

Comparing multiple means

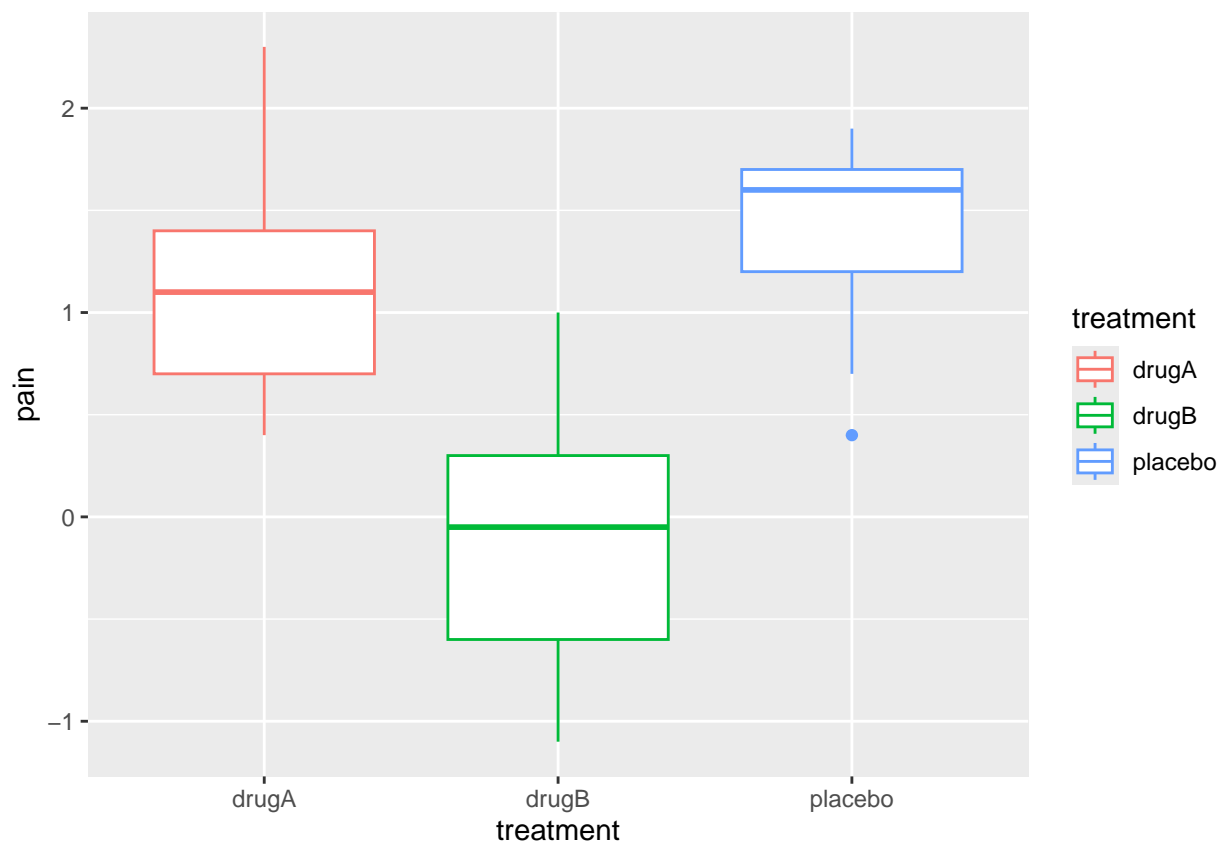
sn

2024-05-20

Practical

1.Looking at the dataset

```
ggplot(data = trial, aes(x = treatment, y = pain, color = treatment)) +  
  geom_boxplot() +  
  scale_fill_manual(values = c('red', 'green', 'blue'))
```



2.H0 and HA

3.Getting a sense of variability

4.Get a large number of sample pairs

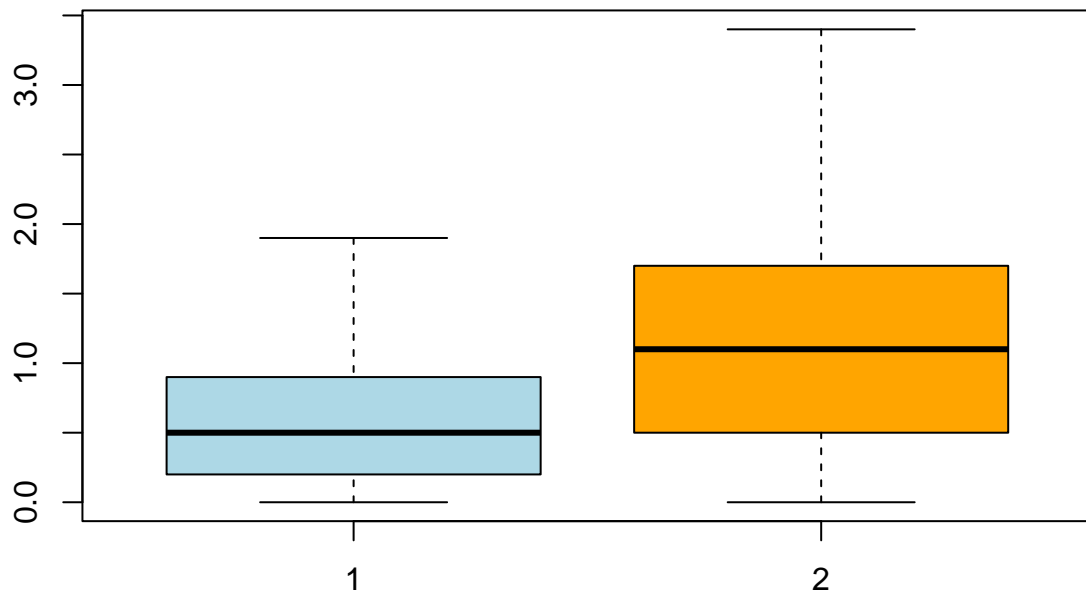
```
same <- c()
different <- c()
for (i in 1:1000){
  # choose 2 (different) rows from the total number of rows
  sample <- trial[sample(1:nrow(trial), 2), ]

  # For the two points in your sample, read out the pain indices
  # and determine their absolute difference
  pain_indices <- sample$pain
  differences <- abs(pain_indices[1]-pain_indices[2])

  # For the two points in your sample, decide whether they belong
  # to the same or to different treatment groups
  group <- sample$treatment
  if (group[1] == group[2]){
    same <- c(same, differences)
  }else{
    different <- c(different, differences)
  }
}
```

5.Plot and Test

```
boxplot(same,different, col = c('lightblue', 'orange'))
```



```
print(mean(different) - mean(same))
```

```
## [1] 0.5685575
```

```
# Run a test to find out
```

```
wilcox.test(x = same, y = different, alternative = 'two.sided', paired = FALSE)
```

```
##
```

```
## Wilcoxon rank sum test with continuity correction
```

```
##
```

```
## data: same and different
```

```
## W = 58686, p-value < 2.2e-16
```

```
## alternative hypothesis: true location shift is not equal to 0
```