

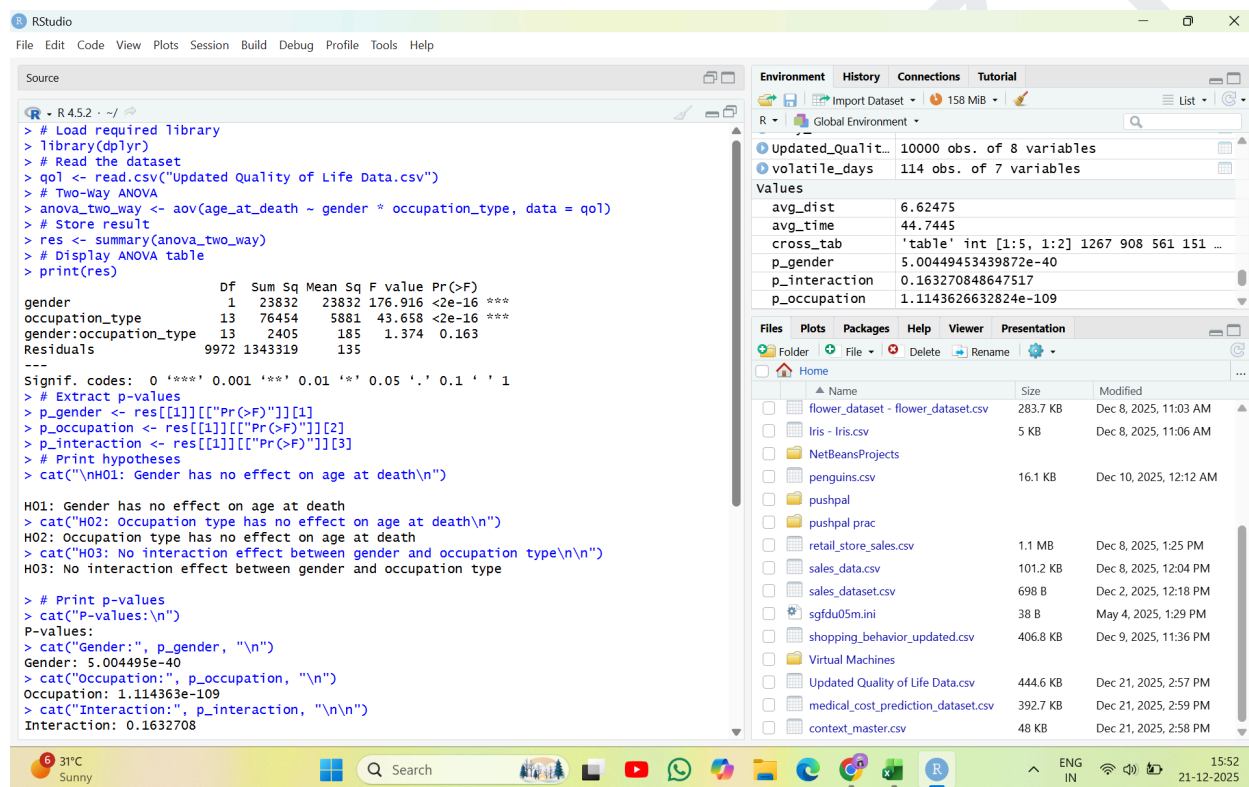
SHETH L.U.J AND SIR M.V COLLEGE

Subject: Data Analysis with SAS / SPSS /R

Practical no. 8

Aim: Performing two-way ANOVA using aov() (R).

