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Subject: Lab 24: One Way ANOVA Data Reading

Figure:

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Summary:

This lab we are running an ANOVA test on data having to do with the weight of litter rats based on the genotype of the mother and the genotype of the litter. We want to see whether there is a difference in the means if we isolate the genotype of the litter and the mother. We can also check the means with the interactions between gl and gm.

1.

Figure 1: Litter mean by gl gm

The MEANS Procedure

gl=a gm=a

Analysis Variable : wt			
Mean	Std Dev	Variance	Median
63.6800000	3.2736829	10.7170000	64.0000000

gl=a gm=b

Analysis Variable : wt			
Mean	Std Dev	Variance	Median
52.4000000	9.3744333	87.8800000	55.0000000

gl=a gm=i

Analysis Variable : wt			
Mean	Std Dev	Variance	Median
54.1250000	5.3218888	28.3225000	52.6000000

gl=a gm=j

Analysis Variable : wt			
Mean	Std Dev	Variance	Median
48.9600000	8.7605936	76.7480000	48.2000000

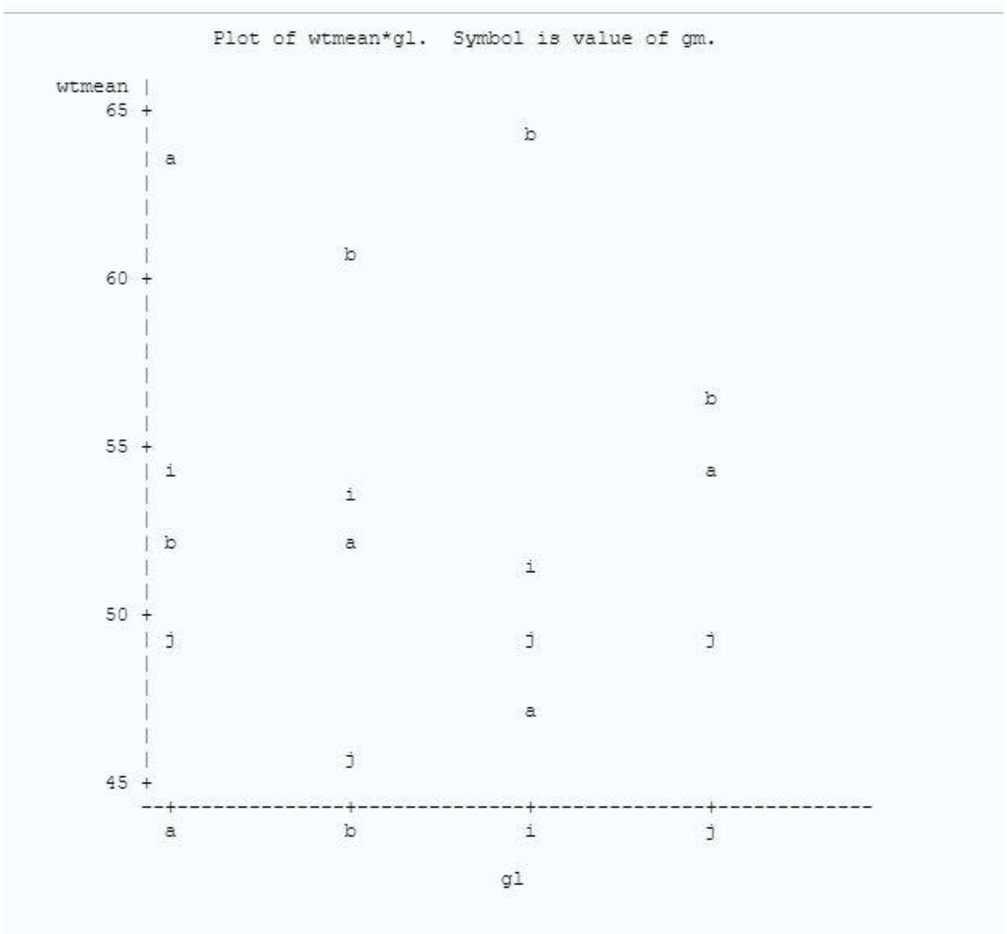
gl=b gm=a

Analysis Variable : wt			
Mean	Std Dev	Variance	Median
52.3250000	5.5331576	30.6158333	50.5000000

This data continues through all the combinations between litter and mother genotypes.

