

## anova\_\_splittimes\_\_Tukey.R

Perform analysis of variance test to verify if split times vary between age groups.

To begin, we create the factors for agegroup, namely divided the Age into following intervals:

“(15,25]” “(25,35]” “(35,45]” “(45,55]” “(55,65]” “(65,75]” “(75,85]”

Let's perform ANOVA for K0-5 splittime and different age groups.

```
#Anova by agegroup
```

```
model1 = aov(dfm.2010$K0.5 ~ dfm.2010$agegroup)
```

```
summary(model1)
```

```
##                Df Sum Sq Mean Sq F value Pr(>F)
## dfm.2010$agegroup      6  13753   2292.1    204.7 <2e-16 ***
## Residuals            22663 253815     11.2
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Perform a TukeyHSD for multiple comparison test to find whether variances for splittime are different among age groups.

```
#Conduct Tukey's multiple comparison test
```

```
TukeyHSD(model1)
```

```
##      Tukey multiple comparisons of means
##      95% family-wise confidence level
##
## Fit: aov(formula = dfm.2010$K0.5 ~ dfm.2010$agegroup)
##
## $`dfm.2010$agegroup`
##              diff              lwr              upr              p adj
## (25,35]-(15,25] -0.1496342 -0.42837037 0.1291021 0.6934223
## (35,45]-(15,25] 0.1642551 -0.10622906 0.4347393 0.5544591
## (45,55]-(15,25] 0.7386318 0.46312599 1.0141376 0.0000000
## (55,65]-(15,25] 2.2485974 1.91383690 2.5833580 0.0000000
## (65,75]-(15,25] 4.1952814 3.56719775 4.8233651 0.0000000
## (75,85]-(15,25] 5.5618450 2.26354181 8.8601482 0.0000136
## (35,45]-(25,35] 0.3138893 0.13756878 0.4902098 0.0000030
## (45,55]-(25,35] 0.8882660 0.70433479 1.0721971 0.0000000
## (55,65]-(25,35] 2.3982316 2.13367188 2.6627913 0.0000000
## (65,75]-(25,35] 4.3449156 3.75126895 4.9385623 0.0000000
## (75,85]-(25,35] 5.7114792 2.41956009 9.0033983 0.0000063
## (45,55]-(35,45] 0.5743767 0.40320865 0.7455447 0.0000000
## (55,65]-(35,45] 2.0843423 1.82849145 2.3401932 0.0000000
## (65,75]-(35,45] 4.0310263 3.44120926 4.6208434 0.0000000
## (75,85]-(35,45] 5.3975899 2.10635925 8.6888205 0.0000273
## (55,65]-(45,55] 1.5099656 1.24881164 1.7711196 0.0000000
## (65,75]-(45,55] 3.4566497 2.86451292 4.0487864 0.0000000
## (75,85]-(45,55] 4.8232132 1.53156609 8.1148604 0.0003139
## (65,75]-(55,65] 1.9466840 1.32476192 2.5686061 0.0000000
## (75,85]-(55,65] 3.3132476 0.01611216 6.6103830 0.0479623
## (75,85]-(65,75] 1.3665636 -1.97312601 4.7062532 0.8919294
```

From TukeyHSD results, we can conclude that differences are not significant among age group (15,25] - (25,35] as  $p\text{-value} = 0.6934223$ .

Similarly, age groups (15,25] - (35,45] and (65,75] - (75,85] do not have significant results as  $p\text{-values}$  are greater than 0.05.