DailyCheck#9

2025-04-28

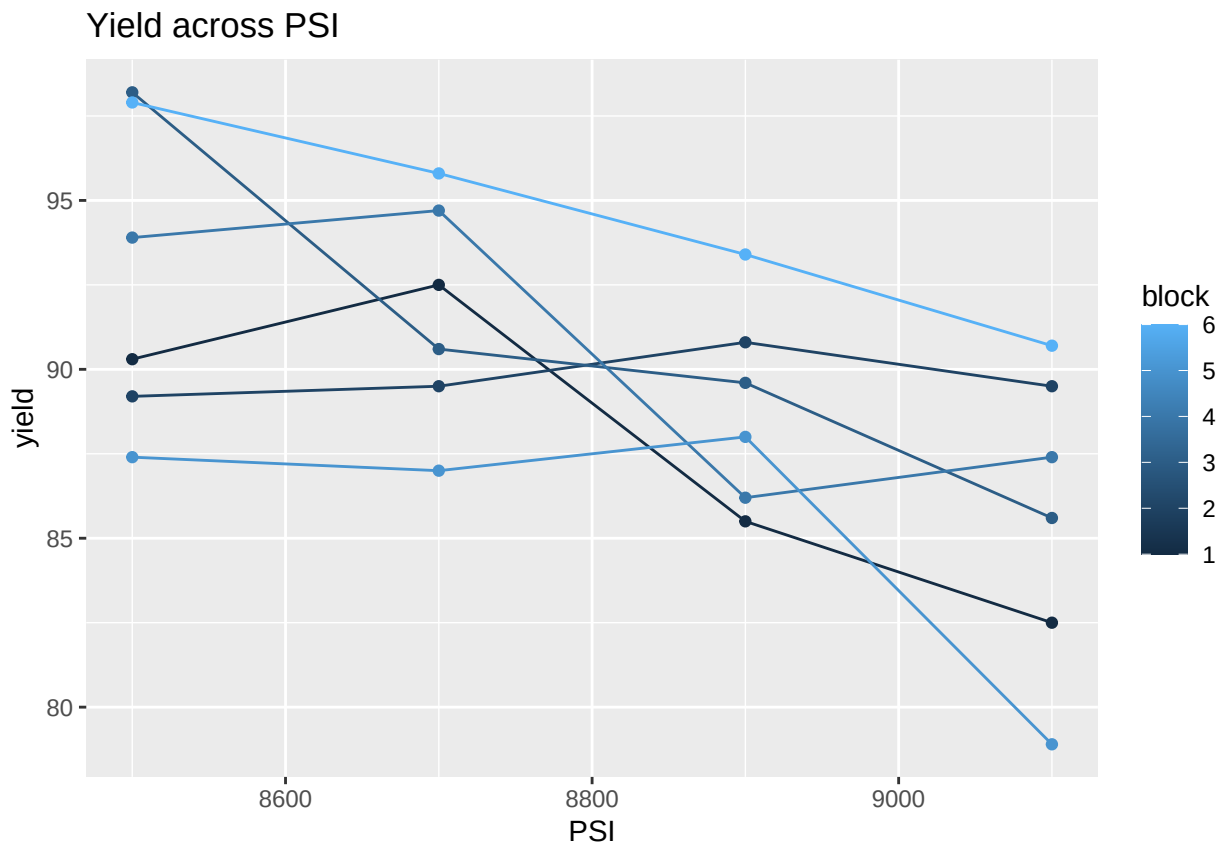
```
person1 <- c(7, 7.5, 9, 8.25)
person2 <- c(8.25, 8.5, 9.5, 8.5)
person3 <- c(6.5, 7, 8.5, 9)
person4 <- c(8, 8, 8, 8)
wines_df <- data.frame(
score = c(person1, person2, person3, person4),
treatment = rep(c("Control", "Decanter", "Aerator", "Blender"), 4),
block = c(rep("Person1",4),
rep("Person2",4),
rep("Person3",4),
rep("Person4",4))
)
```

R Markdown

Your Turn 1

```
library(readxl)
vasc <- read_excel("VascGraft.xlsx")

library(ggplot2)
ggplot(data = vasc, aes(y = yield, x=PSI,
                        group = block, color = block)) +
  geom_point() + geom_line() + ggtitle("Yield across PSI")
```



