The GLM Procedure

Class Level Information		
Class	Levels	Values
group	5	A1 A2 A3 A4 S

Number of Observations Read	50
Number of Observations Used	50

The GLM Procedure

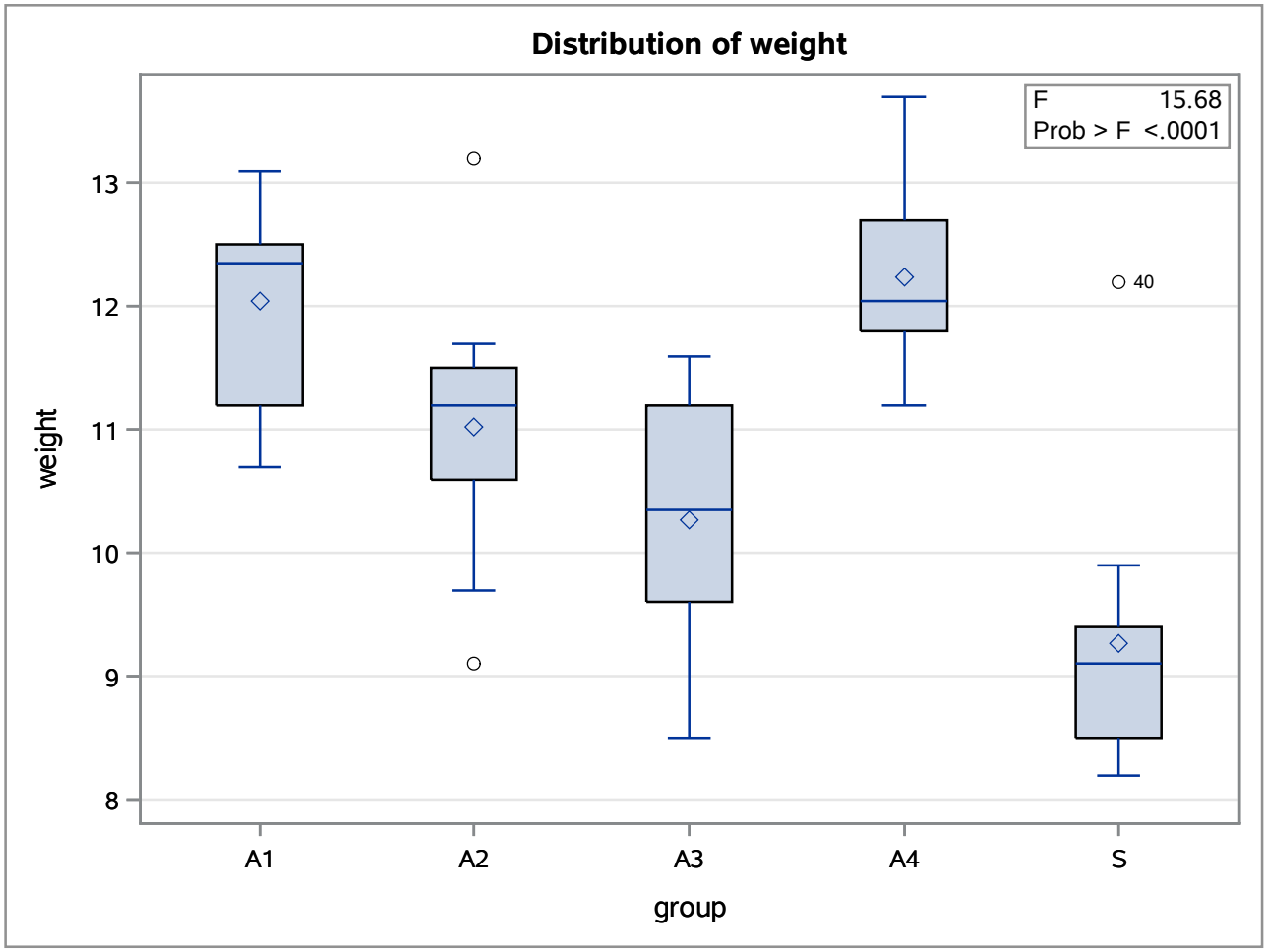
Dependent Variable: weight

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	61.6180000	15.4045000	15.68	<.0001
Error	45	44.2070000	0.9823778		
Corrected Total	49	105.8250000			

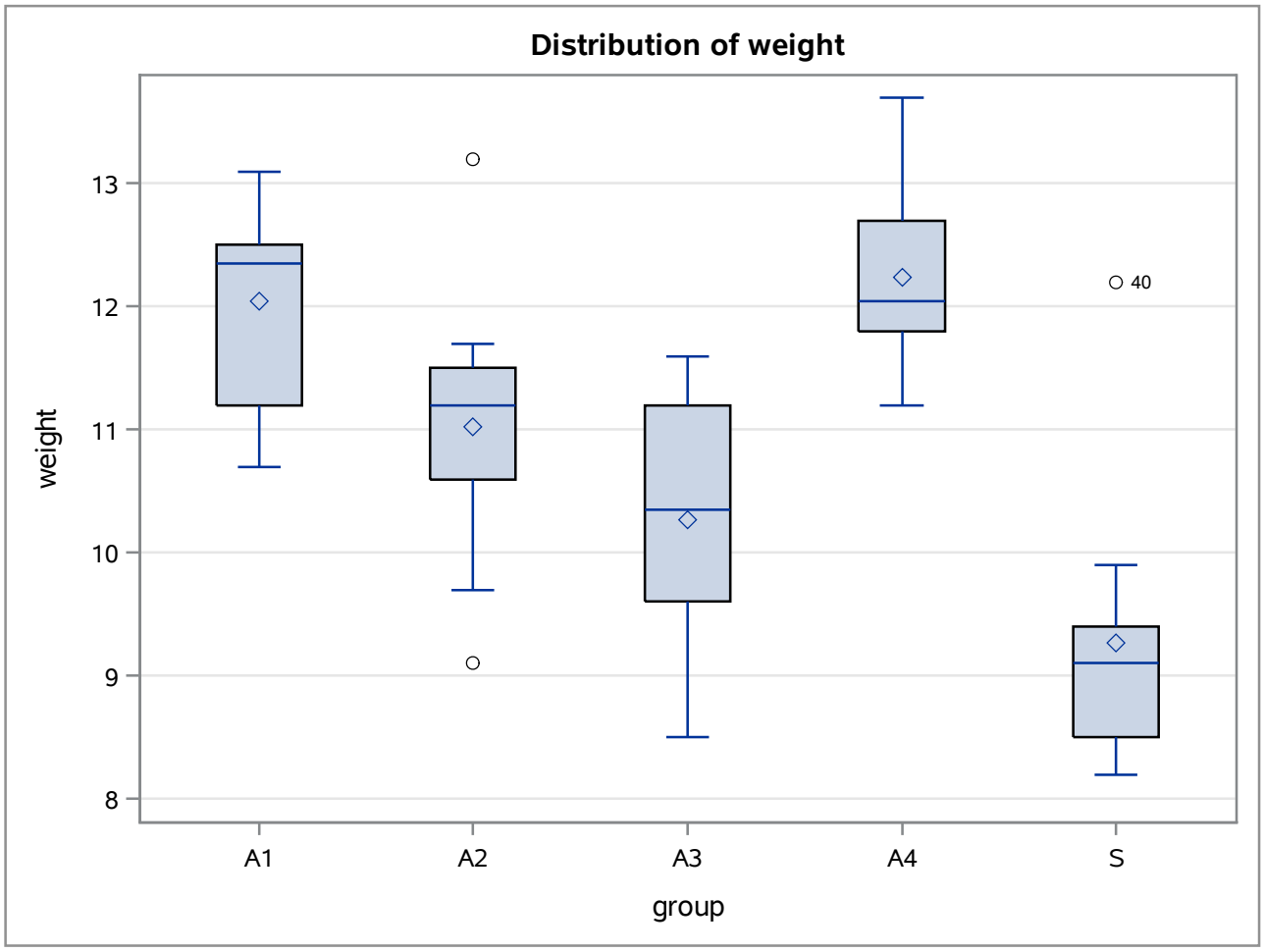
R-Square	Coeff Var	Root MSE	weight Mean
0.582263	9.035093	0.991150	10.97000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
group	4	61.61800000	15.40450000	15.68	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
group	4	61.61800000	15.40450000	15.68	<.0001



The GLM Procedure



The GLM Procedure

t Tests (LSD) for weight

Note: This test controls the Type I comparisonwise error rate, not the experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	45
Error Mean Square	0.982378
Critical Value of t	2.01410
Least Significant Difference	0.8928

Means with the same letter are not significantly different.

t Grouping	Mean	N	group
A	12.2400	10	A4
A			
A	12.0500	10	A1
B	11.0200	10	A2
B			
B	10.2700	10	A3
C	9.2700	10	S

The GLM Procedure

Tukey's Studentized Range (HSD) Test for weight

Note: This test controls the Type I experimentwise error rate, but it generally has a higher Type II error rate than REGWQ.

