-1:NoCue  0.10960845  0.039401258 0.179815638 0.0001397
## 3:NoCue-2:NoCue  0.04444570 -0.017689769 0.106581174 0.3181617
##
```

```
## $`BIRTH_EXP:AGE_GROUPS:TRIAL_TYPE`
##                                diff          lwr          upr     p adj
## V:1:Cue-C:1:Cue       0.0898726491 -0.036554641  0.216299939 0.4547124
## C:2:Cue-C:1:Cue       0.1414013243  0.006499542  0.276303106 0.0304320
## V:2:Cue-C:1:Cue       0.1191468149  0.000174626  0.238119004 0.0492736
## C:3:Cue-C:1:Cue       0.1904756177  0.022223535  0.358727701 0.0118749
## V:3:Cue-C:1:Cue       0.1475360506  0.017926611  0.277145490 0.0110328
## C:1:NoCue-C:1:Cue     0.0037652631 -0.152005897  0.159536423 1.0000000
## V:1:NoCue-C:1:Cue     0.1156846861 -0.010742604  0.242111976 0.1103939
## C:2:NoCue-C:1:Cue     0.1669896278  0.032087846  0.301891410 0.0031877
## V:2:NoCue-C:1:Cue     0.1493445579  0.030372369  0.268316747 0.0025334
## C:3:NoCue-C:1:Cue     0.2287629909  0.060510908  0.397015074 0.0005954
## V:3:NoCue-C:1:Cue     0.1899525733  0.060683227  0.319221920 0.0001141
## C:2:Cue-V:1:Cue       0.0515286752 -0.048058955  0.151116305 0.8690292
## V:2:Cue-V:1:Cue       0.0292741658 -0.047365165  0.105913496 0.9842412
## C:3:Cue-V:1:Cue       0.1006029686 -0.040917237  0.242123175 0.4546910
## V:3:Cue-V:1:Cue       0.0576634015 -0.034628592  0.149955395 0.6587612
## C:1:NoCue-V:1:Cue    -0.0861073860 -0.212534676  0.040319904 0.5250635
## V:1:NoCue-V:1:Cue     0.0258120370 -0.061955069  0.113579143 0.9983184
## C:2:NoCue-V:1:Cue     0.0771169787 -0.022470651  0.176704609 0.3167671
## V:2:NoCue-V:1:Cue     0.0594719088 -0.017167422  0.136111239 0.3135291
## C:3:NoCue-V:1:Cue     0.1388903418 -0.002629864  0.280410548 0.0600131
## V:3:NoCue-V:1:Cue     0.1000799242  0.008266150  0.191893698 0.0192570
## V:2:Cue-C:2:Cue      -0.0222545094 -0.112189031  0.067680012 0.9996670
## C:3:Cue-C:2:Cue       0.0490742934 -0.100065238  0.198213825 0.9954382
## V:3:Cue-C:2:Cue       0.0061347263 -0.097462780  0.109732232 1.0000000
## C:1:NoCue-C:2:Cue    -0.1376360613 -0.272537843 -0.002734279 0.0407386
## V:1:NoCue-C:2:Cue    -0.0257166382 -0.125304268  0.073870992 0.9994992
## C:2:NoCue-C:2:Cue     0.0255883035 -0.084558540  0.135735147 0.9998196
## V:2:NoCue-C:2:Cue     0.0079432336 -0.081991288  0.097877755 1.0000000
## C:3:NoCue-C:2:Cue     0.0873616666 -0.061777865  0.236501198 0.7452264
## V:3:NoCue-C:2:Cue     0.0485512490 -0.054620454  0.151722952 0.9276455
## C:3:Cue-V:2:Cue       0.0713288029 -0.063572979  0.206230585 0.8515172
## V:3:Cue-V:2:Cue       0.0283892357 -0.053393001  0.110171472 0.9927958
## C:1:NoCue-V:2:Cue    -0.1153815518 -0.234353741  0.003590637 0.0670802
## V:1:NoCue-V:2:Cue    -0.0034621287 -0.080101459  0.073177202 1.0000000
## C:2:NoCue-V:2:Cue     0.0478428130 -0.042091708  0.137777334 0.8462929
## V:2:NoCue-V:2:Cue     0.0301977431 -0.033395567  0.093791053 0.9232148
## C:3:NoCue-V:2:Cue     0.1096161760 -0.025285606  0.244517958 0.2460483
## V:3:NoCue-V:2:Cue     0.0708057584 -0.010436418  0.152047935 0.1584780
## V:3:Cue-C:3:Cue      -0.0429395672 -0.187309633  0.101430499 0.9981374
## C:1:NoCue-C:3:Cue    -0.1867103547 -0.354962438 -0.018458272 0.0154034
## V:1:NoCue-C:3:Cue    -0.0747909316 -0.216311138  0.066729274 0.8519396
## C:2:NoCue-C:3:Cue    -0.0234859899 -0.172625521  0.125653542 0.9999965
## V:2:NoCue-C:3:Cue    -0.0411310598 -0.176032842  0.093770722 0.9976707
## C:3:NoCue-C:3:Cue     0.0382873731 -0.141581670  0.218156416 0.9999240
## V:3:NoCue-C:3:Cue    -0.0005230445 -0.144587866  0.143541778 1.0000000
## C:1:NoCue-V:3:Cue    -0.1437707875 -0.273380227 -0.014161348 0.0154822
## V:1:NoCue-V:3:Cue    -0.0318513644 -0.124143358  0.060440629 0.9931412
## C:2:NoCue-V:3:Cue     0.0194535772 -0.084143929  0.123051083 0.9999785
## V:2:NoCue-V:3:Cue     0.0018085074 -0.079973729  0.083590744 1.0000000
## C:3:NoCue-V:3:Cue     0.0812269403 -0.063143126  0.225597006 0.7917511
## V:3:NoCue-V:3:Cue     0.0424165227 -0.053731885  0.138564931 0.9534832
## V:1:NoCue-C:1:NoCue   0.1119194231 -0.014507867  0.238346713 0.1418796
```

```
## C:2:NoCue-C:1:NoCue  0.1632243648  0.028322583  0.298126147 0.0045706
## V:2:NoCue-C:1:NoCue  0.1455792949  0.026607106  0.264551484 0.0038345
## C:3:NoCue-C:1:NoCue  0.2249977278  0.056745645  0.393249811 0.0008206
## V:3:NoCue-C:1:NoCue  0.1861873102  0.056917964  0.315456656 0.0001791
## C:2:NoCue-V:1:NoCue  0.0513049417 -0.048282688  0.150892572 0.8723497
## V:2:NoCue-V:1:NoCue  0.0336598718 -0.042979459  0.110299202 0.9549252
## C:3:NoCue-V:1:NoCue  0.1130783047 -0.028441901  0.254598511 0.2698914
## V:3:NoCue-V:1:NoCue  0.0742678871 -0.017545887  0.166081661 0.2523692
## V:2:NoCue-C:2:NoCue -0.0176450699 -0.107579591  0.072289451 0.9999665
## C:3:NoCue-C:2:NoCue  0.0617733630 -0.087366168  0.210912895 0.9705839
## V:3:NoCue-C:2:NoCue  0.0229629455 -0.080208757  0.126134648 0.9998816
## C:3:NoCue-V:2:NoCue  0.0794184329 -0.055483349  0.214320215 0.7390248
## V:3:NoCue-V:2:NoCue  0.0406080153 -0.040634161  0.121850192 0.8936431
## V:3:NoCue-C:3:NoCue -0.0388104176 -0.182875240  0.105254404 0.9992529
```

```
TukeyHSD(int_mod1, "TRIAL_TYPE")
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = ACCURACY ~ BIRTH_EXP * AGE_GROUPS * TRIAL_TYPE, data = data1)
##
## $TRIAL_TYPE
##                  diff         lwr        upr     p adj
## NoCue-Cue 0.02943283 0.005768332 0.05309733 0.0148663
```

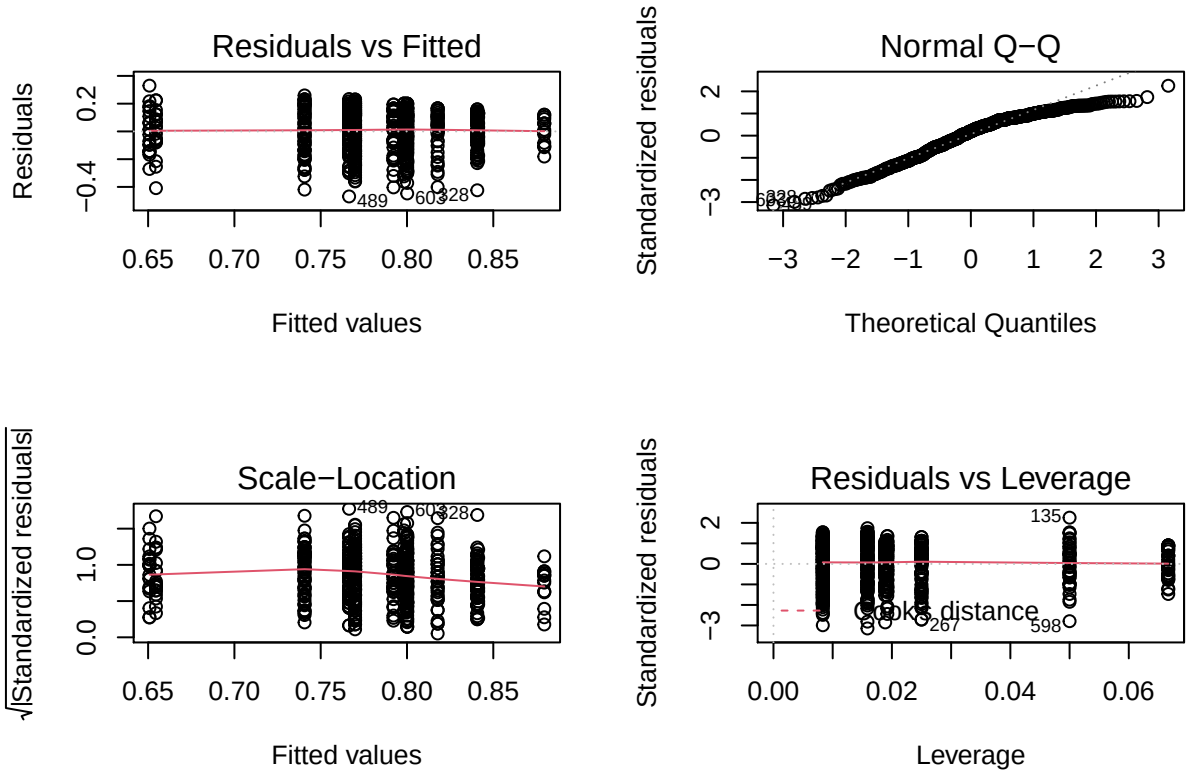
```
# options(contrasts = c("contr.sum", "contr.poly"))
# lm_output <- lm(ACCURACY ~ BIRTH_EXP*AGE_GROUPS*TRIAL_TYPE, data = data1)
# summary (lm_output)
# apa.aov.table(lm_output)

apa.2way.table(BIRTH_EXP, AGE_GROUPS, ACCURACY, data = data1)
```

```
##
##
## Means and standard deviations for ACCURACY as a function of a 2(BIRTH_EXP) X 3(AGE_GROUPS) design
##
##            AGE_GROUPS
##                     1         2         3
##  BIRTH_EXP          M   SD    M   SD    M   SD
##          C       0.65 0.16 0.80 0.15 0.86 0.11
##          V       0.75 0.16 0.79 0.15 0.82 0.14
##
## Note. M and SD represent mean and standard deviation, respectively.
```

1. There is a main effect of Trial type (cue and no cue) in accuracy
2. There is an interaction effect between birth experience and age groups.

