Lesson 14: Inference for Several Means (ANOVA)

Homework

## Solutions

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| Problem | Part | Solution |
| 1 | - | ANOVA is a test for equality of several means. It allows us to compare the means for several groups in one hypothesis test. |
| 2 | - | a. An *F*-distribution is right skewed. A *t*-distribution is bell-shaped. b. The values of *F* are never negative. The values of *t* can be positive or negative. c. The P-value for the ANOVA test is always the area in the right tail in an *F*-distribution. We will never divide the area in the tail. The P-value for a *t*-test can be either the area under the right tail, the left tail, or both. |
| 3 | - | hist |
| 4 | - | **Elderly Females**: n = 11, mean = 0.528, Std. Dev. = 0.112 **Young Females**: n = 10, mean = 0.645, Std. Dev. = 0.099 **Elderly Males**: n = 8, mean = 0.654, Std. Dev. = 0.092 **Young Males**: n = 9, mean = 0.558, Std. Dev. = 0.145 |
| 5 | - | ANOVA |
| 6 | - | Yes, the requirements are satisfied. The requirements that were checked were the following: -The observations are normally distributed within each group. This was checked by creating Q-Q plots for each group. The sample sizes are small and this conclusion is subjective. QQEF QQYF QQEM QQYM -The variances are equal. This was checked by noting that the largest variance is not more than four times the smallest variance. |
| 7 | - |  |
| 8 | - | F = 2.932 df = 3 and 34 |
| 9 | - | P-value = 0.047 |
| 10 | - | P-value = 0.047 < 0.05 =  reject the null hypothesis |
| 11 | - | There is sufficient evidence to suggest that there is a difference in the mean protein requirements of the individuals in the four groups. |
| 12 | - | Hist12 |
| 13 | - | **Control**: n = 7, mean = 0.453, Std. Dev. = 0.391 **MON**: n = 7, mean = 0.521, Std. Dev. = 0.325 **SAFF**: n = 7, mean = 3.363, Std. Dev. = 0.774 **SAFF/MON**: n = 7, mean = 5.151, Std. Dev. = 0.729 |
| 14 | - | No, not all of the requirements are satisfied. The requirements that were checked were the following: -The observations are normally distributed within each group. This was checked by creating Q-Q plots for each group. The sample sizes are small and this conclusion is subjective. QQCON QQMON QQSAFF QQSAFFM -The variances are not equal. This was checked by noting that the largest variance is more than four times the smallest variance. |
| 15 | - |  |
| 16 | - | F = 106.217 df = 3 and 24 |
| 17 | - | P-value = 0 |
| 18 | - | P-value = 0 < 0.05 =  reject the null hypothesis |
| 19 | - | There is sufficient evidence to suggest that there is a difference in the mean CLA content in milk fat for at least one of the four diets. |
| 20 | - | It would be worth figuring out which of the diets produced the highest CLA content and then possibly encouraging the use of that diet more than the others. |