Alpha	0.05
Error Degrees of Freedom	45
Error Mean Square	0.982378
Critical Value of Studentized Range	4.01842
Minimum Significant Difference	1.2595

Means with the same letter are not significantly different.				
Tukey Grouping		**Mean**	**N**	**group**
	A	12.2400	10	A4
	A			
	A	12.0500	10	A1
	A			
B	A	11.0200	10	A2
B				
B	C	10.2700	10	A3
	C			
	C	9.2700	10	S

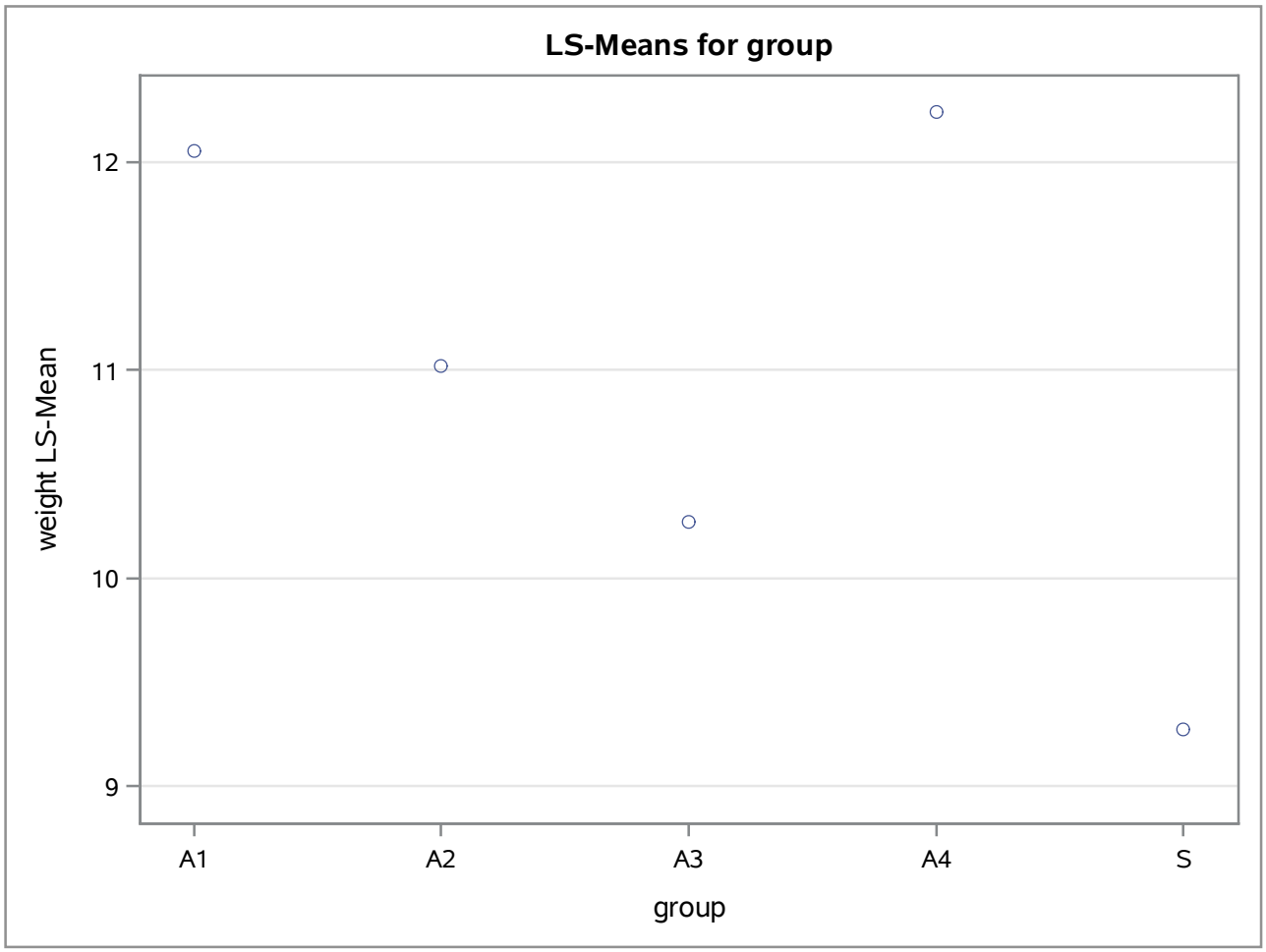
The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey

group	weight LSMEAN	LSMEAN Number
A1	12.0500000	1
A2	11.0200000	2
A3	10.2700000	3
A4	12.2400000	4
S	9.2700000	5

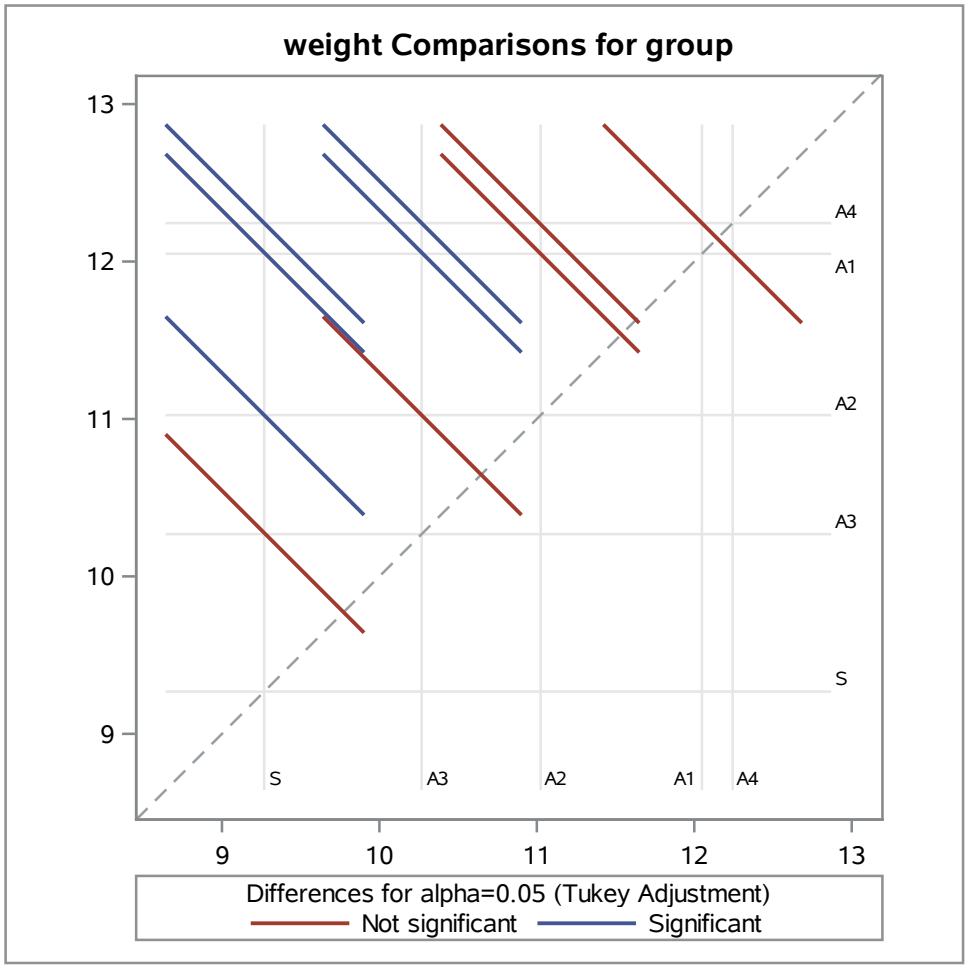
Least Squares Means for effect group
Pr > |t| for H0: LSMean(i)=LSMean(j)

Dependent Variable: weight

i/j	1	2	3	4	5
1		0.1563	0.0020	0.9927	<.0001
2	0.1563		0.4490	0.0618	0.0024
3	0.0020	0.4490		0.0005	0.1784
4	0.9927	0.0618	0.0005		<.0001
5	<.0001	0.0024	0.1784	<.0001	



The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey



The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
subj	7	1 2 3 4 5 6 7
music	3	c h n

Number of Observations Read	21
Number of Observations Used	21

The GLM Procedure

Dependent Variable: score

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	180.2857143	22.5357143	9.53	0.0004
Error	12	28.3809524	2.3650794		
Corrected Total	20	208.6666667			

R-Square	Coeff Var	Root MSE	score Mean
0.863989	7.208819	1.537881	21.33333

Source	DF	Type I SS	Mean Square	F Value	Pr > F
subj	6	149.3333333	24.8888889	10.52	0.0003
music	2	30.9523810	15.4761905	6.54	0.0120