```
par(mfrow=c(2,2))
plot(int_mod1)
```



ANOVA - REACTION TIME OF CORRECT TRIALS - Full Data

```
# IV- Birth Experience and Age Groups, DV - Reaction Time

model2 <- aov(REAC_TIME_CT~ BIRTH_EXP+AGE_GROUPS+TRIAL_TYPE, data = data1)
summary(model2)
```

```
##              Df Sum Sq Mean Sq F value  Pr(>F)
## BIRTH_EXP     1  0.047  0.0471   1.013 0.31455
## AGE_GROUPS    2  5.793  2.8967  62.282 < 2e-16 ***
## TRIAL_TYPE    1  0.425  0.4247   9.131 0.00262 **
## Residuals   616 28.650  0.0465
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
int_mod2 <- aov (REAC_TIME_CT~BIRTH_EXP*AGE_GROUPS*TRIAL_TYPE, data= data1)
summary (int_mod2)
```

```
##                                Df Sum Sq Mean Sq F value  Pr(>F)
## BIRTH_EXP                       1  0.047  0.0471   1.011 0.31507
## AGE_GROUPS                      2  5.793  2.8967  62.149 < 2e-16 ***
## TRIAL_TYPE                      1  0.425  0.4247   9.111 0.00265 **
## BIRTH_EXP:AGE_GROUPS            2  0.203  0.1015   2.178 0.11417
```

```
## BIRTH_EXP:TRIAL_TYPE              1  0.008  0.0076   0.164 0.68574
## AGE_GROUPS:TRIAL_TYPE             2  0.028  0.0138   0.297 0.74314
## BIRTH_EXP:AGE_GROUPS:TRIAL_TYPE   2  0.026  0.0132   0.283 0.75378
## Residuals                       609 28.385  0.0466
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
options(contrasts = c("contr.sum", "contr.poly"))
lm_output2 <- lm(REAC_TIME ~ BIRTH_EXP*AGE_GROUPS*TRIAL_TYPE, data = data1)
apa.aov.table(lm_output2)
```

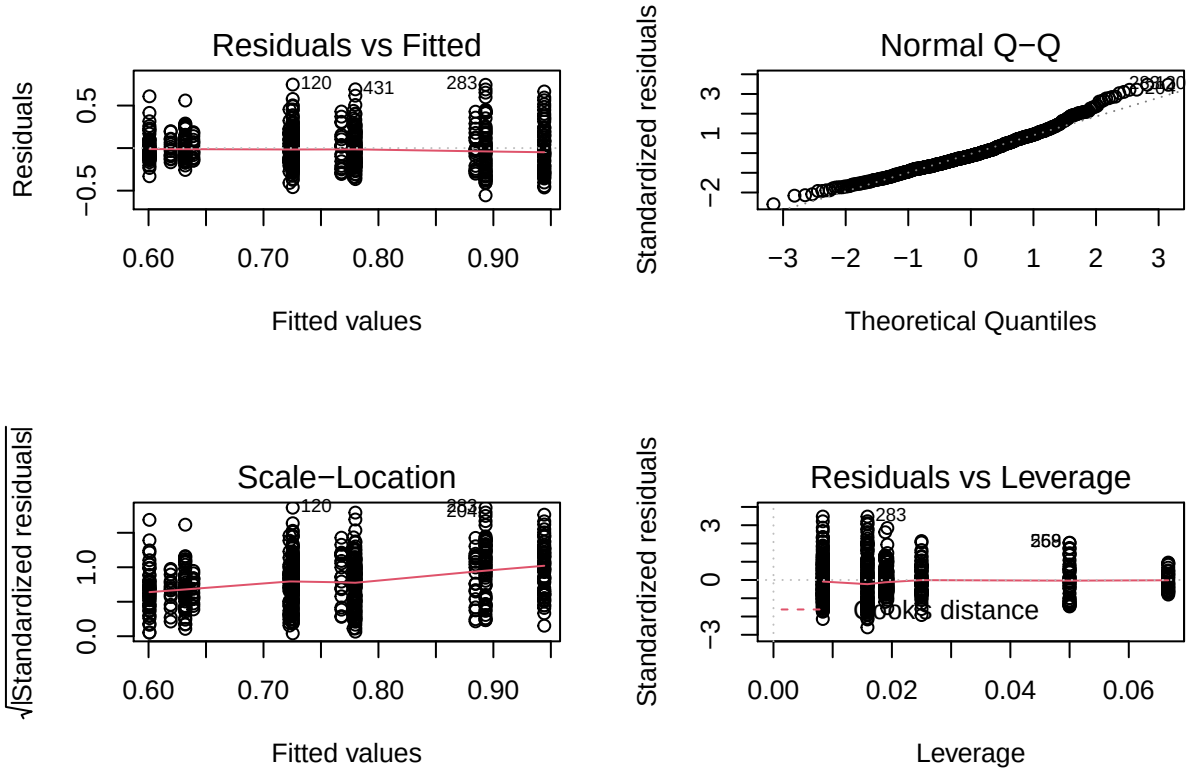
```
##
##
## ANOVA results using REAC_TIME as the dependent variable
##
##
##                            Predictor     SS  df     MS       F    p
##                          (Intercept) 208.77   1 208.77 4317.91 .000
##                            BIRTH_EXP   0.10   1   0.10    2.02 .156
##                           AGE_GROUPS   2.91   2   1.46   30.09 .000
##                           TRIAL_TYPE   0.40   1   0.40    8.30 .004
##               BIRTH_EXP x AGE_GROUPS   0.22   2   0.11    2.31 .100
##               BIRTH_EXP x TRIAL_TYPE   0.02   1   0.02    0.31 .577
##              AGE_GROUPS x TRIAL_TYPE   0.05   2   0.02    0.51 .598
##  BIRTH_EXP x AGE_GROUPS x TRIAL_TYPE   0.03   2   0.01    0.32 .726
##                                 Error  29.45 609   0.05
##  partial_eta2 CI_90_partial_eta2
##
##           .00         [.00, .02]
##           .09         [.06, .13]
##           .01         [.00, .03]
##           .01         [.00, .02]
##           .00         [.00, .01]
##           .00         [.00, .01]
##           .00         [.00, .01]
##
##
## Note: Values in square brackets indicate the bounds of the 90% confidence interval for partial eta-s
```

```
apa.2way.table(BIRTH_EXP, AGE_GROUPS, REAC_TIME, data = data1)
```

```
##
##
## Means and standard deviations for REAC_TIME as a function of a 2(BIRTH_EXP) X 3(AGE_GROUPS) design
##
##            AGE_GROUPS
##                     1         2         3
##  BIRTH_EXP          M   SD    M   SD    M   SD
##          C       0.80 0.24 0.73 0.18 0.62 0.11
##          V       0.90 0.31 0.74 0.21 0.61 0.16
##
## Note. M and SD represent mean and standard deviation, respectively.
```

1. There is a main effect of Trial type (cue and no cue) on reaction time in correct trials

```
par(mfrow=c(2,2))
plot(int_mod2)
```



For each Trial Condition

Cue Trials

1. TWO-WAY ANOVA - ACCURACY

```
# IV- Birth Experience and Age Groups, DV - Accuracy

model3 <- aov(ACCURACY~BIRTH_EXP+AGE_GROUPS, data = data2)
summary (model3)
```

```
##              Df Sum Sq Mean Sq F value Pr(>F)
## BIRTH_EXP     1  0.001 0.00094   0.038  0.846
## AGE_GROUPS    2  0.315 0.15736   6.342  0.002 **
## Residuals   306  7.593 0.02481
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```r
int_mod3 <- aov (ACCURACY~ BIRTH_EXP*AGE_GROUPS, data= data2)
summary (int_mod3)
```

```
##                        Df Sum Sq Mean Sq F value  Pr(>F)
## BIRTH_EXP               1  0.001 0.00094   0.039 0.84450
## AGE_GROUPS              2  0.315 0.15736   6.434 0.00183 **
## BIRTH_EXP:AGE_GROUPS    2  0.158 0.07913   3.235 0.04070 *
## Residuals             304  7.435 0.02446
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```r
TukeyHSD(int_mod3)
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = ACCURACY ~ BIRTH_EXP * AGE_GROUPS, data = data2)
##
## $BIRTH_EXP
##            diff         lwr        upr     p adj
## V-C 0.004071557 -0.03674135 0.04488446 0.8444983
##
## $AGE_GROUPS
##           diff          lwr       upr     p adj
## 2-1 0.05653064  0.006706249 0.1063550 0.0215967
## 3-1 0.08886324  0.028369963 0.1493565 0.0017840
## 3-2 0.03233260 -0.021266006 0.0859312 0.3314545
##
## $`BIRTH_EXP:AGE_GROUPS`
##                  diff         lwr        upr     p adj
## V:1-C:1  0.089872649 -0.02524242 0.20498772 0.2230396
## C:2-C:1  0.141401324  0.01857002 0.26423263 0.0136154
## V:2-C:1  0.119146815  0.01081979 0.22747384 0.0216650
## C:3-C:1  0.190475618  0.03727807 0.34367317 0.0055857
## V:3-C:1  0.147536051  0.02952355 0.26554855 0.0052136
## C:2-V:1  0.051528675 -0.03914825 0.14220560 0.5794483
## V:2-V:1  0.029274166 -0.04050778 0.09905611 0.8351536
## C:3-V:1  0.100602969 -0.02825457 0.22946050 0.2230268
## V:3-V:1  0.057663401 -0.02637067 0.14169747 0.3632449
## V:2-C:2 -0.022254509 -0.10414204 0.05963302 0.9708392
## C:3-C:2  0.049074293 -0.08672082 0.18486941 0.9053108
## V:3-C:2  0.006134726 -0.08819328 0.10046274 0.9999686
## C:3-V:2  0.071328803 -0.05150250 0.19416010 0.5557533
## V:3-V:2  0.028389236 -0.04607545 0.10285392 0.8838010
## V:3-C:3 -0.042939567 -0.17439197 0.08851283 0.9366671
```

