**7 Step guide to make Publication Ready Bargraphs from Scratch**

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**# This guide will show you how to make publication ready barplots from scratch.**

**## Install these packages if you have not and load them:**

``` r

library(ggplot2)

library(ggthemes)

library(multcompView)

library(dplyr)

```

**## 1- Load or import your data**

We will use the following built-in dataset for this example:

``` r

data("chickwts")

tibble(chickwts) #tibble is a function of dplyr package

```

**## 2- Calculate \*means\* of you treatment groups and the \*standard deviation\* SD to show on error bars as follows:**

``` r

mean\_data <- group\_by(chickwts, feed) %>% #feed is our treatment in this example

summarise(weight\_mean=mean(weight), sd = sd(weight)) %>% #to calculate mean and SD

arrange(desc(weight\_mean)) #to arrange in descending order

tibble(mean\_data)

```

**## 3- This step involves performing analysis of variance \*ANOVA\*, using buitin \*\*aov()\*\* function.**

Here we will draw \*ANOVA\* of weight against the group of treatment

(feed) in Chickwts data

``` r

anova <- aov(weight ~ feed, data = chickwts)

summary(anova)

```

**## 4- If the ANOVA is significantly different then, we will draw a multiple mean comparison test (TUKEY HSD, LSD, or Duncan Multiple Range) on \*anova\* object from previous step.**

\*Here is an example of TUKEY HSD test\* \*Important Note:\* You can also

use other tests and look for their commands by using \*\*\*agricolae\*\*\*

package in this step.

``` r

tukey <- TukeyHSD(anova)

tukey

```

This will give us the significant differences based on each combination

of treatment groups from (feed). We can draw conclusion from this step

and write manually the significant difference. But \*hold on\* you can

also show these differences in bar plots in R.

**## 5- Draw multiple comparison letters using \*multcomp\* R package as follows:**

``` r

group\_letters <- multcompLetters4(anova, tukey)

# we have to mention both anova model and tukey objects to get group letters

group\_letters

```

As we have group letters now in step-5, we can extract these group

letters add them to our \*mean\_data\* a data frame developed in step-2 as

follows:

``` r

#extracting group letters

group\_letters <- as.data.frame.list(group\_letters$feed)

#adding to the mean\_data

mean\_data$group\_letters <- group\_letters$Letters

tibble(mean\_data)

```

\\*Finally we have completed our statistical part, now we have to draw

the bar plot and show the significant difference on it.

**## 6- Drawing the \*publication ready Barplot\* in ggplot2**

``` r

p <- ggplot(mean\_data, aes(x = feed, y = weight\_mean)) +

geom\_bar(stat = "identity", aes(fill = feed), show.legend = FALSE, width = 0.6) + #barplot

geom\_errorbar( #this argument is putting sd as error bars

aes(ymin = weight\_mean-sd, ymax=weight\_mean+sd),

width = 0.1

) +

geom\_text(aes(label = group\_letters, y = weight\_mean + sd), vjust=-0.4) + #add letters

scale\_fill\_brewer(palette = "BrBG", direction = 1) + #theme setting

labs(#this will add labels

x = "Feed Type",

y = "Chicken Weight (g)",

title = "Publication Ready Barplot",

subtitle = "Made by #RwithAammar",

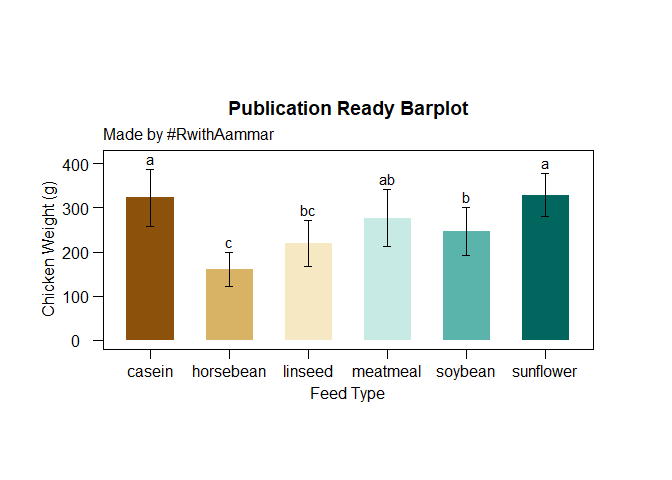
fill = "Feed Type"

) +

ylim(0,410)+ #change your yaxis limits based on the letters

ggthemes::theme\_par(); p

```



**## 7- Saving up to 4K barplots in R**

- First choose a working directory by pressing \*ctrl+shift+H\* and

select a folder then run the following code to save in \*\*.tiff\*\*:

``` r

tiff('Barplot.tiff', units="in", width=10, height=6, res=300, compression = 'lzw')

p

dev.off()

```