**BIS 305**

# Assignment 6

**Due 10/31/22**

32. For the data in the Excel file Coffee Shop Preferences, conduct a hypothesis test to determine if price and taste ratings are the same for large/chain stores versus small/independent coffee shops.

Ho: price ratings are the same for large/chain stores versus small/independent coffee shops.

Ha: price ratings are not the same for large/chain stores versus small/independent coffee shops.

|  |  |  |
| --- | --- | --- |
|  | **Column Labels** |  |
| **Statistics** | **Large/Chain** | **Small/Independent** |
| Sample Size | 16 | 7 |
| Price Mean | 1.625 | 2.428571429 |
| Price Sd | 1.087811258 | 1.133893419 |

|  |  |  |
| --- | --- | --- |
| t-Test: Two-Sample Assuming Equal Variances | | |
|  |  |  |
|  | *Variable 1* | *Variable 2* |
| Mean | 1.625 | 2.428571429 |
| Variance | 1.183333333 | 1.285714286 |
| Observations | 16 | 7 |
| Pooled Variance | 1.212585034 |  |
| Hypothesized Mean Difference | 0 |  |
| df | 21 |  |
| t Stat | -1.610324788 |  |
| P(T<=t) one-tail | 0.061128489 |  |
| t Critical one-tail | 1.720742903 |  |
| P(T<=t) two-tail | 0.122256979 |  |
| t Critical two-tail | 2.079613845 |  |

Since our P-value is not below our alpha level of 0.05, we fail to reject our null hypothesis. There is not sufficient evidence to suggest that price ratings are different for large/chain stores versus small/independent coffee shops.

Ho: Taste ratings are the same for large/chain stores versus small/independent coffee shops.

Ha: Taste ratings are not the same for large/chain stores versus small/independent coffee shops.

|  |  |  |
| --- | --- | --- |
|  | **Column Labels** |  |
| **Statistics** | **Large/Chain** | **Small/Independent** |
| Sample Size | 16 | 7 |
| Taste Mean | 2.75 | 2.857142857 |
| Taste Sd | 1.290994449 | 0.899735411 |

|  |  |  |
| --- | --- | --- |
| t-Test: Two-Sample Assuming Equal Variances | | |
|  |  |  |
|  | *Variable 1* | *Variable 2* |
| Mean | 2.857142857 | 2.75 |
| Variance | 0.80952381 | 1.666666667 |
| Observations | 7 | 16 |
| Pooled Variance | 1.421768707 |  |
| Hypothesized Mean Difference | 0 |  |
| df | 21 |  |
| t Stat | 0.198286817 |  |
| P(T<=t) one-tail | 0.422363832 |  |
| t Critical one-tail | 1.720742903 |  |
| P(T<=t) two-tail | 0.844727663 |  |
| t Critical two-tail | 2.079613845 |  |

Since our P-value is not below our alpha level of 0.05, we fail to reject our null hypothesis. There is not sufficient evidence to suggest that Taste ratings are different for large/chain stores versus small/independent coffee shops.

38. Using the data in the Excel file Ohio Education Performance, test the hypotheses that the mean difference in writing and reading scores is zero and that the mean difference in math and science scores is zero. Use the paired-sample procedure.

Ho: mean score of writing – mean score of math = 0

Ha: mean score of writing – mean score of math != 0

|  |  |  |
| --- | --- | --- |
|  | *Variable 1* | *Variable 2* |
| Mean | 64.193548 | 84.935484 |
| Variance | 227.49462 | 99.729032 |
| Observations | 31 | 31 |
| Pearson Correlation | 0.6978461 |  |
| Hypothesized Mean Difference | 0 |  |
| df | 30 |  |
| t Stat | -10.676802 |  |
| P(T<=t) one-tail | 4.871E-12 |  |
| t Critical one-tail | 1.6972609 |  |
| P(T<=t) two-tail | 9.742E-12 |  |
| t Critical two-tail | 2.0422725 |  |

Since our P-value is below our alpha level of 0.05, we reject our null hypothesis. There is sufficient evidence to suggest that the mean score of writing – the mean score of reading is not 0. (This means there mean scores are different)

Ho: mean score of math – mean score of science = 0

Ha: mean score of math – mean score of science != 0

|  |  |  |
| --- | --- | --- |
| t-Test: Two-Sample Assuming Equal Variances | | |
|  |  |  |
|  | *Variable 1* | *Variable 2* |
| Mean | 64.193548 | 71.709677 |
| sd | 15.082925 | 13.120451 |
| Variance | 227.49462 | 172.14624 |
| Observations | 31 | 31 |
| Pooled Variance | 199.82043 |  |
| Hypothesized Mean Difference | 0 |  |
| df | 60 |  |
| t Stat | -2.0933417 |  |
| P(T<=t) one-tail | 0.020277 |  |
| t Critical one-tail | 1.6706489 |  |
| P(T<=t) two-tail | 0.040554 |  |
| t Critical two-tail | 2.0002978 |  |

Since our P-value is below our alpha level of 0.05, we reject our null hypothesis. There is sufficient evidence to suggest that the mean score of science – the mean score of reading is not 0. (This means there mean scores are different)

42. For the Excel file Job Satisfaction, use ANOVA to determine if the mean overall job satisfaction ratings differ by department.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Source of Variation* | *SS* | *df* | *MS* | *F* | *P-value* | *F crit* |
| Between Groups | 14.29326 | 5 | 2.858652 | 0.572058 | 0.720713 | 2.58679 |
| Within Groups | 129.9255 | 26 | 4.997134 |  |  |  |
|  |  |  |  |  |  |  |
| Total | 144.2188 | 31 |  |  |  |  |

48. The cross-tabulation data given below represent the number of males and females in a survey who have or have not visited an urgent care facility in the last month.

|  |  |  |  |
| --- | --- | --- | --- |
| Visited Urgent Care | Female | Male | total |
| Yes | 14 | 6 | 20 |
| No | 2 | 7 | 9 |
| Total | 16 | 13 | 29 |

1. Write the hypotheses for the chi-square test for independence.

The # of visits in the Urgent Care is independent of gender

b. Find the expected frequencies.

|  |  |  |  |
| --- | --- | --- | --- |
| Expected frequency Table: |  |  |  |
|  |  |  |  |
| Visited Urgent Care | Female | Male | total |
| Yes | =Z12\*AB10/AB12 | =AA12\*AB10/AB12 | =SUM(Z20:AA20) |
| No | =16\*9/29 | =AA12\*AB11/AB12 | =SUM(Z21:AA21) |
| Total | =SUM(Z20:Z21) | =SUM(AA20:AA21) | =SUM(Z22:AA22) |

|  |  |  |  |
| --- | --- | --- | --- |
| Expected frequency Table: |  |  |  |
|  |  |  |  |
| Visited Urgent Care | Female | Male | total |
| Yes | 11.034 | 8.97 | 20 |
| No | 4.9655 | 4.03 | 9 |
| Total | 16 | 13 | 29 |

c. Compute the chi-square statistic using a level of significance of 0.05.

5.728739

d. Find the chi-square critical value and p-value and draw a conclusion.

Critical value: 3.841458821

P value: 0.046847568