```r
options(contrasts = c("contr.sum", "contr.poly"))
lm_output3 <- lm(ACCURACY ~ BIRTH_EXP*AGE_GROUPS, data = data2)
summary (lm_output3)
```

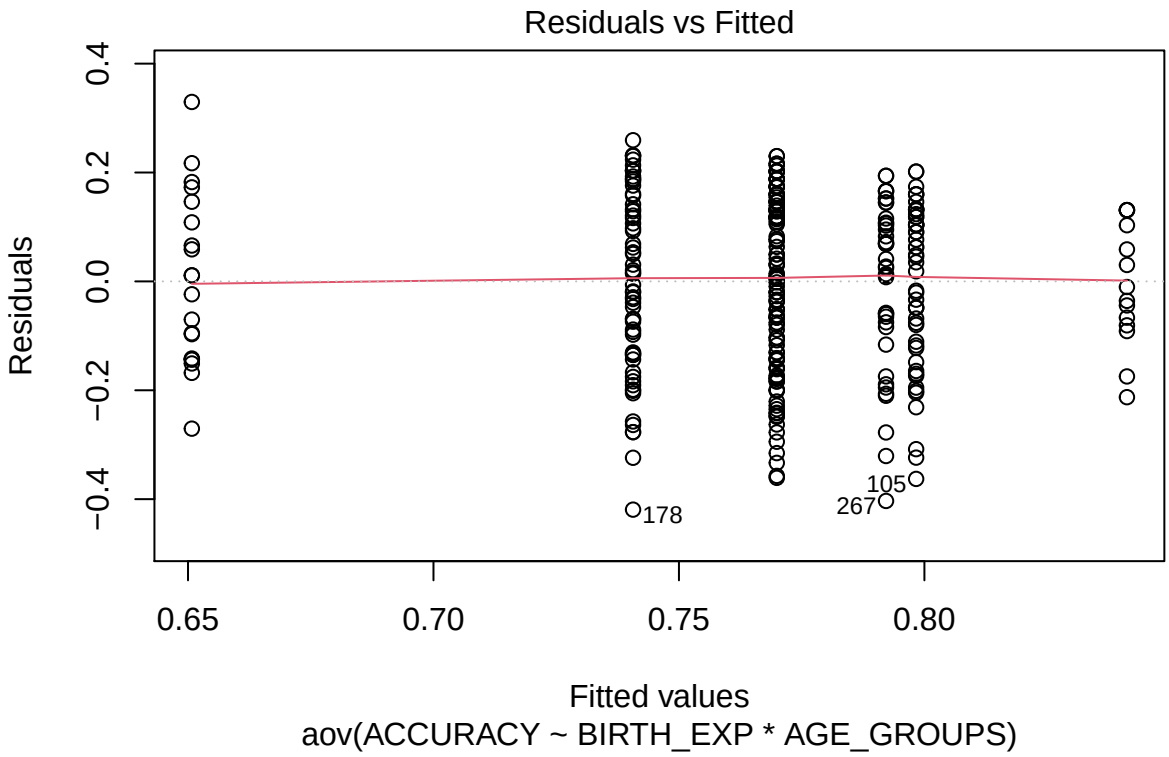
```
##
## Call:
```

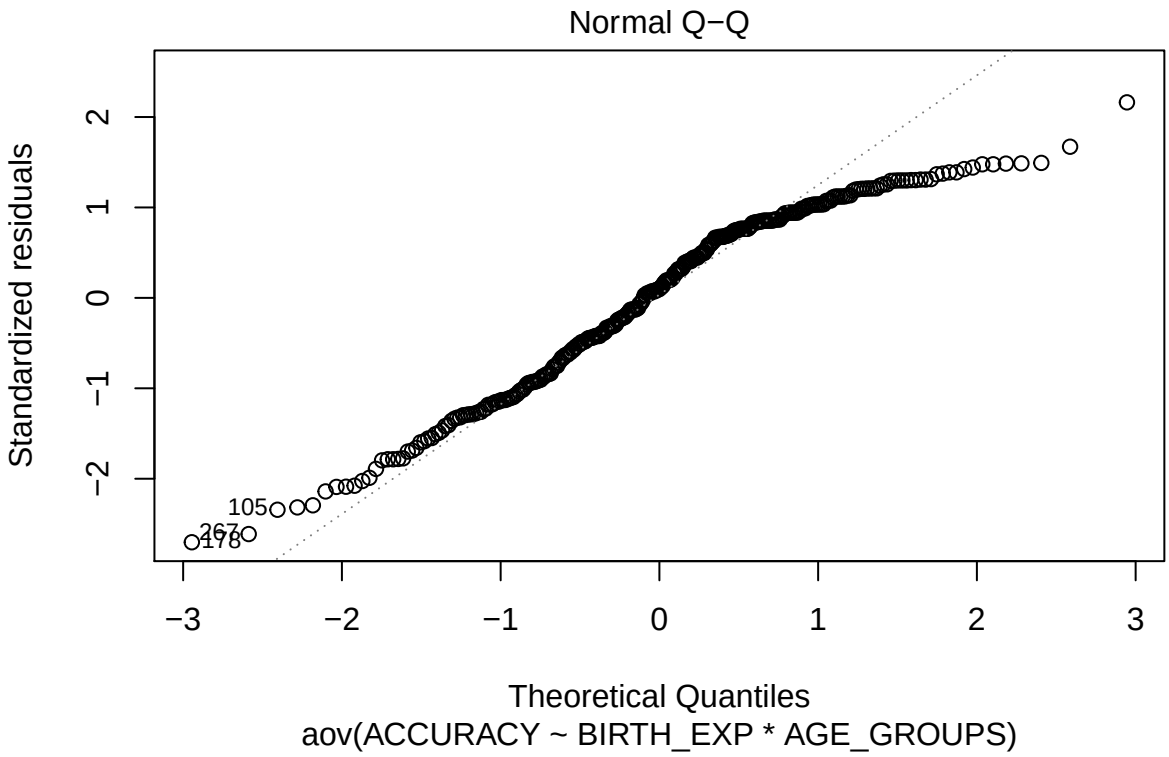
```
## lm(formula = ACCURACY ~ BIRTH_EXP * AGE_GROUPS, data = data2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.41923 -0.12114  0.01559  0.13135  0.32961
##
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
## (Intercept)              0.765520   0.011214  68.265  < 2e-16 ***
## BIRTH_EXP1              -0.004113   0.011214  -0.367   0.7140
## AGE_GROUPS1             -0.069802   0.016125  -4.329 2.04e-05 ***
## AGE_GROUPS2              0.015535   0.013917   1.116   0.2652
## BIRTH_EXP1:AGE_GROUPS1 -0.040823   0.016125  -2.532   0.0119 *
## BIRTH_EXP1:AGE_GROUPS2  0.015240   0.013917   1.095   0.2744
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1564 on 304 degrees of freedom
## Multiple R-squared:  0.05992,    Adjusted R-squared:  0.04446
## F-statistic: 3.876 on 5 and 304 DF,  p-value: 0.002026
```

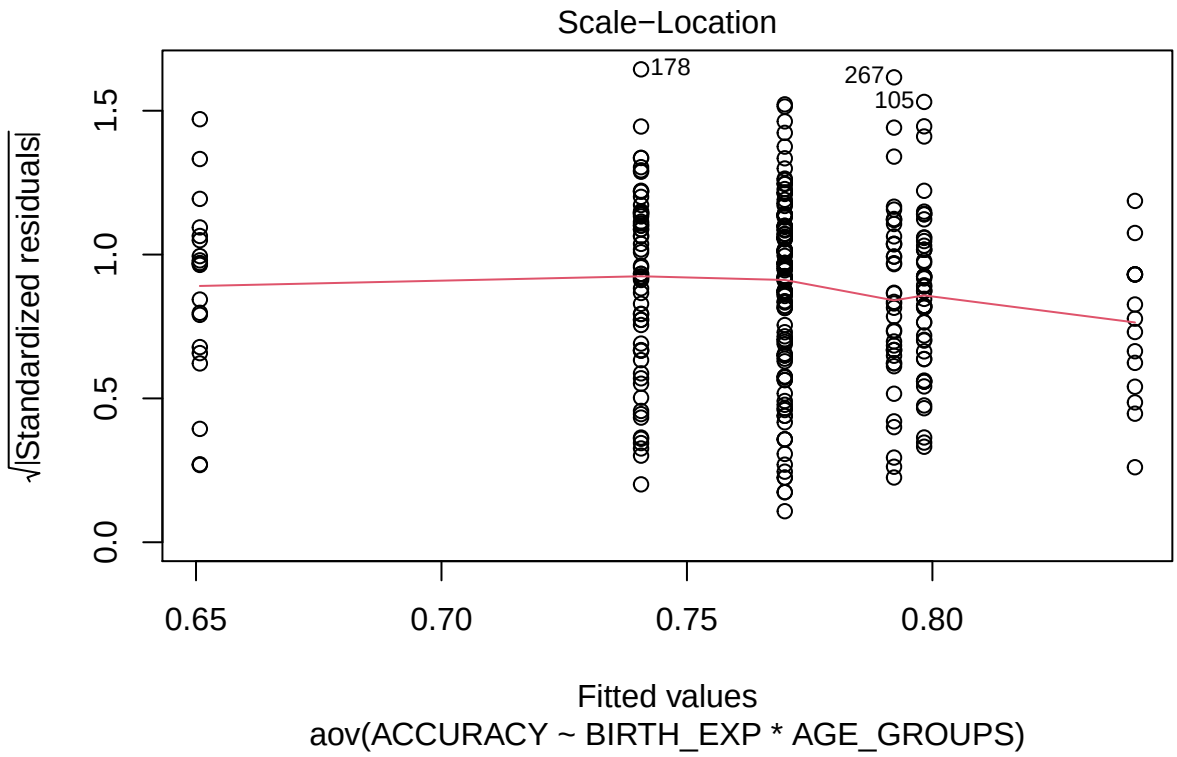
```
apa.aov.table(lm_output3)
```

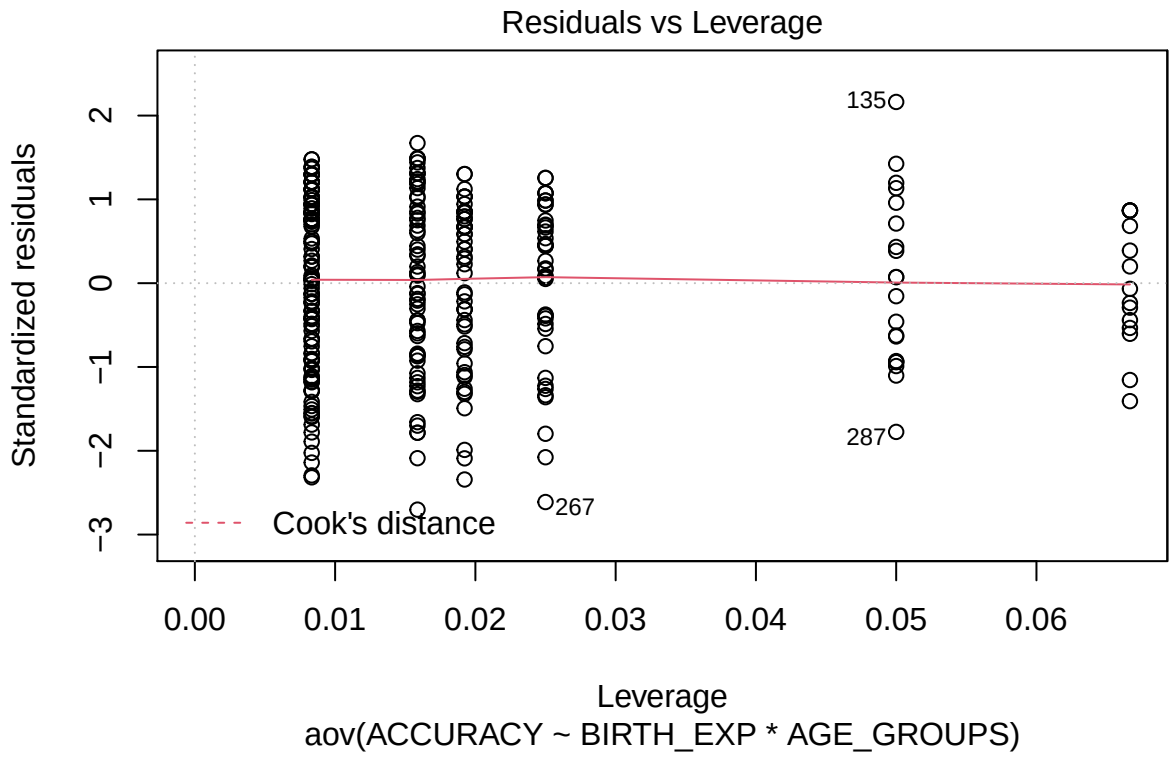
```
##
##
## ANOVA results using ACCURACY as the dependent variable
##
##
##               Predictor     SS  df     MS       F    p partial_eta2
##             (Intercept) 113.97   1 113.97 4660.14 .000
##               BIRTH_EXP   0.00   1   0.00    0.13 .714          .00
##              AGE_GROUPS   0.46   2   0.23    9.44 .000          .06
##  BIRTH_EXP x AGE_GROUPS   0.16   2   0.08    3.24 .041          .02
##                   Error   7.43 304   0.02
##  CI_90_partial_eta2
##
##          [.00, .01]
##          [.02, .10]
##          [.00, .05]
##
##
## Note: Values in square brackets indicate the bounds of the 90% confidence interval for partial eta-s
```