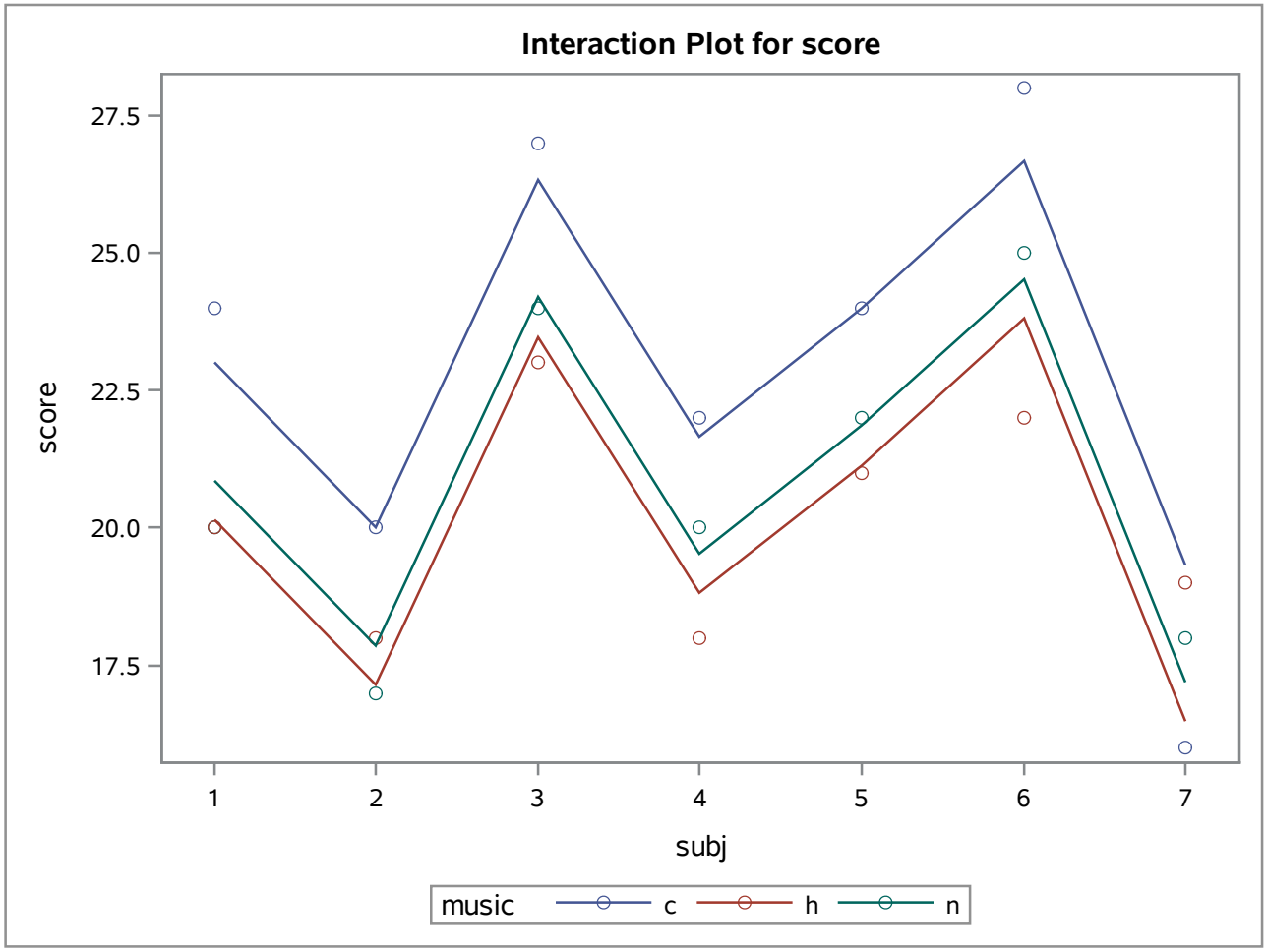
Source	DF	Type III SS	Mean Square	F Value	Pr > F
subj	6	149.3333333	24.8888889	10.52	0.0003
music	2	30.9523810	15.4761905	6.54	0.0120

Parameter	Estimate		Standard Error	t Value	Pr > |t|
Intercept	17.19047619	B	1.00677974	17.07	<.0001
subj 1	3.66666667	B	1.25567495	2.92	0.0128
subj 2	0.66666667	B	1.25567495	0.53	0.6052
subj 3	7.00000000	B	1.25567495	5.57	0.0001
subj 4	2.33333333	B	1.25567495	1.86	0.0878
subj 5	4.66666667	B	1.25567495	3.72	0.0029
subj 6	7.33333333	B	1.25567495	5.84	<.0001
subj 7	0.00000000	B	.	.	.
music c	2.14285714	B	0.82203221	2.61	0.0229
music h	-0.71428571	B	0.82203221	-0.87	0.4019
music n	0.00000000	B	.	.	.

Note: The X'X matrix has been found to be singular, and a generalized inverse was used to solve the normal equations. Terms whose estimates are followed by the letter 'B' are not uniquely estimable.

The GLM Procedure

Dependent Variable: score



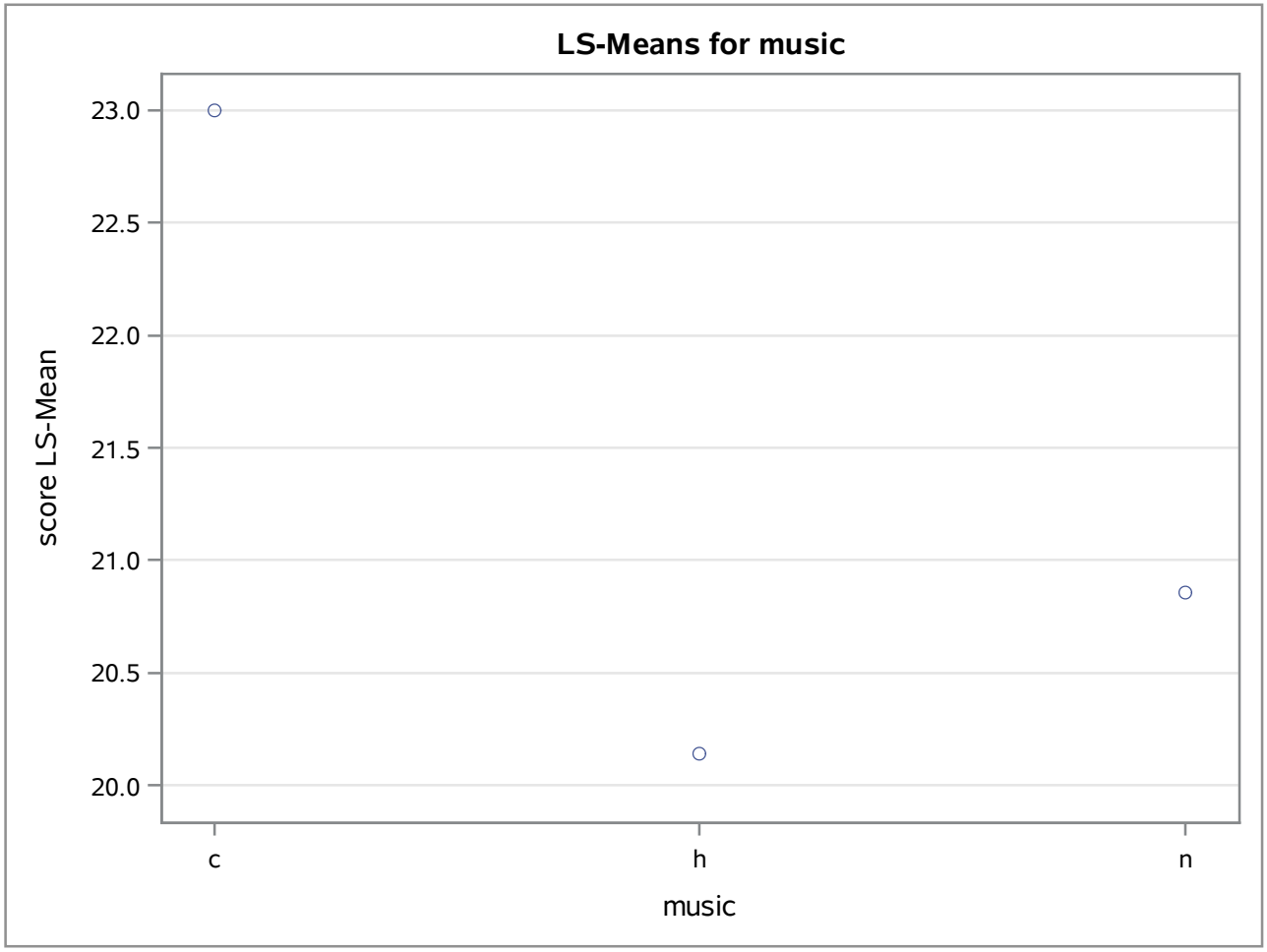
The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey

music	score LSMEAN	LSMEAN Number
c	23.0000000	1
h	20.1428571	2
n	20.8571429	3

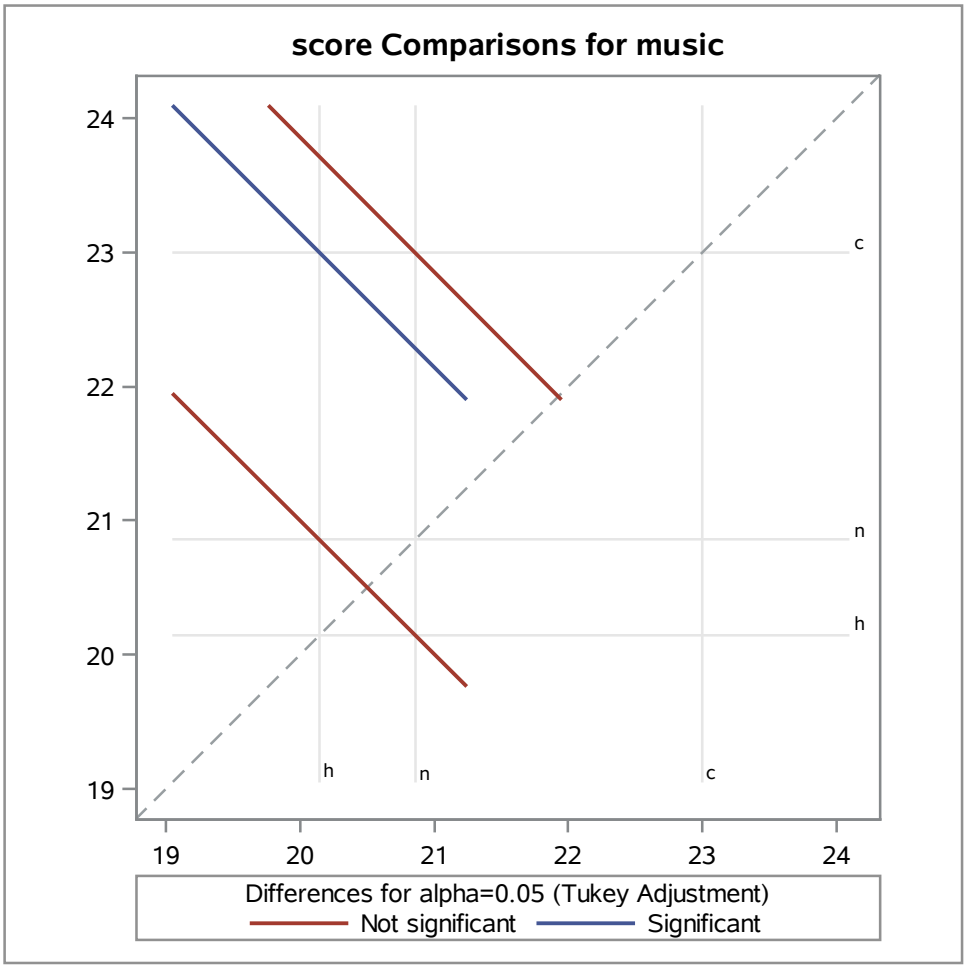
Least Squares Means for effect music
Pr > |t| for H0: LSMean(i)=LSMean(j)

Dependent Variable: score

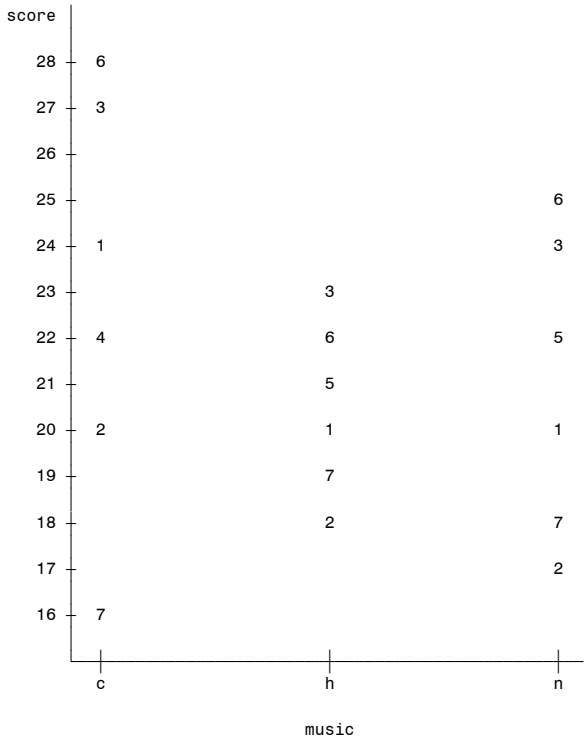
i/j	1	2	3
1		0.0118	0.0557
2	0.0118		0.6691
3	0.0557	0.6691	



The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey

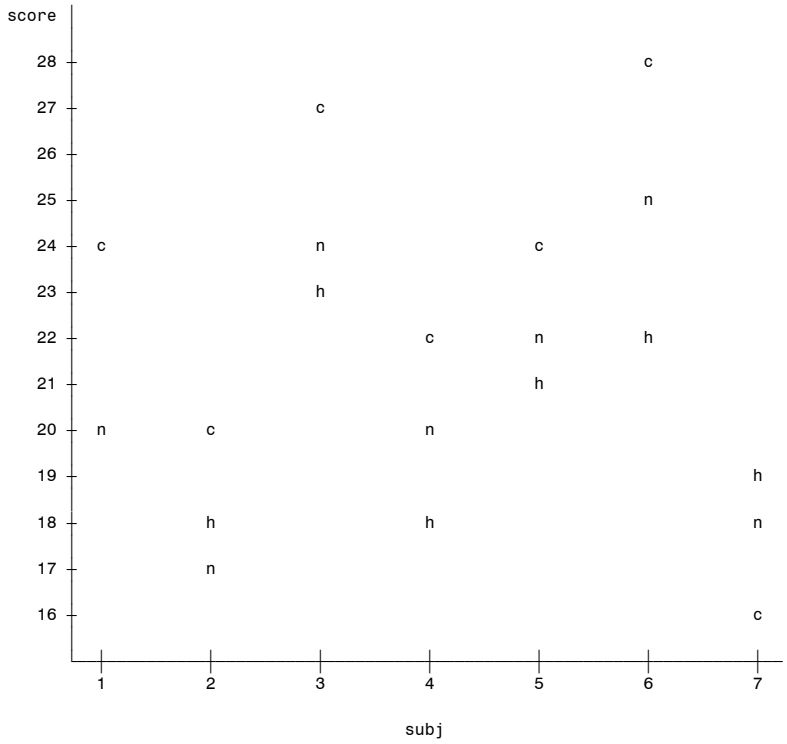


Plot of score*music. Symbol is value of subj.