Outputs→



```
R - R4.5.2 - ~/
File Edit Code View Plots Session Build Debug Profile Tools Help

Source
# Load required library
> library(dplyr)
# Read the dataset
> qol <- read.csv("Updated Quality of Life Data.csv")
# Two-way ANOVA
> anova_two_way <- aov(age_at_death ~ gender * occupation_type, data = qol)
# Store result
> res <- summary(anova_two_way)
# Display ANOVA table
> print(res)

              Df Sum Sq Mean Sq F value Pr(>F)
gender          1   23832    23832  176.916 <2e-16 ***
occupation_type 13   76454     5881  43.658 <2e-16 ***
gender:occupation_type 13   2405      185   1.374  0.163
Residuals      9972 1343319      135
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

# Extract p-values
> p_gender <- res[[1]][["Pr(>F)"]][1]
> p_occupation <- res[[1]][["Pr(>F)"]][2]
> p_interaction <- res[[1]][["Pr(>F)"]][3]
# Print hypotheses
> cat("\nH01: Gender has no effect on age at death\n")
H01: Gender has no effect on age at death
> cat("\nH02: Occupation type has no effect on age at death\n")
H02: Occupation type has no effect on age at death
> cat("\nH03: No interaction effect between gender and occupation type\n")
H03: No interaction effect between gender and occupation type

# Print p-values
> cat("P-values:\n")
P-values:
> cat("Gender:", p_gender, "\n")
Gender: 5.004495e-40
> cat("Occupation:", p_occupation, "\n")
Occupation: 1.114363e-109
> cat("Interaction:", p_interaction, "\n\n")
Interaction: 0.1632708

Environment History Connections Tutorial
R - Global Environment
Updated_Qualit... 10000 obs. of 8 variables
volatile_days    114 obs. of 7 variables
Values
avg_dist         6.62475
avg_time         44.7445
cross_tab        'table' int [1:5, 1:2] 1267 908 561 151 ...
p_gender         5.00449453439872e-40
p_interaction     0.163270848647517
p_occupation     1.1143626632824e-109

Files Plots Packages Help Viewer Presentation
Folder File Delete Rename
Home
Name Size Modified
flower_dataset - flower_dataset.csv 283.7 KB Dec 8, 2025, 11:03 AM
Iris - Iris.csv 5 KB Dec 8, 2025, 11:06 AM
NetBeansProjects
penguins.csv 16.1 KB Dec 10, 2025, 12:12 AM
pushpal
pushpal prac
retail_store_sales.csv 1.1 MB Dec 8, 2025, 1:25 PM
sales_data.csv 101.2 KB Dec 8, 2025, 12:04 PM
sales_dataset.csv 698 B Dec 2, 2025, 12:18 PM
sgfdu05m.ini 38 B May 4, 2025, 1:29 PM
shopping_behavior_updated.csv 406.8 KB Dec 9, 2025, 11:36 PM
Virtual Machines
Updated Quality of Life Data.csv 444.6 KB Dec 21, 2025, 2:57 PM
medical_cost_prediction_dataset.csv 392.7 KB Dec 21, 2025, 2:59 PM
context_master.csv 48 KB Dec 21, 2025, 2:58 PM

31°C Sunny Search 15:52 21-12-2025
```

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The screenshot displays the RStudio environment with the following components:

- Source Editor:** Contains R code for hypothesis testing and decision-making based on p-values.
- Environment Panel:** Lists loaded datasets and their dimensions.
- Files Panel:** Shows the file explorer with various CSV and project files.
- Taskbar:** Displays system information like temperature (31°C) and time (15:53).

R Code in Source Editor:

```
> # Print hypotheses
> cat("\nH01: Gender has no effect on age at death\n")

H01: Gender has no effect on age at death
> cat("\nH02: Occupation type has no effect on age at death\n")
H02: Occupation type has no effect on age at death
> cat("\nH03: No interaction effect between gender and occupation type\n")
H03: No interaction effect between gender and occupation type

> # Print p-values
> cat("P-values:\n")
P-values:
> cat("Gender:", p_gender, "\n")
Gender: 5.004495e-40
> cat("Occupation:", p_occupation, "\n")
Occupation: 1.114363e-109
> cat("Interaction:", p_interaction, "\n")
Interaction: 0.1632708

> # Decisions
> if (p_gender < 0.05) {
+   cat("Decision (Gender): Reject H01\n")
+ } else {
+   cat("Decision (Gender): Accept H01\n")
+ }
Decision (Gender): Reject H01
> if (p_occupation < 0.05) {
+   cat("Decision (Occupation): Reject H02\n")
+ } else {
+   cat("Decision (Occupation): Accept H02\n")
+ }
Decision (Occupation): Reject H02
> if (p_interaction < 0.05) {
+   cat("Decision (Interaction): Reject H03\n")
+ } else {
+   cat("Decision (Interaction): Accept H03\n")
+ }
Decision (Interaction): Accept H03
>
```

Environment Panel Data:

Dataset Name	Observations	Variables
Updated_Qualit...	10000	8
volatile_days	114	7

Files Panel Data:

Name	Size	Modified
flower_dataset - flower_dataset.csv	283.7 KB	Dec 8, 2025, 11:03 AM
Iris - Iris.csv	5 KB	Dec 8, 2025, 11:06 AM
NetBeansProjects		
penguins.csv	16.1 KB	Dec 10, 2025, 12:12 AM
pushpal		
pushpal prac		
retail_store_sales.csv	1.1 MB	Dec 8, 2025, 1:25 PM
sales_data.csv	101.2 KB	Dec 8, 2025, 12:04 PM
sales_dataset.csv	698 B	Dec 2, 2025, 12:18 PM
sgfdu05m.ini	38 B	May 4, 2025, 1:29 PM
shopping_behavior_updated.csv	406.8 KB	Dec 9, 2025, 11:36 PM
Virtual Machines		
Updated Quality of Life Data.csv	444.6 KB	Dec 21, 2025, 2:57 PM
medical_cost_prediction_dataset.csv	392.7 KB	Dec 21, 2025, 2:59 PM
context_master.csv	48 KB	Dec 21, 2025, 2:58 PM