```
plot(int_mod3)
```


Residuals vs Fitted
Residuals
0.4
0.2
0.0
−0.2
−0.4
178
105
267
0.65
0.70
0.75
0.80
Fitted values
aov(ACCURACY ~ BIRTH_EXP * AGE_GROUPS)


Normal Q−Q
Standardized residuals
Theoretical Quantiles
aov(ACCURACY ~ BIRTH_EXP * AGE_GROUPS)
105
267
178


Scale−Location
178
267
105
√|Standardized residuals|
0.0
0.5
1.0
1.5
0.65
0.70
0.75
0.80
Fitted values
aov(ACCURACY ~ BIRTH_EXP * AGE_GROUPS)



2. TWO-WAY ANOVA - REACTION TIME

```
# IV- Birth Experience and Age Groups, DV - Reaction Time

model4 <- aov(REAC_TIME_CT~ BIRTH_EXP+AGE_GROUPS, data = data2)
summary(model4)
```

```
##              Df Sum Sq Mean Sq F value   Pr(>F)
## BIRTH_EXP     1  0.047  0.0472   0.921    0.338
## AGE_GROUPS    2  2.518  1.2589  24.554 1.29e-10 ***
## Residuals   306 15.689  0.0513
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
int_mod4 <- aov (REAC_TIME_CT~BIRTH_EXP*AGE_GROUPS, data= data2)
summary (int_mod4)
```