Yield generally decreases as PSI increases, but the effect varies between blocks. There is noticeable variability in yield resonse across blocks.

```
model1 <- aov(score ~ treatment + block, data = wines_df)
summary(model1)
```

```
##             Df Sum Sq Mean Sq F value Pr(>F)
## treatment    3  4.391  1.4635   4.279  0.039 *
## block        3  2.016  0.6719   1.964  0.190
## Residuals    9  3.078  0.3420
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
model2 <- aov(score ~ treatment, data = wines_df)
summary(model2)
```

```
##             Df Sum Sq Mean Sq F value Pr(>F)
## treatment    3  4.391  1.4635   3.448 0.0516 .
## Residuals   12  5.094  0.4245
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Question:

With the wines dataset, why do we get a different treatment p-value on Slides 15 and 16? Which one is the one we should use? Answer: We need to work on each block first. One of them has block in the model and

one of them does not. We should have blocks in the model which the p-value from Model1(0.039), because blocks must be included. Model2 has an incorrect p-vlaue since it ignores blocks. model1 is right and model2 is wrong.

Your Turn #2

This is wrong becuase it treats PSI and block as quantitative:

```
model3 <- aov(yield ~ PSI + block, data = vasc)
summary(model3)
```

```
##             Df Sum Sq Mean Sq F value  Pr(>F)
## PSI          1 171.60  171.60  12.609 0.00189 **
## block        1  22.91   22.91   1.684 0.20850
## Residuals   21 285.79   13.61
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

First we have to change PSI and block to categorical:

```
vasc$PSI <- as.factor(vasc$PSI)
vasc$block <- as.factor(vasc$block)
```

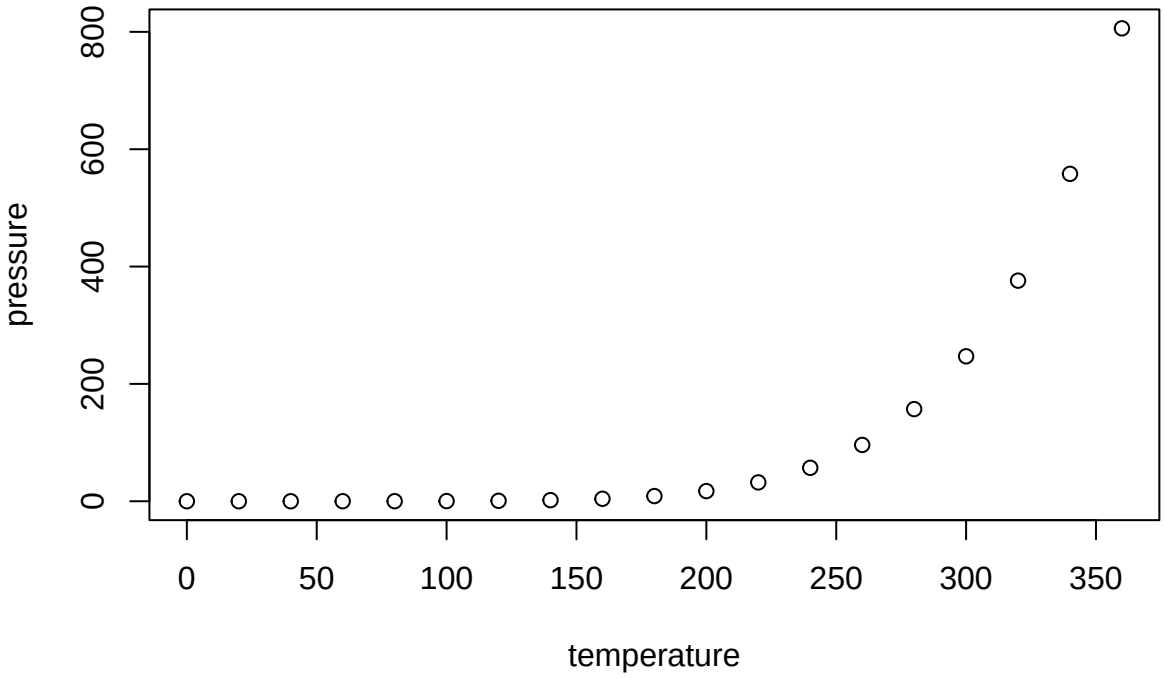
Now we can re-run analysis:

```
model4 <- aov(yield ~ PSI + block, data = vasc)
summary(model4)
```

```
##             Df Sum Sq Mean Sq F value  Pr(>F)
## PSI          3  178.2   59.39   8.107 0.00192 **
## block        5  192.2   38.45   5.249 0.00553 **
## Residuals   15  109.9    7.33
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Including Plots

You can also embed plots, for example:



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.