2151299_苏家铭_hw3

苏家铭

This is an R Markdown Notebook. When you execute code within the notebook, the results appear beneath the code.

Try executing this chunk by clicking the *Run* button within the chunk or by placing your cursor inside it and pressing *Ctrl+Shift+Enter*.

```
# 导入数据
music_data <- read.csv("music_data.csv")

# 查看数据结构和基本统计信息
str(music_data)
```

```
## 'data.frame':    150 obs. of  3 variables:
##  $ ID          : int  1 2 3 4 5 6 7 8 9 10 ...
##  $ condition   : chr  "no_music" "no_music" "no_music" "no_music" ...
##  $ productivity: num  188 196 194 190 157 ...
```

```
summary(music_data)
```

```
##        ID          condition          productivity
##  Min.   :  1.00   Length:150         Min.   :104.7
##  1st Qu.: 38.25   Class :character   1st Qu.:161.0
##  Median : 75.50   Mode  :character   Median :185.0
##  Mean   : 75.50                      Mean   :184.9
##  3rd Qu.:112.75                      3rd Qu.:205.0
##  Max.   :150.00                      Max.   :285.3
```

```
# 进行方差分析
anova_result <- aov(productivity ~ condition, data = music_data)

# 查看方差分析结果
summary(anova_result)
```

```
##              Df Sum Sq Mean Sq F value   Pr(>F)
## condition     2  24734   12367   9.291 0.000159 ***
## Residuals   147 195661    1331
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
# 组别之间的差异： 通过 p 值（Pr(>F)），我们拒绝了零假设，即至少一个组别的均值与其他组别不同。因此，我们

# F 统计量： F 统计量（9.291）表示组间均值方差与组内均值方差的比例。由于 p 值非常小，我们可以得出结论，
```

```
# 进行 Tukey HSD 测试
tukey_result <- TukeyHSD(anova_result)

# 查看比较结果
print(tukey_result)
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = productivity ~ condition, data = music_data)
##
## $condition
##                                     diff       lwr        upr     p adj
## music_no_choice-music_choice -25.820579 -43.09679  -8.544367 0.0015539
## no_music-music_choice        -28.466400 -45.74261 -11.190188 0.0004246
## no_music-music_no_choice      -2.645821 -19.92203  14.630391 0.9301260
```

```
# music_no_choice vs. music_choice:

#差异 (diff): -25.82
# 置信区间 (95% family-wise confidence level): [-43.10, -8.54]
#调整过的 p 值 (p adj): 0.00155
#结论：music_no_choice 组的平均生产力明显低于 music_choice 组，差异具有统计学显著性。

#no_music vs. music_choice:

#差异 (diff): -28.47
#置信区间: [-45.74, -11.19]
#调整过的 p 值: 0.00042
```

```
#结论：no_music 组的平均生产力明显低于 music_choice 组，差异具有统计学显著性。

#no_music vs. music_no_choice:

#差异 (diff): -2.65
#置信区间: [-19.92, 14.63]
#调整过的 p 值: 0.93013
#结论：no_music 组和 music_no_choice 组之间的平均生产力差异不具有统计学显著性。

#结论和建议:

#在音乐条件方面，music_choice 组表现出最高的生产力，明显高于其他两组。
#music_no_choice 组的生产力也明显高于 no_music 组，两者之间差异显著。
#no_music 组和 music_no_choice 组之间的生产力差异不显著。
#这些结论有助于理解不同音乐条件对员工生产力的影响。建议在提高生产力的同时，也考虑员工对音乐的个人选择，
```

Add a new chunk by clicking the *Insert Chunk* button on the toolbar or by pressing *Ctrl+Alt+I*.

When you save the notebook, an HTML file containing the code and output will be saved alongside it (click the *Preview* button or press *Ctrl+Shift+K* to preview the HTML file).

The preview shows you a rendered HTML copy of the contents of the editor. Consequently, unlike *Knit*, *Preview* does not run any R code chunks. Instead, the output of the chunk when it was last run in the editor is displayed.