```
##                       Df Sum Sq Mean Sq F value   Pr(>F)
## BIRTH_EXP              1  0.047  0.0472   0.926    0.337
## AGE_GROUPS             2  2.518  1.2589  24.689 1.16e-10 ***
## BIRTH_EXP:AGE_GROUPS   2  0.188  0.0938   1.840    0.161
## Residuals            304 15.502  0.0510
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```r
TukeyHSD(int_mod4)
```

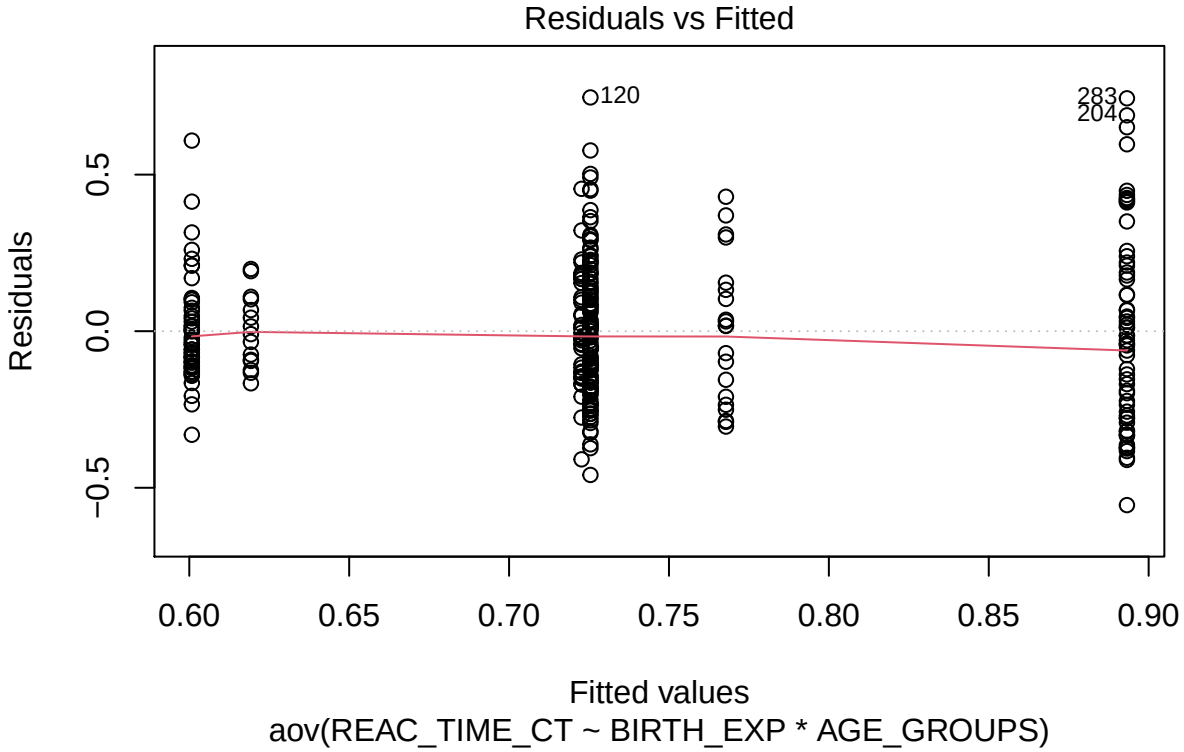
```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = REAC_TIME_CT ~ BIRTH_EXP * AGE_GROUPS, data = data2)
##
## $BIRTH_EXP
##           diff        lwr        upr     p adj
## V-C 0.02881428 -0.0301178 0.08774637 0.3367458
##
## $AGE_GROUPS
##           diff        lwr         upr     p adj
## 2-1 -0.1379879 -0.2099322 -0.06604363 0.0000267
## 3-1 -0.2585553 -0.3459050 -0.17120559 0.0000000
## 3-2 -0.1205674 -0.1979615 -0.04317329 0.0008372
##
## $`BIRTH_EXP:AGE_GROUPS`
##                 diff         lwr         upr     p adj
## V:1-C:1  0.125394596 -0.04082664  0.29161583 0.2580507
## C:2-C:1 -0.045157536 -0.22252067  0.13220560 0.9780928
## V:2-C:1 -0.042373169 -0.19879275  0.11404641 0.9712451
## C:3-C:1 -0.148544557 -0.36975525  0.07266614 0.3883372
## V:3-C:1 -0.167020407 -0.33742539  0.00338458 0.0583953
## C:2-V:1 -0.170552132 -0.30148572 -0.03961855 0.0030355
## V:2-V:1 -0.167767765 -0.26852990 -0.06700563 0.0000410
## C:3-V:1 -0.273939153 -0.46000391 -0.08787440 0.0004551
## V:3-V:1 -0.292415003 -0.41375660 -0.17107341 0.0000000
## V:2-C:2  0.002784367 -0.11545772  0.12102646 0.9999998
## C:3-C:2 -0.103387021 -0.29946934  0.09269530 0.6567008
## V:3-C:2 -0.121862871 -0.25806847  0.01434273 0.1089697
## C:3-V:2 -0.106171387 -0.28353452  0.07119175 0.5217115
## V:3-V:2 -0.124647238 -0.23217105 -0.01712343 0.0126298
## V:3-C:3 -0.018475850 -0.20828748  0.17133578 0.9997700
```

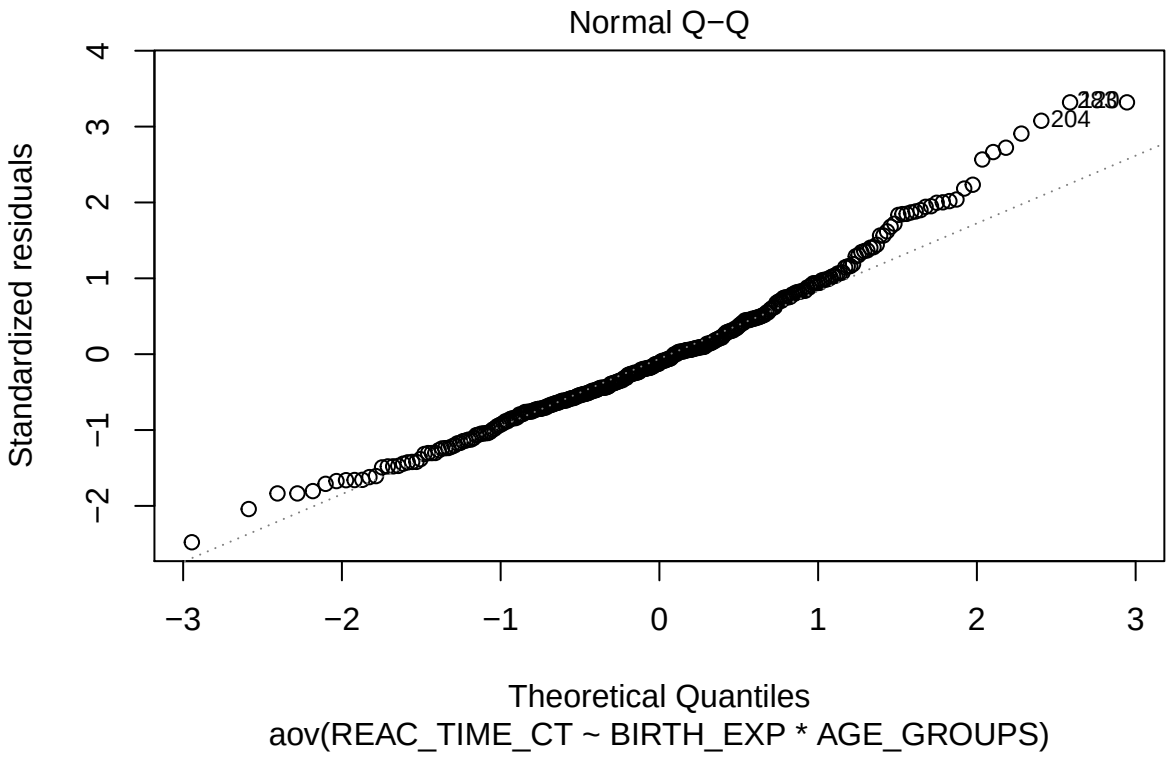
```r
options(contrasts = c("contr.sum", "contr.poly"))
lm_output4 <- lm(REAC_TIME_CT ~ BIRTH_EXP*AGE_GROUPS, data = data2)
apa.aov.table(lm_output4)
```

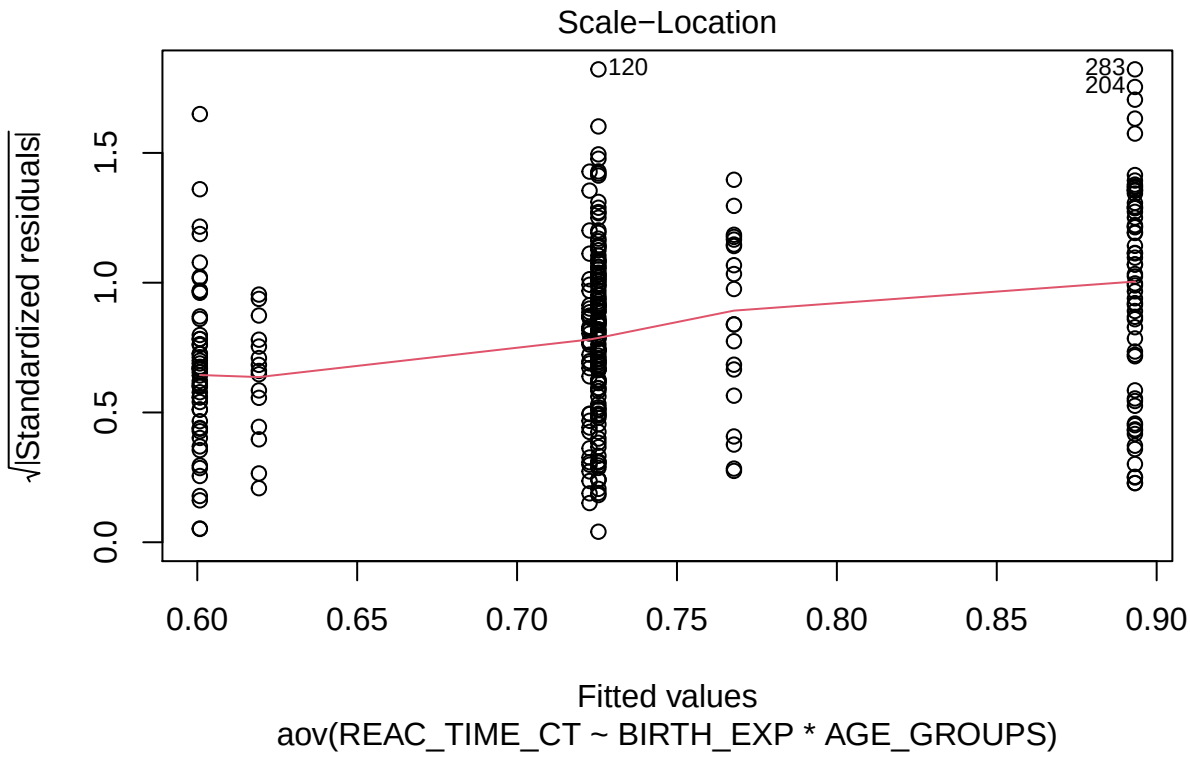
```
##
##
## ANOVA results using REAC_TIME_CT as the dependent variable
##
##
##               Predictor     SS  df     MS       F    p partial_eta2
##             (Intercept) 101.25   1 101.25 1985.61 .000
##               BIRTH_EXP   0.07   1   0.07    1.28 .260          .00
##              AGE_GROUPS   1.29   2   0.64   12.63 .000          .08
##  BIRTH_EXP x AGE_GROUPS   0.19   2   0.10    1.84 .161          .01
##                   Error  15.50 304   0.05
##  CI_90_partial_eta2
##
```

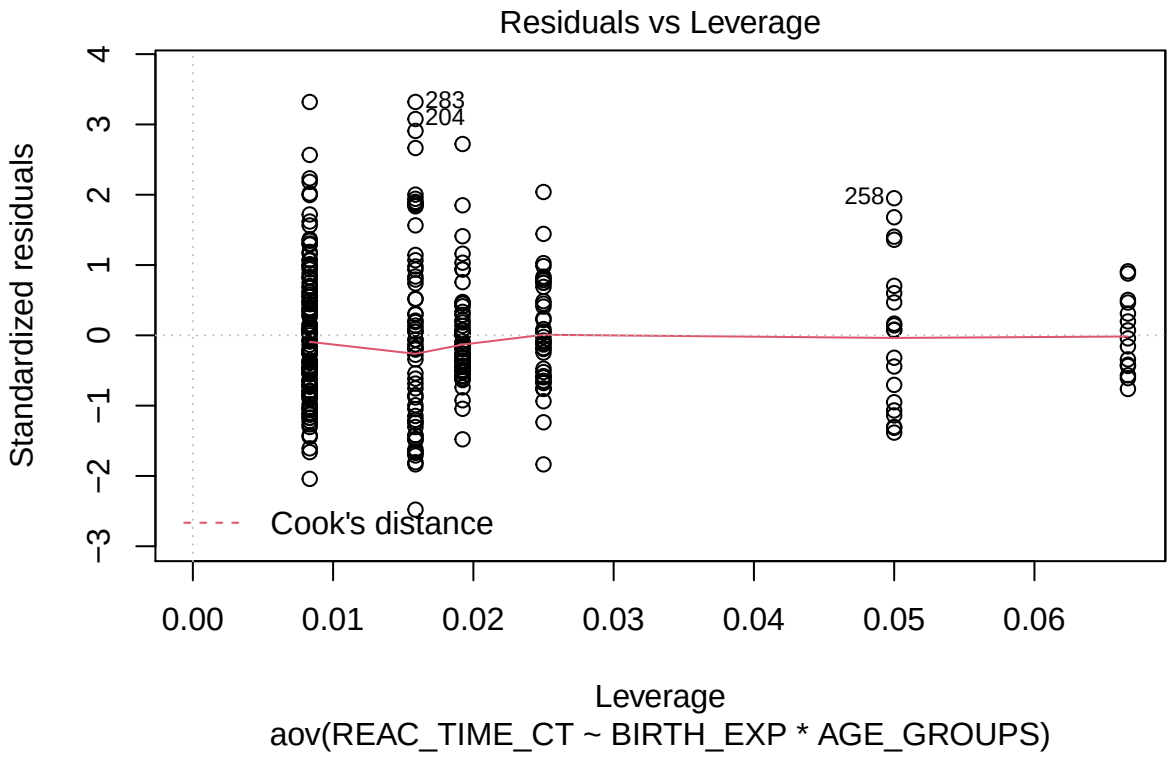
```
##           [.00, .02]
##           [.03, .12]
##           [.00, .04]
##
##
## Note: Values in square brackets indicate the bounds of the 90% confidence interval for partial eta-s
```

```
plot(int_mod4)
```




Normal Q−Q
Standardized residuals
Theoretical Quantiles
aov(REAC_TIME_CT ~ BIRTH_EXP * AGE_GROUPS)
204


Scale−Location
√|Standardized residuals|
0.0
0.5
1.0
1.5
120
283
204
0.60
0.65
0.70
0.75
0.80
0.85
0.90
Fitted values
aov(REAC_TIME_CT ~ BIRTH_EXP * AGE_GROUPS)



No Cue Trials

1. TWO-WAY ANOVA - ACCURACY

```
# IV- Birth Experience and Age Groups, DV - Accuracy

model5 <- aov(ACCURACY~BIRTH_EXP+AGE_GROUPS, data = data3)
summary (model5)
```

```
##              Df Sum Sq Mean Sq F value   Pr(>F)
## BIRTH_EXP     1  0.010 0.01002   0.472    0.493
## AGE_GROUPS    2  0.461 0.23060  10.856 2.79e-05 ***
## Residuals   306  6.500 0.02124
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
int_mod5 <- aov (ACCURACY~ BIRTH_EXP*AGE_GROUPS, data= data3)
summary (int_mod5)
```