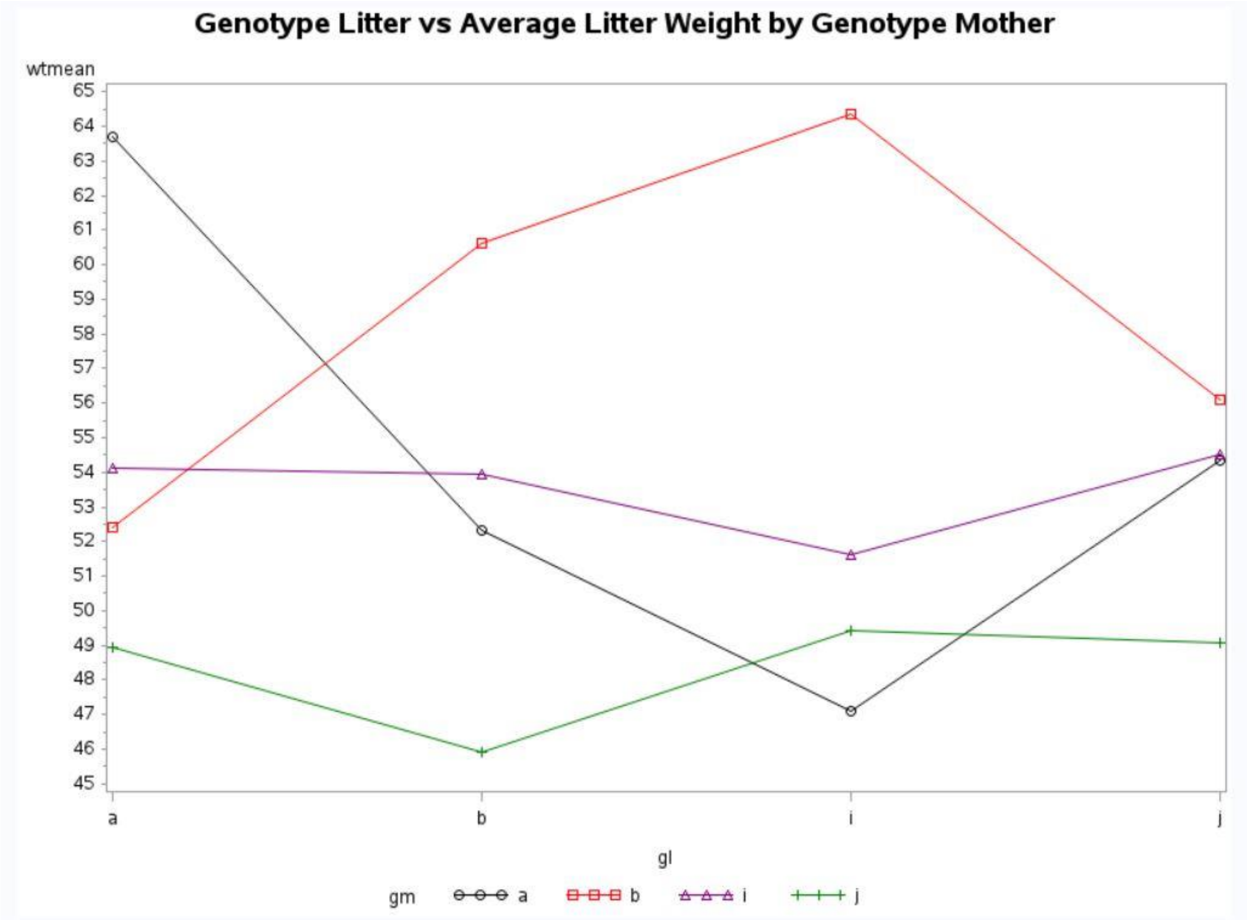
2.

