检测day和rep

> model11 <- aov(co1 ~ day, data=data)

> model12 <- aov(co1 ~ rep, data=data)

> summary(model11)

Df Sum Sq Mean Sq F value Pr(>F)

day 1 0.0028 0.002848 0.417 0.522

Residuals 50 0.3418 0.006836

> summary(model12)

Df Sum Sq Mean Sq F value Pr(>F)

rep 1 0.0004 0.000419 0.061 0.806

Residuals 50 0.3442 0.006885

>

> model21 <- aov(co2 ~ day, data=data)

> model22 <- aov(co2 ~ rep, data=data)

> summary(model21)

Df Sum Sq Mean Sq F value Pr(>F)

day 1 0.98 0.9807 0.626 0.433

Residuals 50 78.35 1.5670

> summary(model22)

Df Sum Sq Mean Sq F value Pr(>F)

rep 1 1.50 1.497 0.962 0.331

Residuals 50 77.83 1.557

>

> model31 <- aov(hc ~ day, data=data)

> model32 <- aov(hc ~ rep, data=data)

> summary(model31)

Df Sum Sq Mean Sq F value Pr(>F)

day 1 1 1.02 0.021 0.886

Residuals 50 2449 48.98

> summary(model32)

Df Sum Sq Mean Sq F value Pr(>F)

rep 1 43.6 43.65 0.907 0.346

Residuals 50 2406.5 48.13

模型

> modela <- aov(hc ~ dev, data=data)

> modelb <- aov(co1 ~ dev, data=data)

> modelc <- aov(co2 ~ dev, data=data)

> summary(modela)

Df Sum Sq Mean Sq F value Pr(>F)

dev 1 77.6 77.61 1.636 0.207

Residuals 50 2372.5 47.45

> summary(modelb)

Df Sum Sq Mean Sq F value Pr(>F)

dev 1 0.0050 0.004969 0.731 0.396

Residuals 50 0.3397 0.006794

> summary(modelc)

Df Sum Sq Mean Sq F value Pr(>F)

dev 1 1.55 1.546 0.993 0.324

Residuals 50 77.79 1.556

正态检验：

> shapiro.test(hc\_a)

Shapiro-Wilk normality test

data: hc\_a

W = 0.94903, p-value = 0.4744

> shapiro.test(dd)

Shapiro-Wilk normality test

data: dd

W = 0.90166, p-value = 0.003789

> shapiro.test(co2\_a)

Shapiro-Wilk normality test

data: co2\_a

W = 0.97264, p-value = 0.8794

> shapiro.test(co2\_b)

Shapiro-Wilk normality test

data: co2\_b

W = 0.95168, p-value = 0.1181

shapiro.test(co1\_a)

Shapiro-Wilk normality test

data: co1\_a

W = 0.93427, p-value = 0.2847

> shapiro.test(co1\_b)

Shapiro-Wilk normality test

data: co1\_b

W = 0.98424, p-value = 0.8765

方差齐性检验：

> bartlett.test(hc~dev, data)

Bartlett test of homogeneity of variances

data: hc by dev

Bartlett's K-squared = 6.4722, df = 1, p-value = 0.01096

> bartlett.test(co2~dev, data)

Bartlett test of homogeneity of variances

data: co2 by dev

Bartlett's K-squared = 0.032933, df = 1, p-value = 0.856

> bartlett.test(co1~dev, data)

Bartlett test of homogeneity of variances

data: co1 by dev

Bartlett's K-squared = 1.7036, df = 1, p-value = 0.1918

加装置前后

> t.test(hc ~ co3, var.equal = TRUE, data)

Two Sample t-test

data: hc by co3

t = 0.27799, df = 14, p-value = 0.7851

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

-4.020795 5.218295

sample estimates:

mean in group 1 mean in group 2

13.02250 12.42375

> t.test(co1 ~ co3, var.equal = TRUE, data)

Two Sample t-test

data: co1 by co3

t = 0.67275, df = 14, p-value = 0.5121

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

-0.0738478 0.1413478

sample estimates:

mean in group 1 mean in group 2

0.17750 0.14375

> t.test(co2 ~ co3, var.equal = TRUE, data)

Two Sample t-test

data: co2 by co3

t = 0.31392, df = 14, p-value = 0.7582

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

-1.144584 1.537084

sample estimates:

mean in group 1 mean in group 2

15.12000 14.92375

火花塞前后：

> t.test(hc ~ co3, var.equal = TRUE, data)

Two Sample t-test

data: hc by co3

t = 1.5592, df = 34, p-value = 0.1282

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

-1.207953 9.170203

sample estimates:

mean in group 1 mean in group 2

11.845500 7.864375

> t.test(co1 ~ co3, var.equal = TRUE, data)

Two Sample t-test

data: co1 by co3

t = 0.0049313, df = 34, p-value = 0.9961

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

-0.05138894 0.05163894

sample estimates:

mean in group 1 mean in group 2

0.139500 0.139375

> t.test(co2 ~ co3, var.equal = TRUE, data)

Two Sample t-test

data: co2 by co3

t = -4.0255, df = 34, p-value = 0.000301

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

-2.1410161 -0.7044839

sample estimates:

mean in group 1 mean in group 2

14.01600 15.43875

> t.test(co2 ~ dev, var.equal = TRUE, data)

Two Sample t-test

data: co2 by dev

t = 2.0351, df = 26, p-value = 0.05215

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

-0.01106071 2.21906071

sample estimates:

mean in group 0 mean in group 1

15.120 14.016

> t.test(co2 ~ dev, var.equal = TRUE, data)

Two Sample t-test

data: co2 by dev

t = -1.3982, df = 22, p-value = 0.176

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

-1.2788673 0.2488673

sample estimates:

mean in group 0 mean in group 1

14.92375 15.43875

Hotelling T^2:

> x=cbind(x1,x2,x3)

> mshapiro.test(t(x))

Shapiro-Wilk normality test

data: Z

W = 0.97011, p-value = 0.8404

> y=cbind(y1,y2,y3)

> mshapiro.test(t(y))

Shapiro-Wilk normality test

data: Z

W = 0.95308, p-value = 0.1307

> HotellingsT2(x,y)

Hotelling's two sample T2-test

data: x and y

T.2 = 1.1363, df1 = 3, df2 = 48, p-value = 0.3439

alternative hypothesis: true location difference is not equal to c(0,0,0)