```
##                       Df Sum Sq Mean Sq F value   Pr(>F)
## BIRTH_EXP              1  0.010 0.01002   0.484  0.48703
## AGE_GROUPS             2  0.461 0.23060  11.143 2.14e-05 ***
## BIRTH_EXP:AGE_GROUPS   2  0.209 0.10456   5.053  0.00694 **
```

```
## Residuals            304  6.291 0.02069
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
TukeyHSD(int_mod5)
```

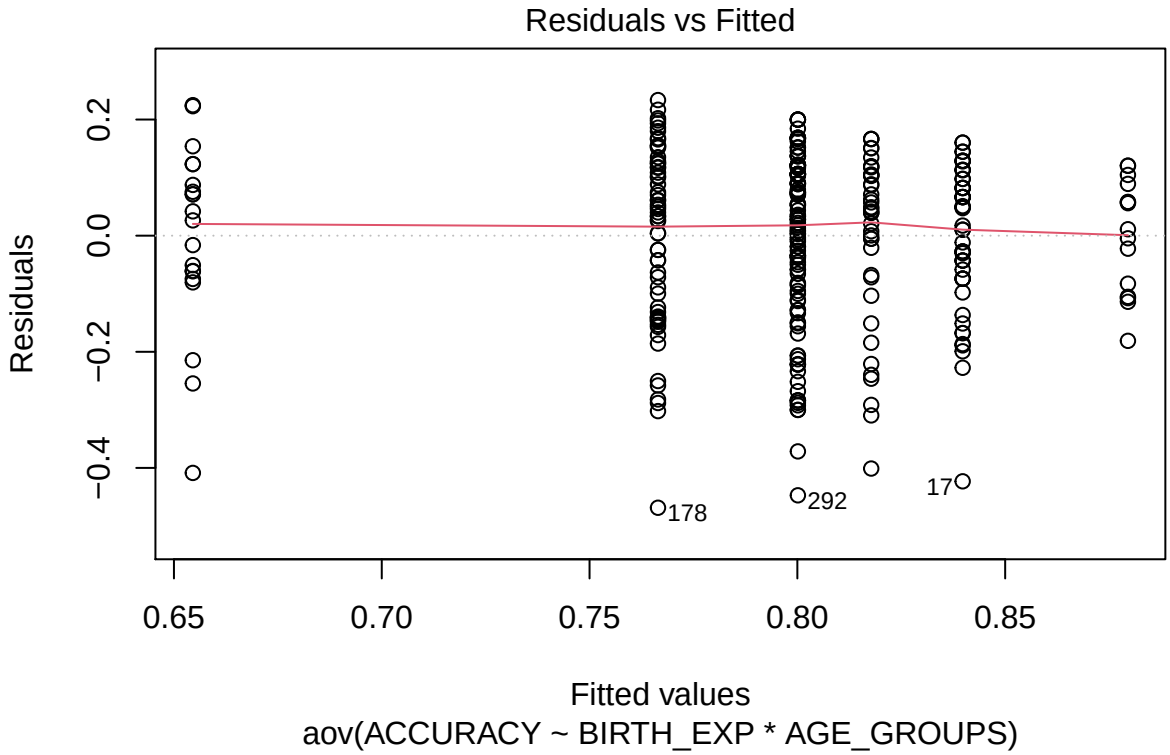
```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = ACCURACY ~ BIRTH_EXP * AGE_GROUPS, data = data3)
##
## $BIRTH_EXP
##           diff         lwr       upr     p adj
## V-C 0.01327635 -0.02426561 0.0508183 0.4870277
##
## $AGE_GROUPS
##           diff          lwr        upr     p adj
## 2-1 0.06515964  0.019328425 0.11099086 0.0026259
## 3-1 0.10895388  0.053308834 0.16459892 0.0000175
## 3-2 0.04379423 -0.005508707 0.09309717 0.0931474
##
## $`BIRTH_EXP:AGE_GROUPS`
##                diff          lwr        upr     p adj
## V:1-C:1  0.11191942  0.006030253 0.21780859 0.0313873
## C:2-C:1  0.16322436  0.050237384 0.27621135 0.0006292
## V:2-C:1  0.14557929  0.045934144 0.24522445 0.0005199
## C:3-C:1  0.22499773  0.084078204 0.36591725 0.0000991
## V:3-C:1  0.18522787  0.076673486 0.29378225 0.0000236
## C:2-V:1  0.05130494 -0.032104673 0.13471456 0.4906175
## V:2-V:1  0.03365987 -0.030529396 0.09784914 0.6620228
## C:3-V:1  0.11307830 -0.005451937 0.23160855 0.0712131
## V:3-V:1  0.07330844 -0.003990712 0.15060760 0.0742592
## V:2-C:2 -0.01764507 -0.092969724 0.05767958 0.9848985
## C:3-C:2  0.06177336 -0.063138444 0.18668517 0.7158969
## V:3-C:2  0.02200350 -0.064764585 0.10877159 0.9784766
## C:3-V:2  0.07941843 -0.033568548 0.19240541 0.3356634
## V:3-V:2  0.03964857 -0.028848137 0.10814528 0.5593089
## V:3-C:3 -0.03976986 -0.160687003 0.08114728 0.9348766
```

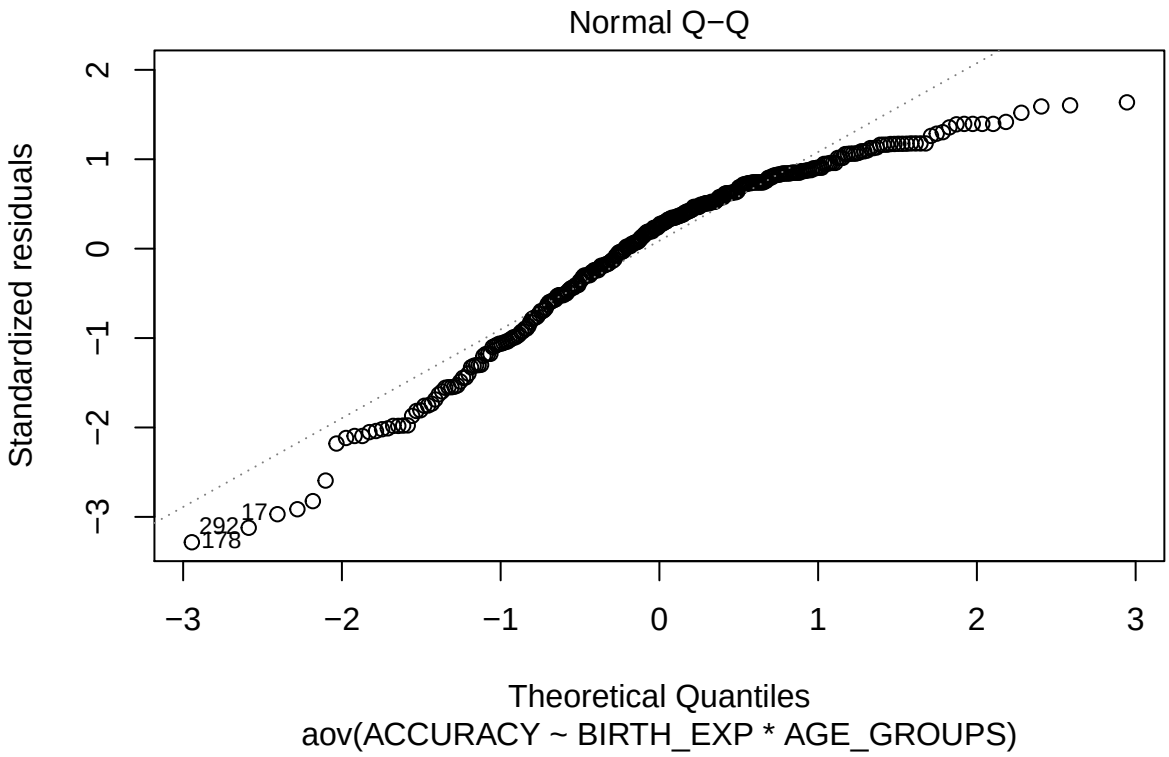
```
options(contrasts = c("contr.sum", "contr.poly"))
lm_output5 <- lm(ACCURACY ~ BIRTH_EXP*AGE_GROUPS, data = data3)
apa.aov.table(lm_output5)
```

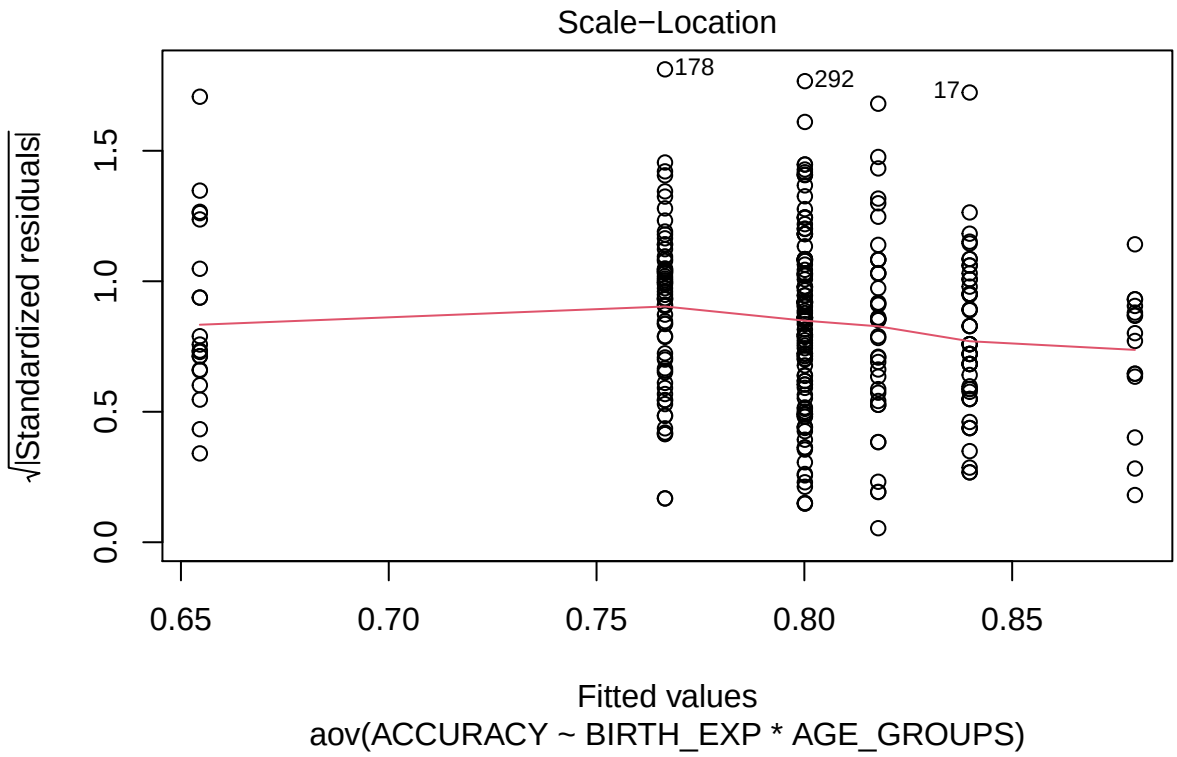
```
##
##
## ANOVA results using ACCURACY as the dependent variable
##
##
##               Predictor     SS  df     MS       F    p partial_eta2
##             (Intercept) 122.31   1 122.31 5910.65 .000
##               BIRTH_EXP   0.02   1   0.02    0.78 .379          .00
##              AGE_GROUPS   0.65   2   0.32   15.72 .000          .09
##  BIRTH_EXP x AGE_GROUPS   0.21   2   0.10    5.05 .007          .03
```

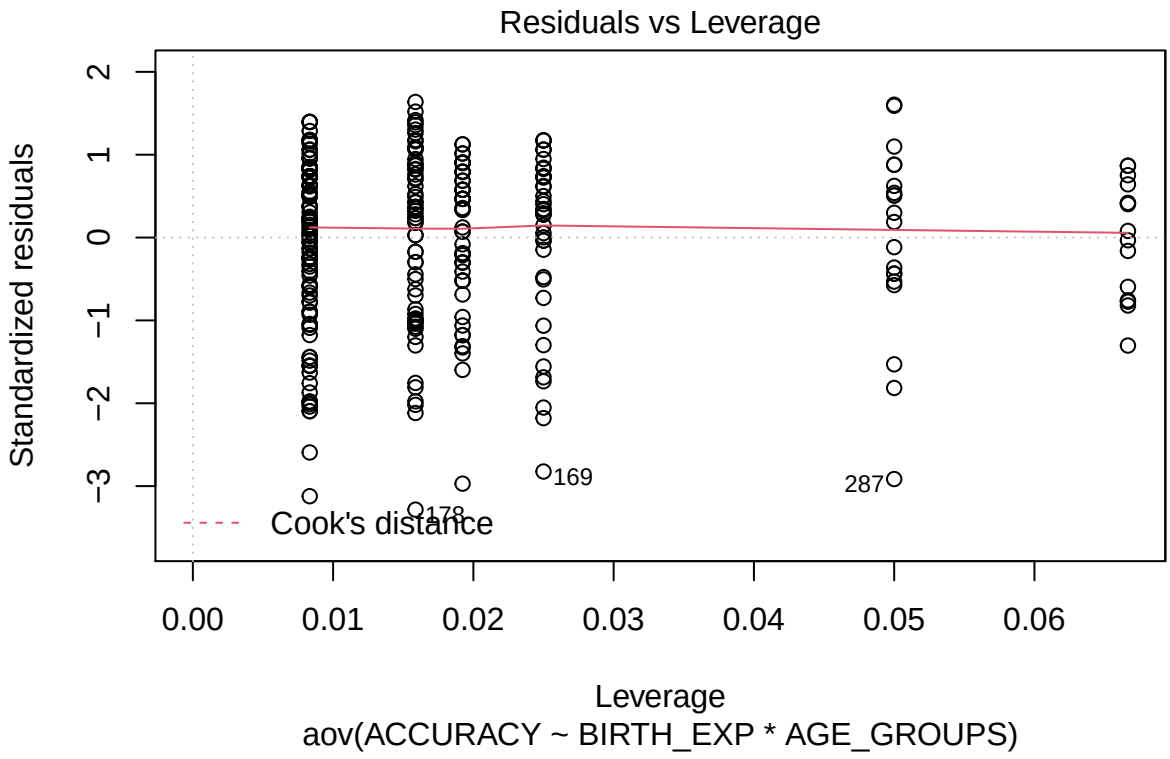
```
##                   Error   6.29 304   0.02
##  CI_90_partial_eta2
##
##          [.00, .02]
##          [.05, .14]
##          [.01, .07]
##
##
## Note: Values in square brackets indicate the bounds of the 90% confidence interval for partial eta-sc
```