Figure 2: Genotype Litter vs Weight Mean



3.

Figure 3: Genotype Litter vs Weight Mean CC



4.

There seems to be an interaction between a and b. Often were a has a good yield with a certain genotype of a litter b seems to do poorly and visa versa. An i genotype mother seems to yield a lower amount than the others across the litters.

5.

Figure 4: GLM wt

The GLM Procedure

Dependent Variable: wt

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	15	1659.310385	110.620692	2.04	0.0333
Error	45	2440.816500	54.240367		
Corrected Total	60	4100.126885			

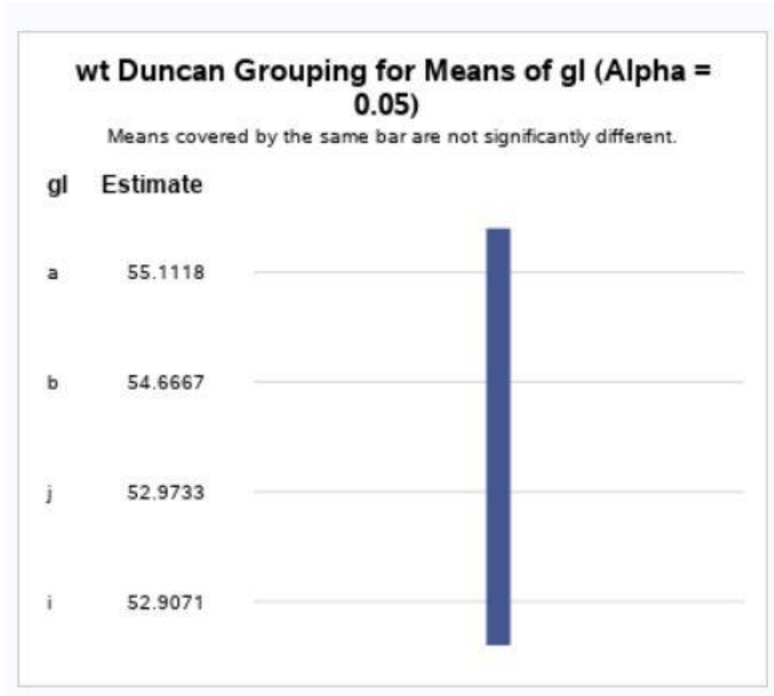
R-Square	Coeff Var	Root MSE	wt Mean
0.404697	13.64599	7.364806	53.97049

Source	DF	Type I SS	Mean Square	F Value	Pr > F
gl	3	60.1572858	20.0524286	0.37	0.7752
gm	3	775.0805878	258.3601959	4.76	0.0057
gl*gm	9	824.0725117	91.5636124	1.69	0.1201

Source	DF	Type III SS	Mean Square	F Value	Pr > F
gl	3	27.6559242	9.2186414	0.17	0.9161
gm	3	671.7376486	223.9125495	4.13	0.0114
gl*gm	9	824.0725117	91.5636124	1.69	0.1201