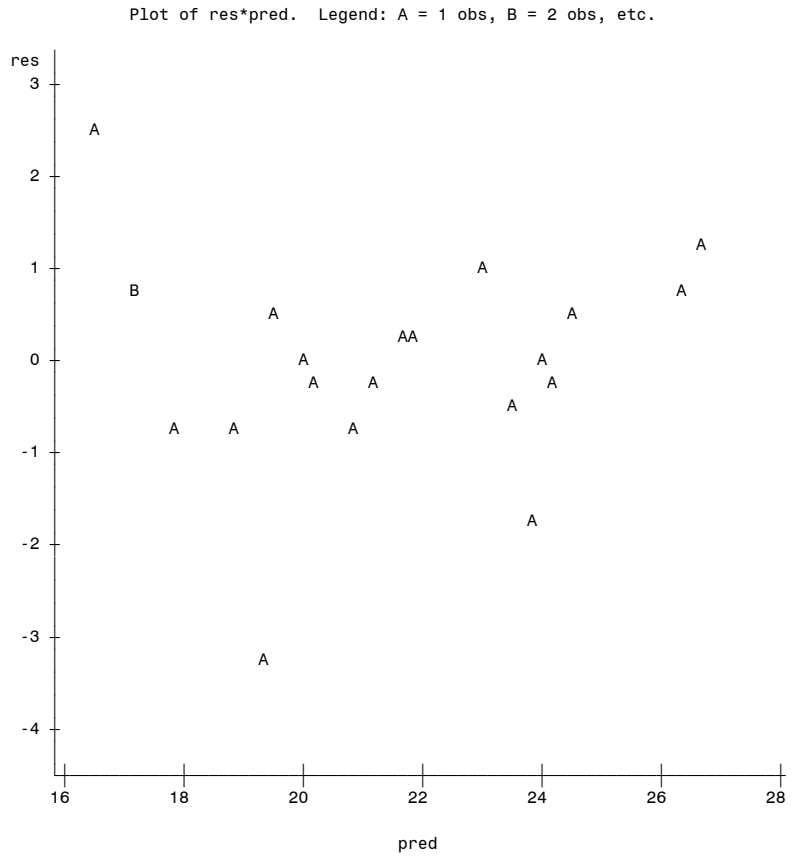


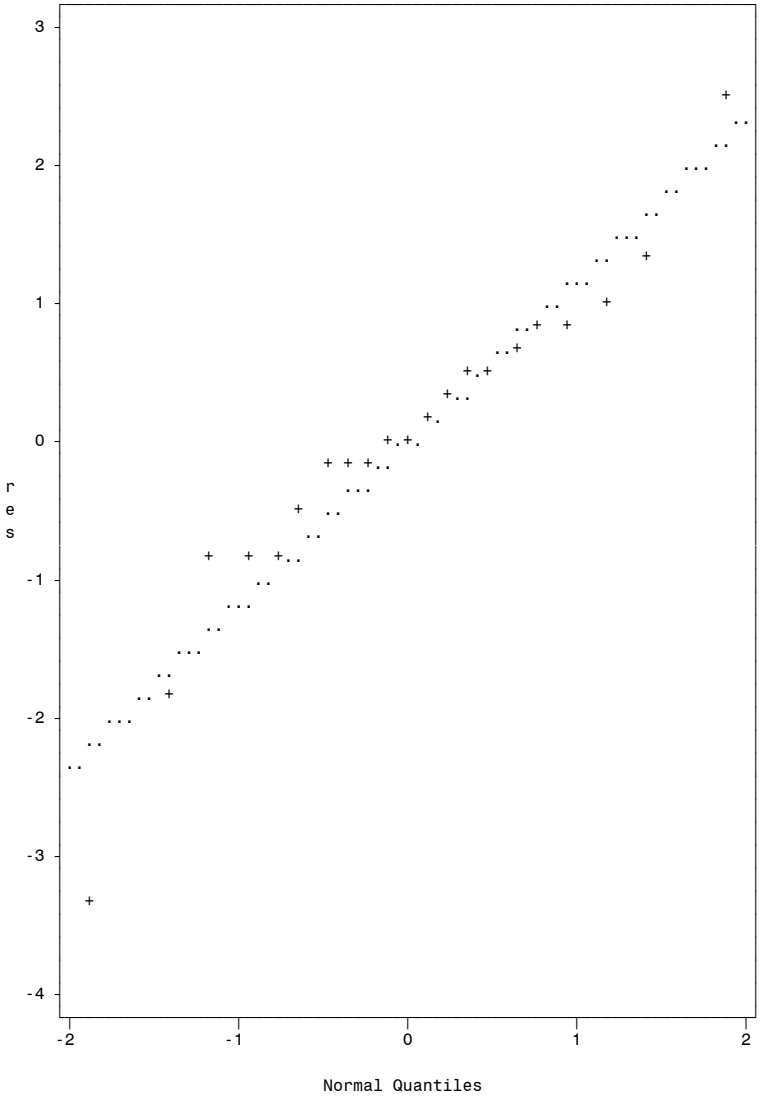
NOTE: 3 obs hidden.

Plot of score*subj. Symbol is value of music.



NOTE: 1 obs hidden.


Plot of res*pred. Legend: A = 1 obs, B = 2 obs, etc.
res
3
2
1
0
-1
-2
-3
-4
16
18
20
22
24
26
28
pred



Normal Line: ... Mu=0, Sigma=1.1912

Obs	driver	car	gas	mileage
1	1	1	1	15.5
2	1	2	2	33.8
3	1	3	3	13.7
4	1	4	4	29.2
5	2	1	2	16.3
6	2	2	3	26.4
7	2	3	4	19.1
8	2	4	1	22.5
9	3	1	3	10.5
10	3	2	4	31.5
11	3	3	1	17.5
12	3	4	2	30.1
13	4	1	4	14.0
14	4	2	1	34.5
15	4	3	2	19.7
16	4	4	3	21.6

The GLM Procedure

Class Level Information		
Class	Levels	Values
driver	4	1 2 3 4
car	4	1 2 3 4
gas	4	1 2 3 4

Number of Observations Read	16
Number of Observations Used	16

The GLM Procedure

Dependent Variable: mileage

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	869.9756250	96.6639583	22.42	0.0006
Error	6	25.8637500	4.3106250		
Corrected Total	15	895.8393750			

R-Square	Coeff Var	Root MSE	mileage Mean
0.971129	9.333878	2.076204	22.24375

Source	DF	Type I SS	Mean Square	F Value	Pr > F
driver	3	8.3318750	2.7772917	0.64	0.6143
car	3	755.3718750	251.7906250	58.41	<.0001
gas	3	106.2718750	35.4239583	8.22	0.0151

Source	DF	Type III SS	Mean Square	F Value	Pr > F
driver	3	8.3318750	2.7772917	0.64	0.6143
car	3	755.3718750	251.7906250	58.41	<.0001
gas	3	106.2718750	35.4239583	8.22	0.0151

Parameter	Estimate		Standard Error	t Value	Pr > |t|
Intercept	27.26250000	B	1.64138375	16.61	<.0001
driver 1	0.60000000	B	1.46809826	0.41	0.6970
driver 2	-1.37500000	B	1.46809826	-0.94	0.3851
driver 3	-0.05000000	B	1.46809826	-0.03	0.9739
driver 4	0.00000000	B	.	.	.
car 1	-11.77500000	B	1.46809826	-8.02	0.0002
car 2	5.70000000	B	1.46809826	3.88	0.0081
car 3	-8.35000000	B	1.46809826	-5.69	0.0013
car 4	0.00000000	B	.	.	.
gas 1	-0.95000000	B	1.46809826	-0.65	0.5415
gas 2	1.52500000	B	1.46809826	1.04	0.3390
gas 3	-5.40000000	B	1.46809826	-3.68	0.0104
gas 4	0.00000000	B	.	.	.

Note: The X'X matrix has been found to be singular, and a generalized inverse was used to solve the normal equations. Terms whose estimates are followed by the letter 'B' are not uniquely estimable.

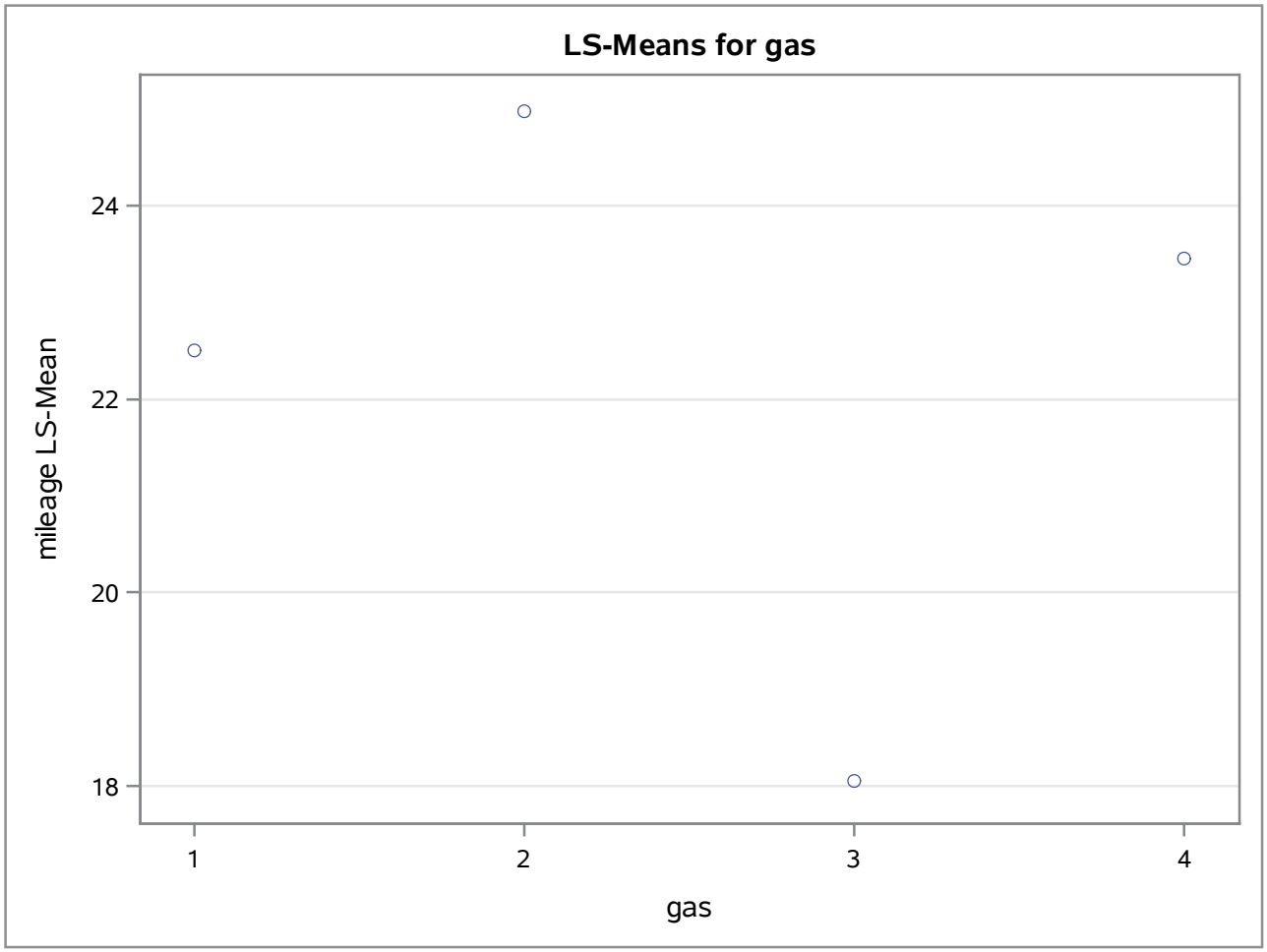
The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey

gas	mileage LSMEAN	LSMEAN Number
1	22.5000000	1
2	24.9750000	2
3	18.0500000	3
4	23.4500000	4