```r
plot(int_mod5)
```




Normal Q−Q
Standardized residuals
Theoretical Quantiles
aov(ACCURACY ~ BIRTH_EXP * AGE_GROUPS)
292
17
178


Scale−Location
178
292
17
√|Standardized residuals|
0.0
0.5
1.0
1.5
0.65
0.70
0.75
0.80
0.85
Fitted values
aov(ACCURACY ~ BIRTH_EXP * AGE_GROUPS)



2. TWO-WAY ANOVA - REACTION TIME

```
# IV- Birth Experience and Age Groups, DV - Reaction Time

model6 <- aov(REAC_TIME_CT~ BIRTH_EXP+AGE_GROUPS, data = data3)
summary(model6)
```

```
##              Df Sum Sq Mean Sq F value   Pr(>F)
## BIRTH_EXP     1  0.009  0.0092   0.217    0.642
## AGE_GROUPS    2  3.268  1.6342  38.700 1.04e-15 ***
## Residuals   306 12.921  0.0422
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
int_mod6 <- aov (REAC_TIME_CT~BIRTH_EXP*AGE_GROUPS, data= data3)
summary (int_mod6)
```

```
##                       Df Sum Sq Mean Sq F value   Pr(>F)
## BIRTH_EXP              1  0.009  0.0092   0.216    0.642
## AGE_GROUPS             2  3.268  1.6342  38.569 1.18e-15 ***
## BIRTH_EXP:AGE_GROUPS   2  0.041  0.0205   0.483    0.617
## Residuals            304 12.880  0.0424
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```r
TukeyHSD(int_mod6)
```

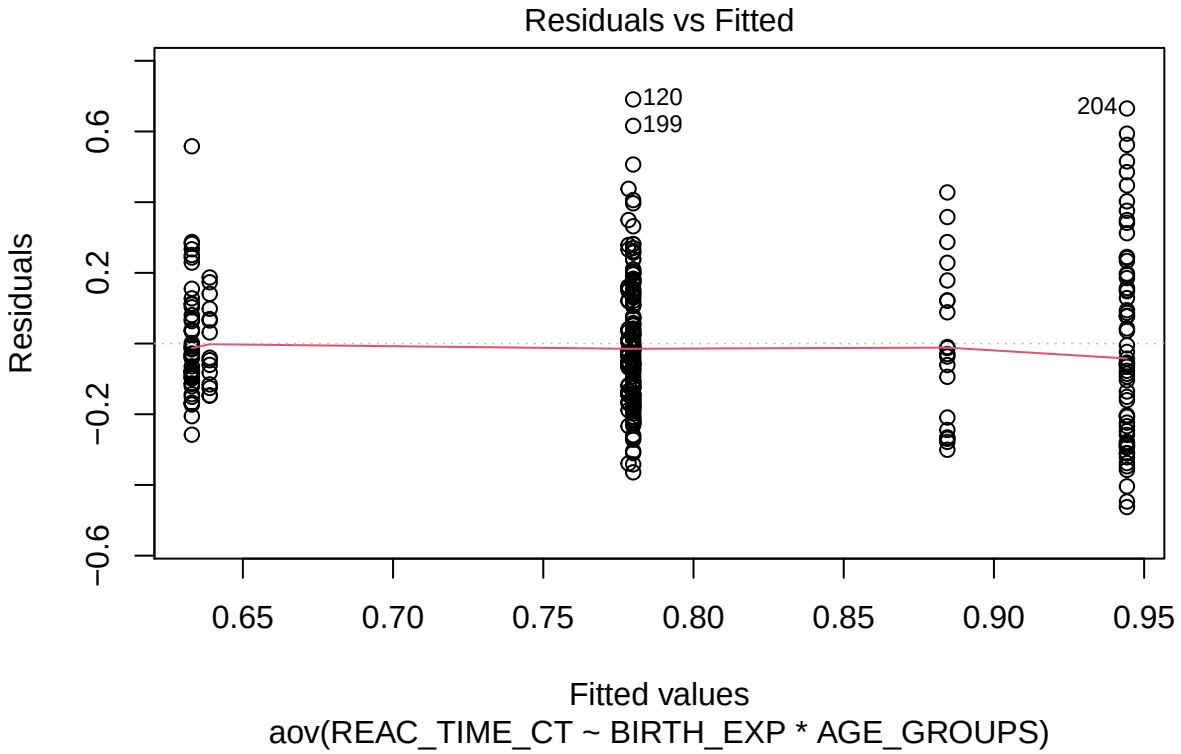
```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = REAC_TIME_CT ~ BIRTH_EXP * AGE_GROUPS, data = data3)
##
## $BIRTH_EXP
##           diff        lwr        upr     p adj
## V-C 0.01269311 -0.0410252 0.06641141 0.6422848
##
## $AGE_GROUPS
##           diff        lwr         upr   p adj
## 2-1 -0.1502188 -0.2157981 -0.08463949 4.0e-07
## 3-1 -0.2957350 -0.3753568 -0.21611321 0.0e+00
## 3-2 -0.1455162 -0.2160632 -0.07496924 5.7e-06
##
## $`BIRTH_EXP:AGE_GROUPS`
##                 diff         lwr         upr     p adj
## V:1-C:1  0.059784706 -0.09173077  0.21130018 0.8679063
## C:2-C:1 -0.106126314 -0.26779796  0.05554533 0.4148470
## V:2-C:1 -0.104564218 -0.24714521  0.03801677 0.2883142
## C:3-C:1 -0.245521383 -0.44716135 -0.04388142 0.0072136
## V:3-C:1 -0.251471524 -0.40680062 -0.09614243 