Assignment:

* By calculator, as Dr. McGee did in the lecture (3.7), calculate the sums of squares and confirm your numbers match those seen in the example.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Summary Statistics |  |  |  |  |
|  |  | Male | Female | All |
| Caucasian | mean | 51.2 | 31 | 41.1 |
|  | sd | 7.694 | 9.083 | 13.279 |
| African American | mean | 55.2 | 43.6 | 49.4 |
|  | sd | 10.569 | 6.914 | 10.405 |
| Hispanic | mean | 28.6 | 27.4 | 28 |
|  | sd | 3.209 | 3.209 | 6.566 |
| All | mean | 45 | 34 | 39.5 |
|  | sd | 14.097 | 10.650 | 13.490 |
|  |  |  |  |  |
| Anova Table |  |  |  |  |
| Source | SS | df | MS | F |
| Gender | 907.5 | 1 | 907.5 | 13.70501 |
| Race | 2328.2 | 2 | 1164.1 | 17.58017 |
| Interaction | 452.6 | 2 | 226.3 | 3.417569 |
| Error | 1589.2 | 24 | 66.21667 |  |
| Total | 5277.5 | 29 |  |  |

* Use SAS (input the original data) to obtain the same results as those seen in this example. (See 3.9)

| **Source** | **DF** | **Sum of Squares** | **Mean Square** | **F Value** | **Pr > F** |
| --- | --- | --- | --- | --- | --- |
| **Model** | 5 | 3688.300000 | 737.660000 | 11.14 | <.0001 |
| **Error** | 24 | 1589.200000 | 66.216667 |  |  |
| **Corrected Total** | 29 | 5277.500000 |  |  |  |

| **Source** | **DF** | **Type I SS** | **Mean Square** | **F Value** | **Pr > F** |
| --- | --- | --- | --- | --- | --- |
| **Sex** | 1 | 907.500000 | 907.500000 | 13.71 | 0.0011 |
| **Race** | 2 | 2328.200000 | 1164.100000 | 17.58 | <.0001 |
| **Race\*Sex** | 2 | 452.600000 | 226.300000 | 3.42 | 0.0494 |

Do Exercise 13.19 from *Statistical Sleuth.*

Using proc GLM check for interaction:

| **Source** | | **DF** | | **Type I SS** | | **Mean Square** | | **F Value** | | **Pr > F** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Adoptive** | | 1 | | 1477.632749 | | 1477.632749 | | 8.46 | | 0.0064 | |
| **Biological** | | 1 | | 2291.471895 | | 2291.471895 | | 13.11 | | 0.0009 | |
| **Adoptive\*Biological** | | 1 | | 1.905882 | | 1.905882 | | 0.01 | | 0.9174 | |
| **Source** | **DF** | | **Type III SS** | | **Mean Square** | | **F Value** | | **Pr > F** | |
| **Adoptive** | 1 | | 1277.388235 | | 1277.388235 | | 7.31 | | 0.0106 | |
| **Biological** | 1 | | 2275.788235 | | 2275.788235 | | 13.02 | | 0.0010 | |
| **Adoptive\*Biological** | 1 | | 1.905882 | | 1.905882 | | 0.01 | | 0.9174 | |

Neither are significant at the 0.05 level so we don’t need to include them.



The histogram appears normal and the QQ plot is linear so we do not do any transformations.

| **Least Squares Means Estimate** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Effect** | **Label** | **Estimate** | **Standard Error** | **DF** | **t Value** | **Pr > |t|** |
| **Adoptive** | **Adoptive high-low** | 11.6500 | 4.3089 | 34 | 2.70 | 0.0106 |

| **Least Squares Means Estimate** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Effect** | **Label** | **Estimate** | **Standard Error** | **DF** | **t Value** | **Pr > |t|** |
| **Biological** | **Biological high-low** | 15.5500 | 4.3089 | 34 | 3.61 | 0.0010 |

The estimate for the amount IQ is affected by adoptive or biological parents’ SES levels are above. Adoptive parents’ SES levels are more influencial.