# CP2403 - Project – Part 2 – CHI Squared

First Name: Kaung Khant

Last Name: Naing

|  |
| --- |
| **Step 1: hypothesis** |
| Null hypothesis (Ho):  There is no difference between Reported Temperature (R\_TEMP) and Reported Potential Density of Water (R\_SIGMA). – NO DIFFERENCE |
| Alternative (Ha) hypothesis:  There is difference between Reported Temperature (R\_TEMP) and Reported Potential Density of Water (R\_SIGMA) – THERE IS DIFFERENCE |
| **Step 2: Data Selection** |
| The data taken from CalCCOFI database – bottle table:  Cast count = 11:   * Reported Temperature (R\_TEMP) * Reported Potential Density of Water (R\_SIGMA) |
| **Step 3: Assess the evidence (Chi Squared)** |
| Cross Tab (numbers) |
| Cross Tab (Percentages) |
| Cross Tab (numbers)  chi-square value, p value, expected counts  (63.08571428571428, 4.309709751477708e-06, 21, array([[1.3125, 2.1875, 2.1875, 1.3125],  [0.1875, 0.3125, 0.3125, 0.1875],  [0.5625, 0.9375, 0.9375, 0.5625],  [0.375 , 0.625 , 0.625 , 0.375 ],  [0.5625, 0.9375, 0.9375, 0.5625],  [0.375 , 0.625 , 0.625 , 0.375 ],  [0.375 , 0.625 , 0.625 , 0.375 ],  [2.25 , 3.75 , 3.75 , 2.25 ]]) |
| Chi Squared Value: 63.08571428571428  p-value: 4.309709751477708e-06 |
| **Step 4: Draw Conclusion** |
| It can be concluded from the data above that the null hypothesis is rejected and the alternative hypothesis is accepted because the p-value is 4.309709751477708e-06 which is less than 0.05 (p<0.05). Therefore, there is difference between reported temperature and reported potential density of water. |
| **Post-hoc test (if any)** |
| 24 versus 25 Chi value: 3.1999999999999997 p value: 0.2018965179946554  24 versus 26 Chi value: 16.0 p value: 0.006844073922420431  24 versus 27 Chi value: 8.333333333333334 p value: 0.003892417122778637  25 versus 26 Chi value: 20.0 p value: 0.005569683072945574  25 versus 27 Chi value: 16.0 p value: 0.0011339842897853216  26 versus 27 Chi value: 12.342857142857143 p value: 0.014975740400189464  Based on Bonferroni Adjustment the new p - value is 0.00833 (0.05/6 = 0.00833) since there are 6 comparison.  There are significantly more cases of differences between reported temperature from cast count of 11 in:   * 26 unit of reported potential density of water than 24 unit of reported potential density of water * 27 unit of reported potential density of water than 24 unit of reported potential density of water * 26 unit of reported potential density of water than 25 unit of reported potential density of water * 27 unit of reported potential density of water than 25 unit of reported potential density of water |
| **Plot/Chart(s)** |
| Based from the bar chart it can be concluded that reported potential density of water and reported temperature has a negative relationship |