0.0000745
## C:2-V:1 -0.165911019 -0.28526078 -0.04656125 0.0011720
## V:2-V:1 -0.164348924 -0.25619654 -0.07250131 0.0000076
## C:3-V:1 -0.305306088 -0.47490951 -0.13570266 0.0000065
## V:3-V:1 -0.311256230 -0.42186261 -0.20064985 0.0000000
## V:2-C:2  0.001562095 -0.10621900  0.10934319 1.0000000
## C:3-C:2 -0.139395069 -0.31812980  0.03933966 0.2240811
## V:3-C:2 -0.145345211 -0.26950057 -0.02118985 0.0113447
## C:3-V:2 -0.140957164 -0.30262881  0.02071448 0.1271484
## V:3-V:2 -0.146907306 -0.24491838 -0.04889623 0.0003315
## V:3-C:3 -0.005950142 -0.17896895  0.16706867 0.9999987
```

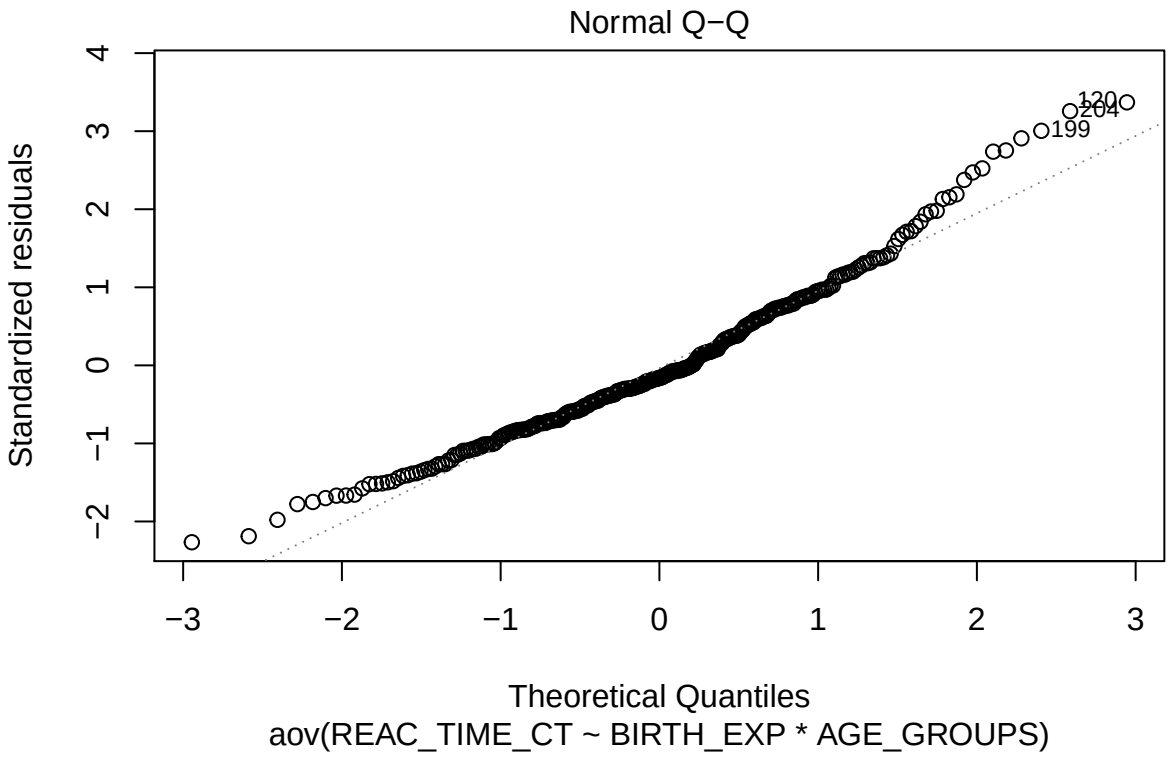
```r
options(contrasts = c("contr.sum", "contr.poly"))
lm_output6 <- lm(REAC_TIME_CT ~ BIRTH_EXP*AGE_GROUPS, data = data3)
apa.aov.table(lm_output6)
```

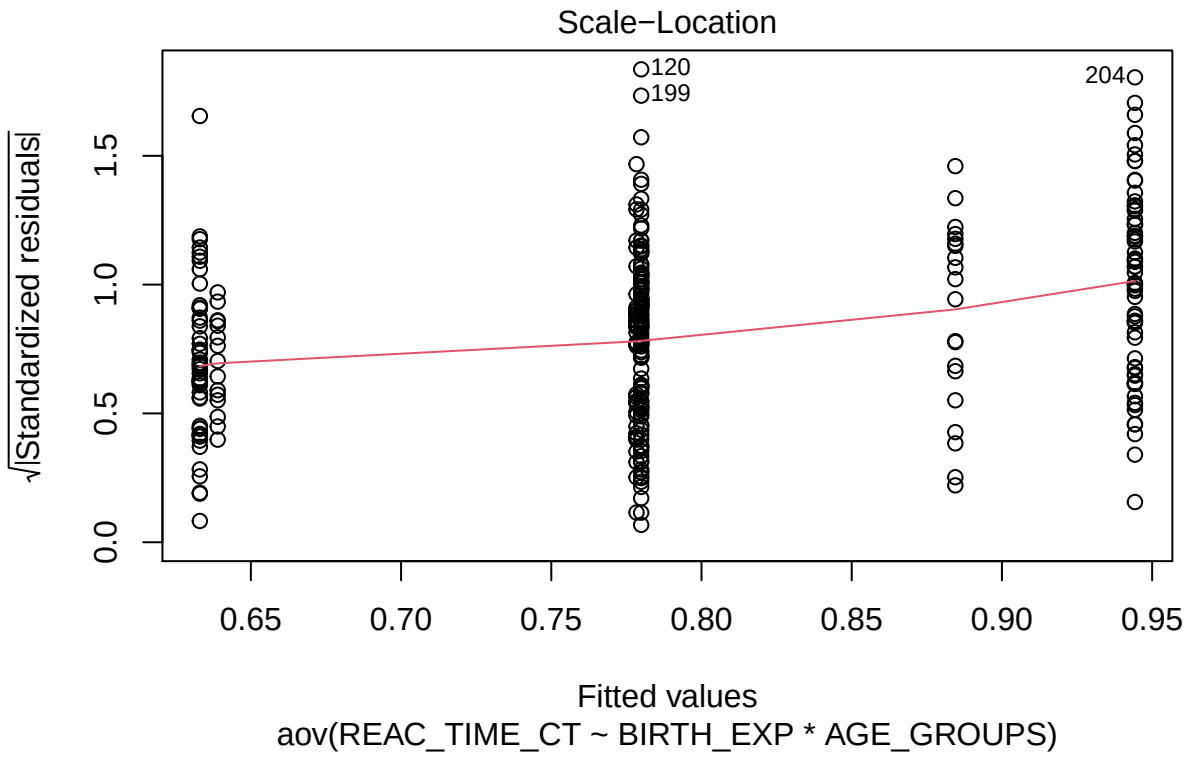
```
##
##
## ANOVA results using REAC_TIME_CT as the dependent variable
##
##
##               Predictor     SS  df     MS       F    p partial_eta2
##             (Intercept) 117.27   1 117.27 2767.75 .000
##               BIRTH_EXP   0.02   1   0.02    0.39 .532          .00
##              AGE_GROUPS   2.05   2   1.02   24.24 .000          .14
##  BIRTH_EXP x AGE_GROUPS   0.04   2   0.02    0.48 .617          .00
##                   Error  12.88 304   0.04
##  CI_90_partial_eta2
##
```

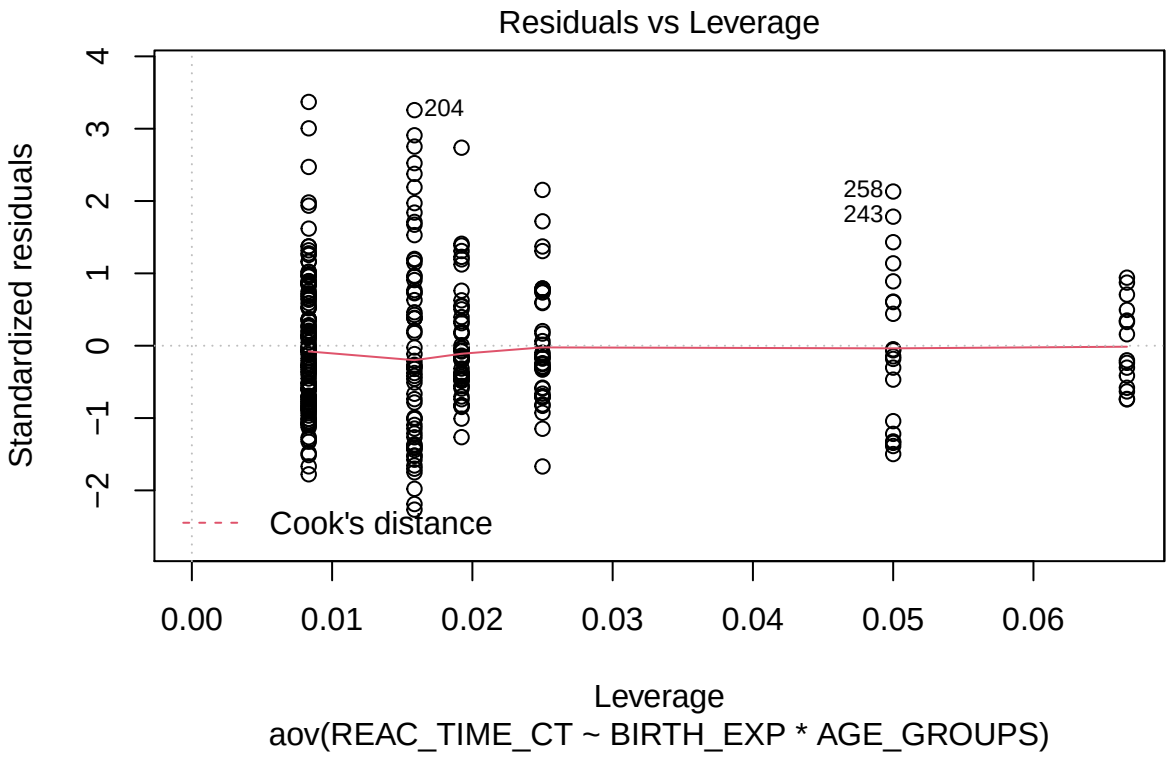
```
##           [.00, .02]
##           [.08, .19]
##           [.00, .02]
##
##
## Note: Values in square brackets indicate the bounds of the 90% confidence interval for partial eta-s
```

```r
plot(int_mod6)
```




Normal Q−Q
Standardized residuals
Theoretical Quantiles
aov(REAC_TIME_CT ~ BIRTH_EXP * AGE_GROUPS)
120
204
199


Scale−Location
120
199
204
√|Standardized residuals|
0.0
0.5
1.0
1.5
0.65
0.70
0.75
0.80
0.85
0.90
0.95
Fitted values
aov(REAC_TIME_CT ~ BIRTH_EXP * AGE_GROUPS)


Residuals vs Leverage
Standardized residuals
4
3
2
1
0
−1
−2
204
258
243
Cook's distance
0.00
0.01
0.02
0.03
0.04
0.05
0.06
Leverage
aov(REAC_TIME_CT ~ BIRTH_EXP * AGE_GROUPS)