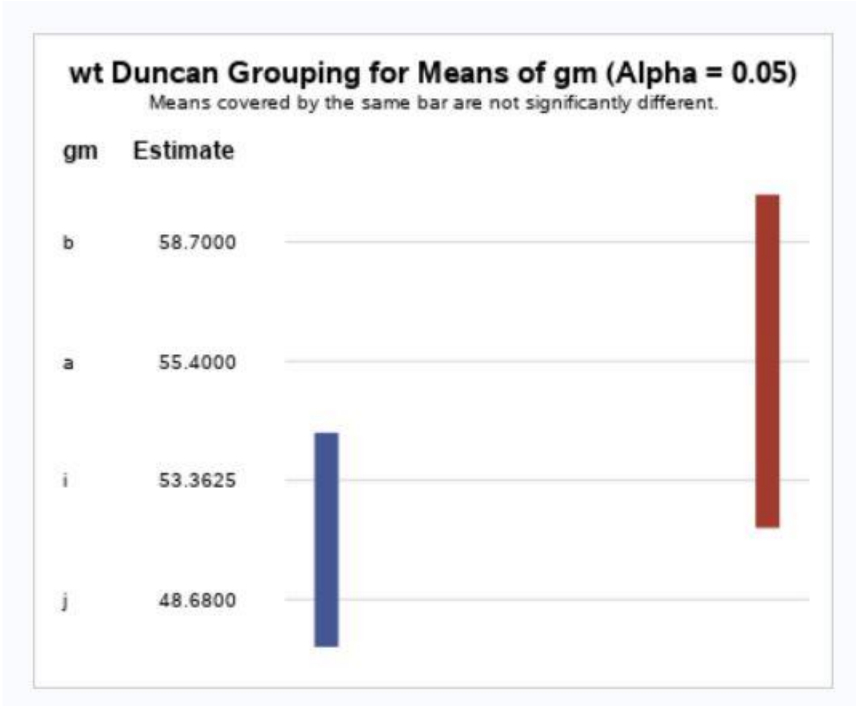
From the glm procedure, we get a p value well about 5 percent for our litters. In this case there is strong evidence for the null hypothesis. The null hypothesis being that means among the different genotypes of the litters are equal. For gm, get a p-value below 5 percent. This tells us that the genotype of the mother does make a difference in the weight of the litter. The interaction between the litter and the mother does not seem to make a difference based on the p-value.

Figure 5: Duncan gl



By the Duncan test we have strong evidence that the means between the litters are the same.

Figure 6: Duncan gm



The means between b, a, and i are statistically the same. The means between i and j are the same. Since the means between {b a i} and {i j} are the same, we cannot rule out all the means being the same because of the association rule.

6.

Figure 7: A GLM Coefficients

The GLM Procedure

Coefficients for Estimate gl = a	
	Row 1
Intercept	1
gl a	1
gl b	0
gl i	0
gl j	0
gm a	0.25
gm b	0.25
gm i	0.25
gm j	0.25
gl*gm a a	0.25
gl*gm a b	0.25
gl*gm a i	0.25
gl*gm a j	0.25
gl*gm b a	0
gl*gm b b	0
gl*gm b i	0
gl*gm b j	0
gl*gm i a	0
gl*gm i b	0
gl*gm i i	0
gl*gm i j	0
gl*gm j a	0
gl*gm j b	0
gl*gm j i	0
gl*gm j j	0

In this ANOVA we wanted to see whether there is a difference in the gl means of a across all gm. We used a coefficient of 1 for the gl procedure and 0.25 across the gm procedures and 0.25 across all interactions between gl and gm.

Figure 8: GL a ANOVA

The GLM Procedure

Dependent Variable: wt

Parameter	Estimate	Standard Error	t Value	Pr > |t|
gl = a	54.7912500	1.82579367	30.01	<.0001

As we can see from the ANOVA test there is a difference in the means gl = a across all gm. This means that if the litter is an a genotype there is strong evidence for a difference in the means across all mother genotypes.

7.

Figure 9: wt mean by gl

The MEANS Procedure

gl=a

Analysis Variable : wt				
N	Mean	Std Dev	Minimum	Maximum
17	55.1117647	8.6343704	39.6000000	68.2000000

gl=b

Analysis Variable : wt				
N	Mean	Std Dev	Minimum	Maximum
15	54.6666667	7.1336894	40.5000000	64.7000000

gl=i

Analysis Variable : wt				
N	Mean	Std Dev	Minimum	Maximum
14	52.9071429	11.2733494	36.3000000	69.8000000

gl=j

Analysis Variable : wt				
N	Mean	Std Dev	Minimum	Maximum
15	52.9733333	5.8708075	42.0000000	61.4000000

This chart shows the means of the weight across of the litter genotypes. We can see that the means are very similar between them. This is a contrast with our previous result that said the means between the mothers are different when we isolate the litter genotype to just a. This is because the cells have different number of observations making the data unbalanced.