**PTX HW3 (Chapter 8)**

*In all problems, use appropriate notation to show all work for full credit. Use appropriate notation throughout. Turn in a single MS Word file or typed PDF (with the exception of when I ask for it, handwritten = no credit). I will also neither open nor examine raw data files and Excel spreadsheets. Include screen shots of relevant figures, tables and etc.*

**In all ANOVA problems: examine residuals, and interpret and explain the model and your results**

1. Consider HW3\_1.jmp, this contains 2 groups: diagnosed psychotic and non-psychotic and measured dopamine from each patient. This data was taken from Sternberg et al. “Schizophrenia: dopamine b-hydroxylase activity and treatment response,” *science*, 1982, v. 216, pp 1423-1425. Using JMP do the following:
   1. Examine if there is a difference between groups.
   2. Does your result differ significantly from using a t-test (as provided in JMP)?
2. Redo Example 8.3.1 (page 339) using only JMP. Do you get the same results as in the book? Examine the residuals of your model, does it appear adequate?
3. **Blocking.** This data considers prices (cents) for various solutions as collected in 9 catalogs in the mid-1970s. Consider yourself as the buyer for a company who is interested in finding the cheapest brand and supplier. Assume the quality of the brands is the same.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Brand | | | |
| Store | P | H | V | Q |
| 1 | 87 | 95 | 95 | 82 |
| 2 | 96 | 104 | 106 | 97 |
| 3 | 75 | 87 | 81 | 70 |
| 4 | 81 | 94 | 91 | 77 |
| 5 | 70 | 85 | 87 | 65 |
| 6 | 85 | 98 | 97 | 83 |
| 7 | 110 | 123 | 128 | 112 |
| 8 | 83 | 98 | 95 | 78 |
| 9 | 105 | 120 | 119 | 98 |

Using JMP and ANOVA examine the following and explain:

* 1. Analyze this data and appropriately explain your results.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

* 1. Analyze and interpret your residuals for normality, outliers, and against the data
  2. Are store and brand factors or blocks? why? Does it change the results?

1. **Consider** HW3\_2.jmp. This data considers results of Bailey (1953) *Inheritance of maternal influences on the growth of the rat*, PhD thesis, Uni. Cali., who examined infant rats who were given to foster mothers. The genotypes of both the infant and foster mothers were recorded as was the weight gain of the infants (grams) after 28 days. Bailey confirmed that the variability was negligible, using JMP for ANOVA evaluate his conclusions yourself.

* Consider this as having the following factors: litter genotype (L), mother genotype (M), and their interaction (LM).
* Evaluate what factors are relevant in the model and if there are any differences between groups
* Consider the sum and mean squares for the factors. How does your interpretation change when considering one and then the other? Why? Examine the residuals and overall model, draw appropriate conclusions.

1. **Factorial Experiment.** Consider the following table. This examine the relationship between which lab technician, cycle time, temperature dye solution was cycled at, and adsorption behavior of reactive dyes on a medium. Assume a significance of 5%

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Cycle Time** | **Temperature** | | | | | |
| **100F** | | | **150F** | | |
| **Lab Technician** | | | **Lab Technician** | | |
| **1** | **2** | **3** | **1** | **2** | **3** |
| **40** | 23 | 27 | 31 | 24 | 38 | 34 |
| 24 | 28 | 32 | 23 | 36 | 36 |
| 25 | 26 | 28 | 28 | 35 | 39 |
| **50** | 36 | 34 | 33 | 37 | 34 | 34 |
| 35 | 38 | 34 | 39 | 38 | 36 |
| 36 | 39 | 35 | 35 | 36 | 31 |
| **60** | 28 | 35 | 26 | 26 | 36 | 28 |
| 24 | 35 | 27 | 29 | 37 | 26 |
| 27 | 34 | 25 | 25 | 34 | 34 |

State the appropriate hypothesis, conduct ANOVA and examine all relevant results to determine how/if these factors are interacting, if all factors are significant and generally evaluate the model and draw conclusions about the relationship.

Examine your residuals for normality, outliers, and patterns