Quiz 1

ANOVA for the Completely Randomized Design

Restoring Self-Control When Intoxicated

Does coffee or some other form of stimulation really allow a person suffering from alcohol intoxication to "sober up" ?

Psychologists from the University of Waterloo recruited 44 healthy make college students and randomized them to a number of different "stimulant" groups. Each participant was asked to memorize 40 words, 20 from a green list and 20 on a red list, and then given two alcoholic beverages (one group received a Placebo). After 25 minutes, the participants were asked to complete a memory task, and scored on their performance.

McClave and Sincich, 12th Ed., problem 10.34.

R Code: Drinkers Data

```
> table(Drink$GROUP)
 A AC AR  P
11 11 11 11

> summary(aov(SCORE ~ GROUP,data=Drink))
            Df Sum Sq Mean Sq F value   Pr(>F)
GROUP        3 0.9506  0.3169        3.76e-05 ***
Residuals   40 1.2317  0.0308
---
Sig. Codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

> leveneTest(SCORE ~ GROUP,data=Drink,center='mean')
Levene's Test for Homogeneity of Variance (center = "mean")
      Df F value Pr(>F)
group  3  0.7799 0.5122
      40

> qf(0.95,3,40)
[1] 2.838745
```

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```

Q1: How many treatments are there ?

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      40

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[1] 2.838745
```

Q2: What is the total sum of squares ?

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```
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[1] 2.838745
```

Q3: What is the value of the ANOVA F statistic ?

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[1] 2.838745
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Q4: What is the conclusion of the test ?

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```

Q5: Is the conclusion valid, given the information provided ?

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A1: 4

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A2: $SS = 0.9506 + 1.2317 = 2.1823$

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[1] 2.838745
```

A3: $F = 0.3169/0.0308 \doteq 10.29$

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A4: Reject H_0 as $C_R = 2.838745 < 10.3$, and as $p = 3.76\text{e} - 05$.

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A5: No evidence to suggest otherwise from Levene's test.