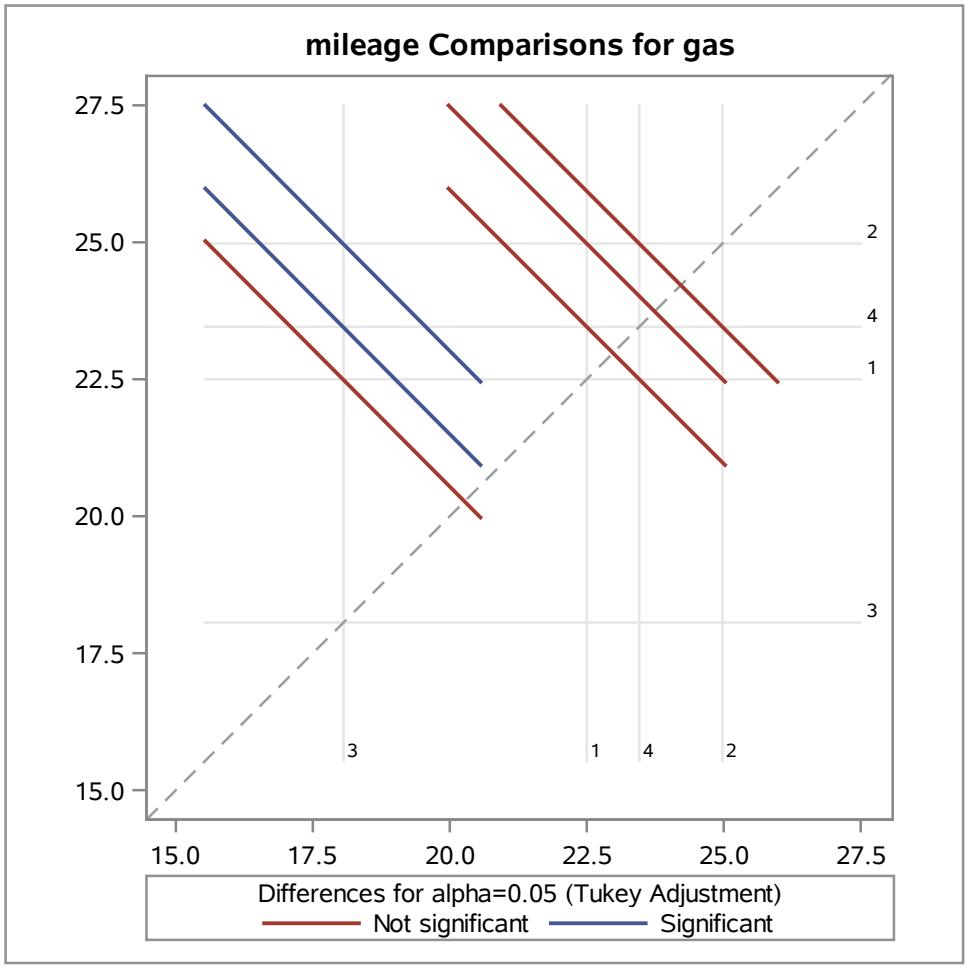
Least Squares Means for effect gas
Pr > |t| for H0: LSMean(i)=LSMean(j)

Dependent Variable: mileage

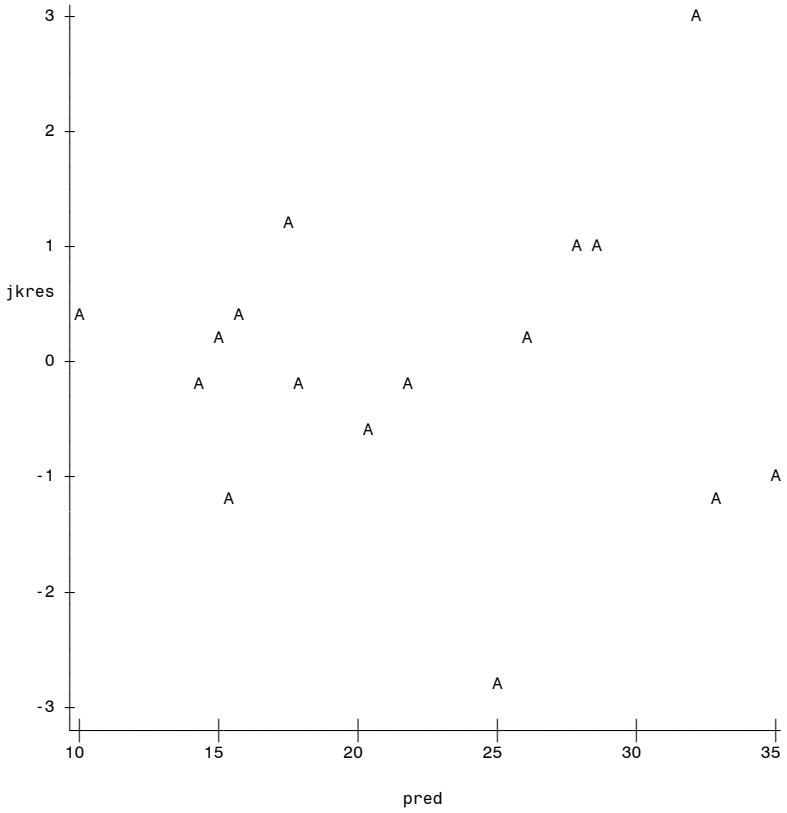
i/j	1	2	3	4
1		0.4054	0.0829	0.9128
2	0.4054		0.0129	0.7351
3	0.0829	0.0129		0.0390
4	0.9128	0.7351	0.0390	

