

# SPPH567 TUTORIAL III

# TODAY'S TASKS

- Make side-by-side boxplots
- Calculate grouped summary statistics
- Do t-test
- Do simple linear regression

# MAKE SIDE-BY-SIDE BOXPLOT - I

1. Go to Plots > Plot Builder

2. Click Geometric Elements tab

3. Double click boxplot

The image shows the R Studio Plot Builder window. The 'Geometric Elements' tab is selected, and the 'geom boxplot' option is highlighted. The 'Components' panel on the right is empty. The console window on the left shows the R startup sequence and the command `load("G:/courses/SPPH567T")`.

```
Console
File Edit Workspace Data Analysis Plots Extras Packages & Data Window Help

-31
For
agw3:

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.
>
[Previously saved workspace restored]

>
Loading required package: J
Loading required package: r
Loading required package: J
Loading required package: i
starting httpd help server
Loading required package: D
Loading required package: D
Loading required package: g
Loading required package: c
Loading required package: M
Loading required package: i
Loading required package: l

> load("G:/courses/SPPH567T")
```

# MAKE SIDE-BY-SIDE BOXPLOT - 2

The screenshot shows a software window with a 'Position' dropdown set to 'boxplot'. On the left, a list of variables is shown under the 'dat' dropdown, with 'Foundation' selected. The 'Mappings' tab is active, showing 'MainRadon.tr' assigned to the Y-axis and 'Foundation' assigned to the X-axis. The 'Options' section includes settings for Colour, Fill, Size (0.5), Weight (1.0), Alpha (1.0), and Group. The 'OK' button is highlighted.

1. Put your radon variable as Y

2. Put the categorical variable here

3. Click OK

# MAKE SIDE-BY-SIDE BOXPLOT - 2

Plot Builder

File Tools Window

Templates Geometric Elements Statistics Scales Facets Coordinates Other

geom abline geom area geom bar geom bin2d geom blank geom boxplot geom contour geom crossbar geom density

MainRadon.tr

Other Poured NA

Foundation

Components

1. Preview the boxplot (there will be an extra level for NA)

2. Click Run

Run Reset Cancel

Foundation	Min	Q1	Median	Q3	Max	Outliers
Other	2.8	3.2	3.9	4.7	6.4	6.9
Poured	2.8	3.4	3.9	4.6	6.4	6.5, 6.6, 6.7, 6.8, 6.9
NA	2.8	3.3	3.7	4.7	5.1	





# T-TEST

Console

File Edit Workspace Data Analysis Plots Extras Packages & Data Window Help

Two Independent Sample Tests

dat

Filter:

UID  
Community  
MainRadon  
Location  
Soil  
LowerWindow  
Separation  
Heating  
AC  
HomeAge1990  
RockType  
Potential  
radon\_subLOD

Outcomes

MainRadon.tr

Factor

Foundation

Split

Subset

Plots

Mean

T-Test

Permutation

Central Tendency (AUC)

Wilcoxon

Brunner-Munzel

Distribution

Kolmogorov-Smirnov

Options

Run Reset Cancel

```
> load("G:/c
```

1. Put the variable you want to test here

2. Put the dichotomise variable here

3. Check T-Test

4. The test result should show up in the Console



# SIMPLE LINEAR REGRESSION CATEGORICAL PREDICTOR - I

1. Go to Analysis >  
Linear Model

The screenshot shows the 'Linear Regression Model' dialog box in R Studio. The 'dat' dropdown is set to 'dat'. The 'Filter' field is empty. The 'Outcome' dropdown is set to 'Radon\_subLODroot2.tr'. The 'As Numeric' section is empty. The 'As Factor' section has 'Foundation' listed. The 'Weights' and 'Subset' fields are empty. The 'Continue' button is highlighted. The background shows the R console with the following text:

```
Response: Radon
Foundation
Residuals 10
> summarylm(m)

Call:
lm(formula =
Residuals:
  Min      -1.8751  -0.67
Coefficients:
(Intercept)
FoundationPou
---
Signif. codes
Residual stan
(11 observa
```

2. Put the  
outcome  
variable here

3. Put the  
dichotomise  
variable here

4. Check Continue

# SIMPLE LINEAR REGRESSION CATEGORICAL PREDICTOR - 2

Linear Regression Model Builder

Specify

Outcomes  
Radon\_subLODroot2.tr

Variables  
Foundation

2-way  
3-way  
+  
⋮  
\*  
-  
IN  
poly

Model  
Foundation

Remove  
Continue  
Reset  
Cancel

1. Click Continue

# SIMPLE LINEAR REGRESSION CATEGORICAL PREDICTOR - 3

Linear Regression Model Explorer

Radon\_subLODroot2.tr ~ Foundation

General Diagnostics Terms Added Variable

Preview

```
>.gui.working.env$model.lm <- lm(formula=Radon_subLODroot2.tr ~ undation,data=.gui.working.env$dat,na.action=na.omit)

>Anova(.gui.working.env$model.lm,type='II')

Anova Table (Type II tests)

Response: Radon_subLODroot2.tr
      Sum Sq  Df F value Pr(>F)
Foundation  0.06  1  0.069 0.7928
Residuals 1000.41 1121

>summarylm(.gui.working.env$model.lm)

Call:
lm(formula = Radon_subLODroot2.tr ~ Foundation, data = .gui.work
g.env$dat,
    na.action = na.omit)

Residuals:
  Min     1Q  Median     3Q    Max
```

Options

Post Hoc

Tests

Plots

Means

Export

Update Model

Run Reset Cancel

1. You can preview the result here

2. Click Run

# SIMPLE LINEAR REGRESSION CATEGORICAL PREDICTOR - 4

1. You should see this result in the Console

2. The model formula

3. The model coefficients

4. The reference level is "Other"

```
> summarylm(model.lm)

Call:
lm(formula = Radon_subLODroot2.tr ~ Foundation, data = dat, na.action = na.omit)

Residuals:
    Min       1Q   Median       3Q      Max
-1.5522 -0.7022 -0.0909  0.5934  3.5296

Coefficients:
                Estimate Std. Error t value Pr(>|t|)
(Intercept)      3.89177    0.07492   51.947  <2e-16 ***
FoundationPoured  0.02124    0.08086    0.263   0.793
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.9447 on 1121 degrees of freedom
(11 observations deleted due to missingness)
Multiple R-squared:  6.155e-05,    Adjusted R-squared:  -0.0008305
F-statistic: 0.069 on 1 and 1121 DF,  p-value: 0.7928
```

5. R-squared and p-value