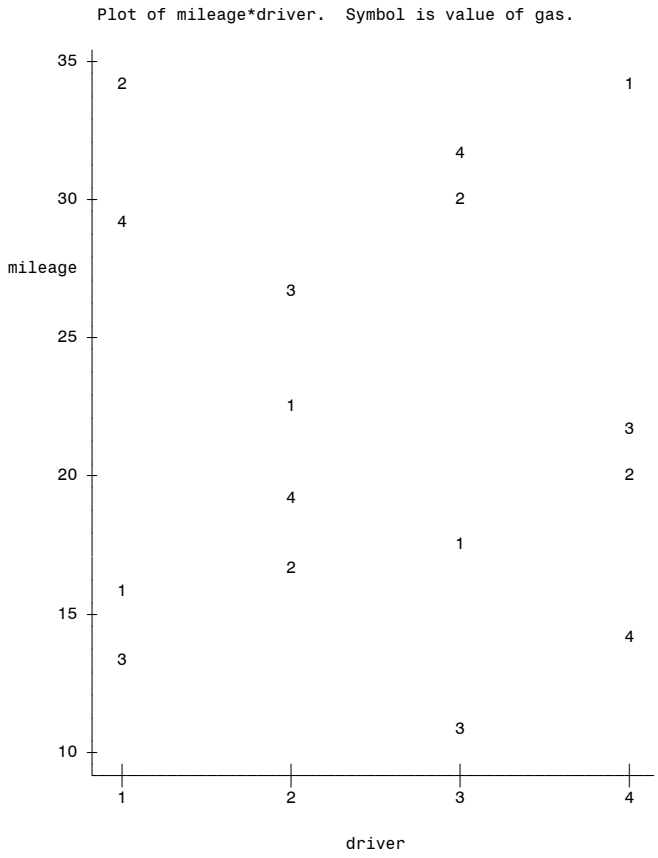


The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey

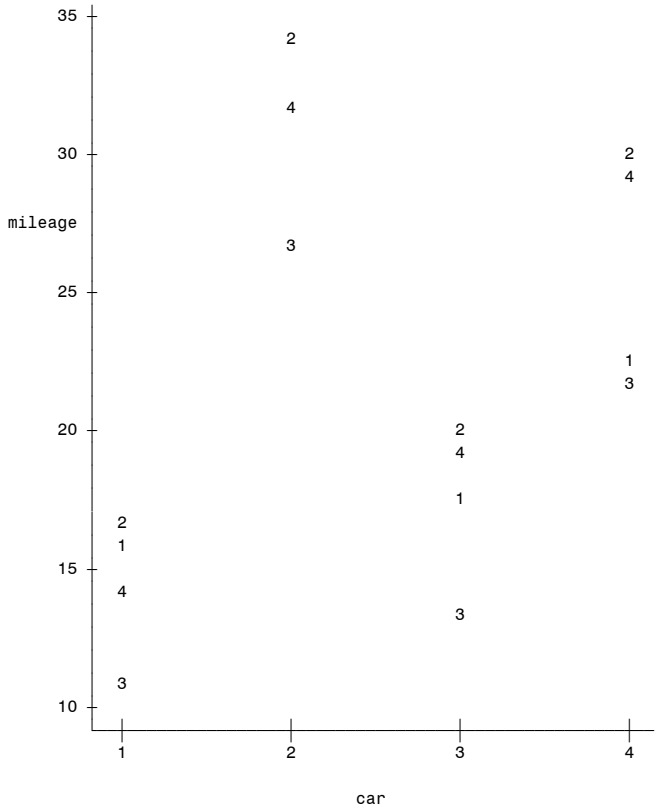


Plot of jkres*pred. Legend: A = 1 obs, B = 2 obs, etc.

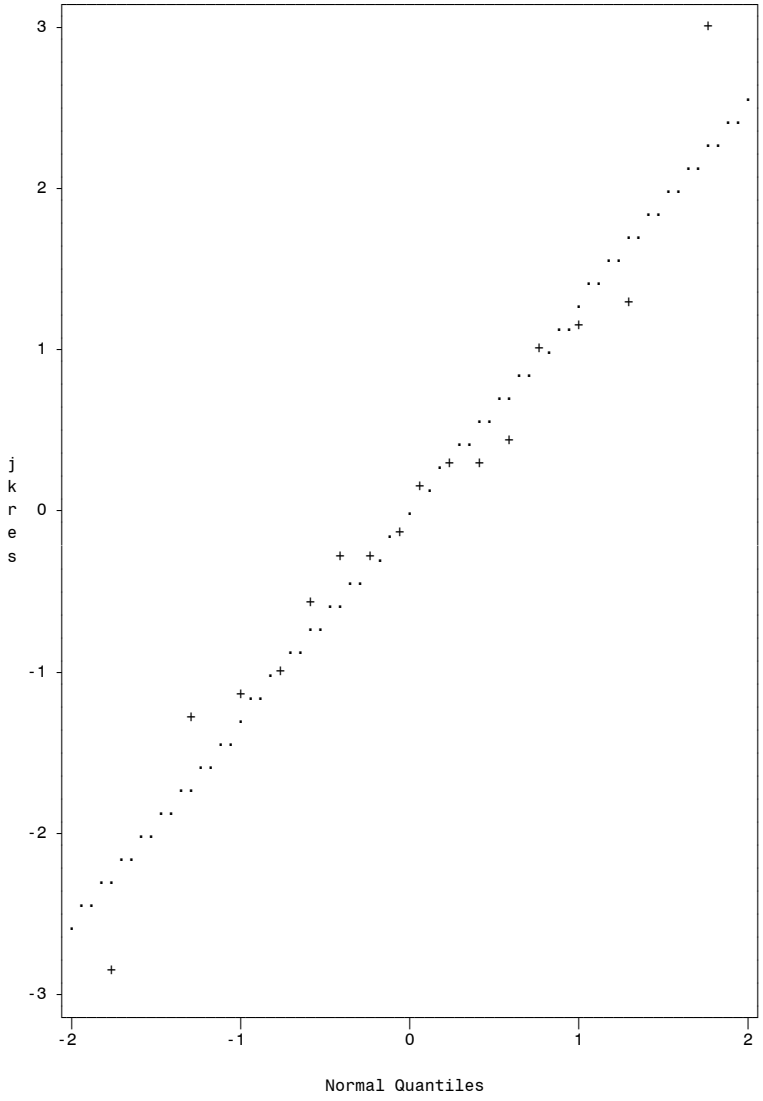



Plot of mileage*driver. Symbol is value of gas.
35
30
25
20
15
10
mileage
1
2
3
4
driver

Plot of mileage*car. Symbol is value of gas.



NOTE: 1 obs hidden.



Normal Line: ... Mu=0.0089, Sigma=1.303

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
ph	4	4 5 6 7
calc	3	100 200 300

Number of Observations Read	36
Number of Observations Used	36

The GLM Procedure

Dependent Variable: diam

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	9.18305556	0.83482323	12.32	<.0001
Error	24	1.62666667	0.06777778		
Corrected Total	35	10.80972222			

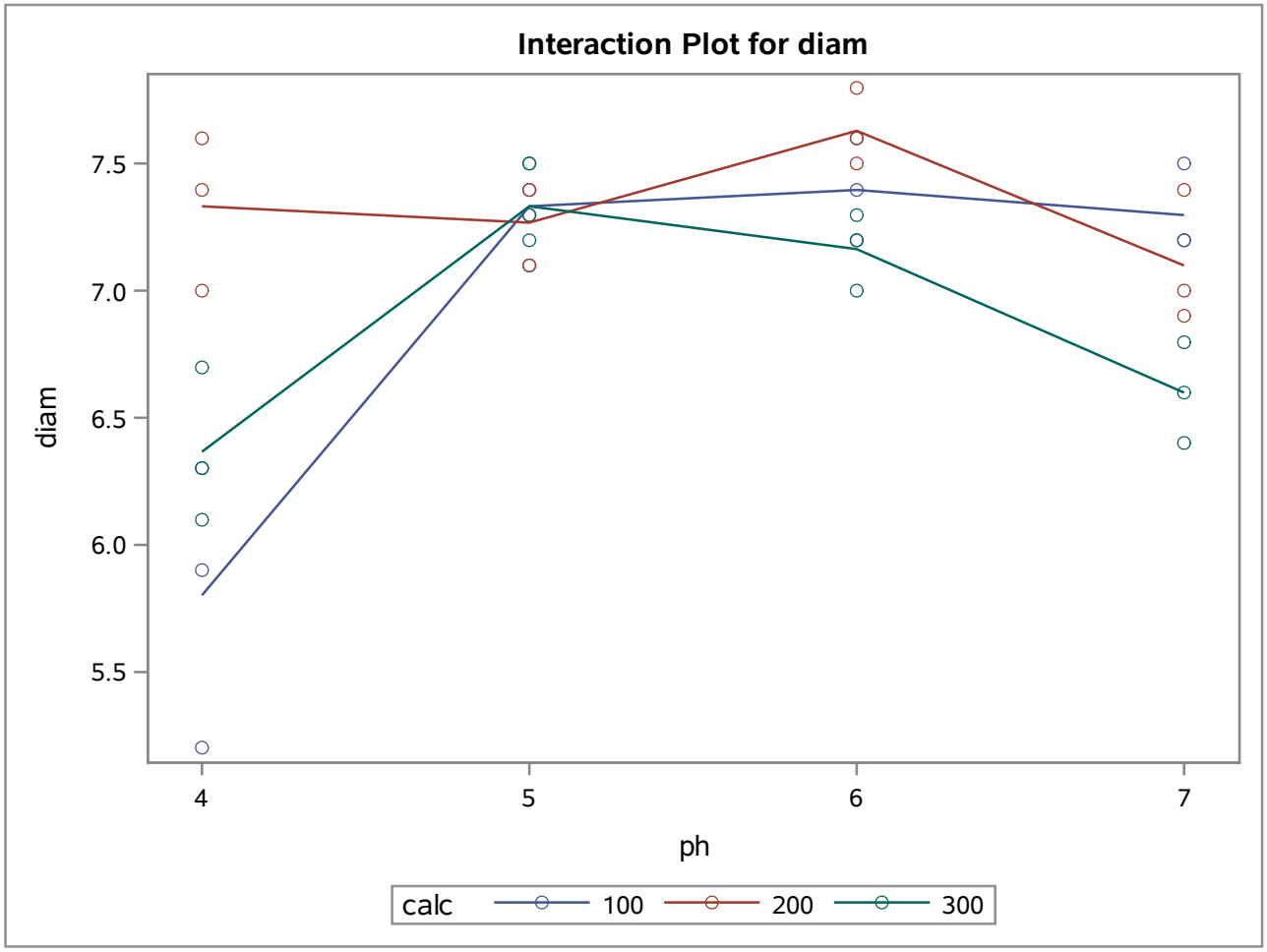
R-Square	Coeff Var	Root MSE	diam Mean
0.849518	3.691335	0.260342	7.052778

Source	DF	Type I SS	Mean Square	F Value	Pr > F
ph	3	4.46083333	1.48694444	21.94	<.0001
calc	2	1.46722222	0.73361111	10.82	0.0004
ph*calc	6	3.25500000	0.54250000	8.00	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
ph	3	4.46083333	1.48694444	21.94	<.0001
calc	2	1.46722222	0.73361111	10.82	0.0004
ph*calc	6	3.25500000	0.54250000	8.00	<.0001

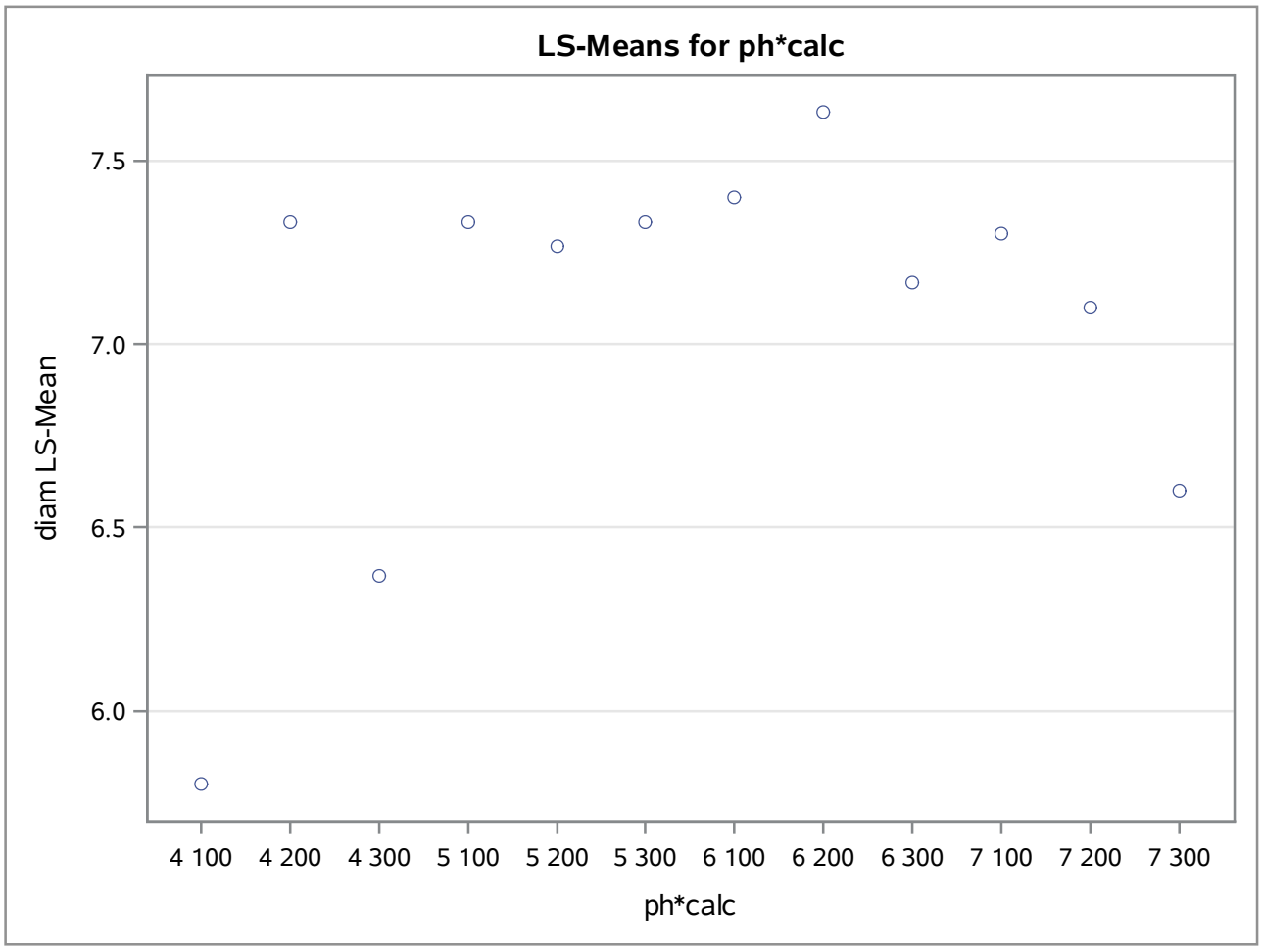
The GLM Procedure

Dependent Variable: diam

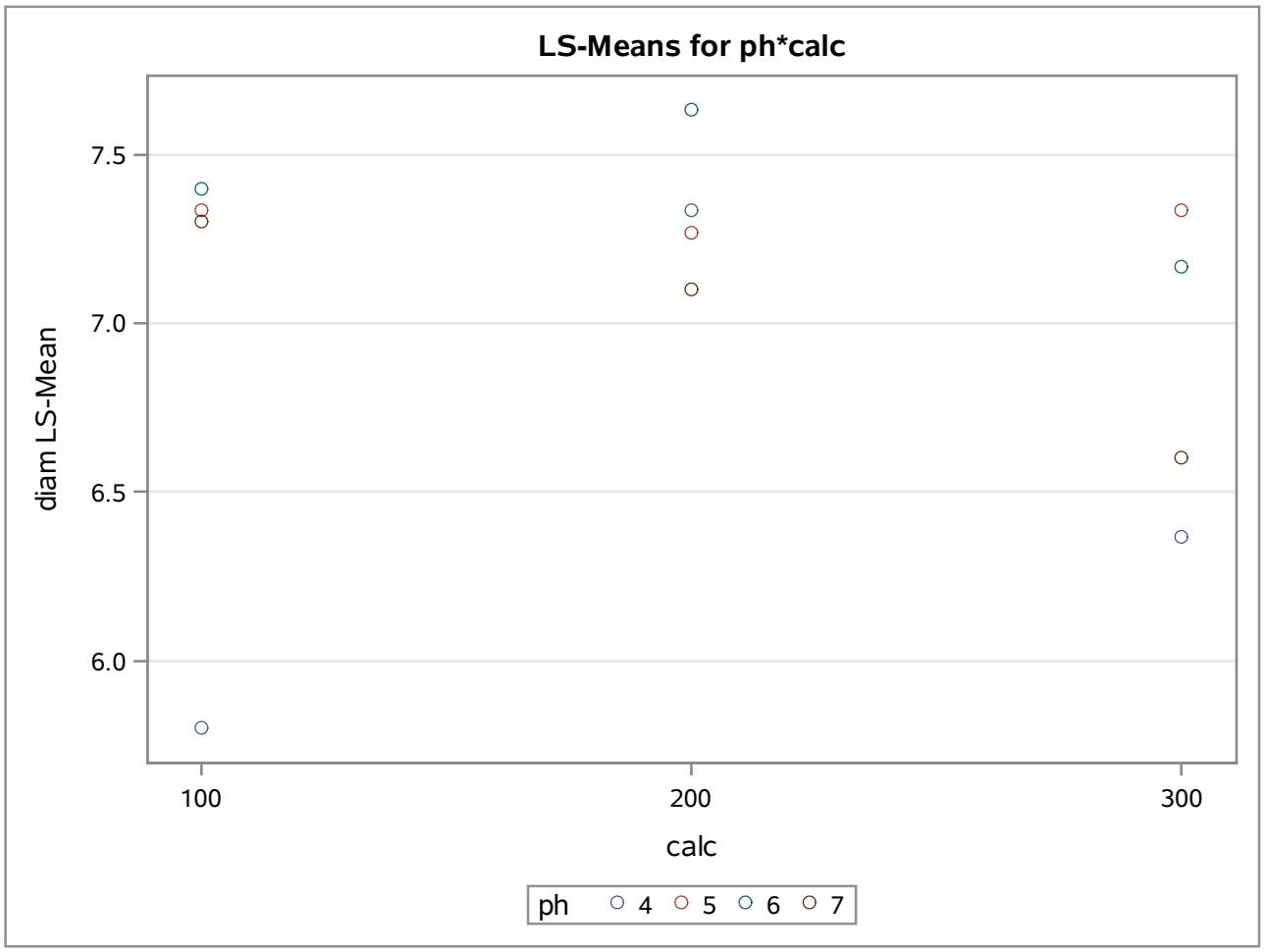


The GLM Procedure
Least Squares Means

ph	calc	diam LSMEAN
4	100	5.80000000
4	200	7.33333333
4	300	6.36666667
5	100	7.33333333
5	200	7.26666667
5	300	7.33333333
6	100	7.40000000
6	200	7.63333333
6	300	7.16666667
7	100	7.30000000
7	200	7.10000000
7	300	6.60000000



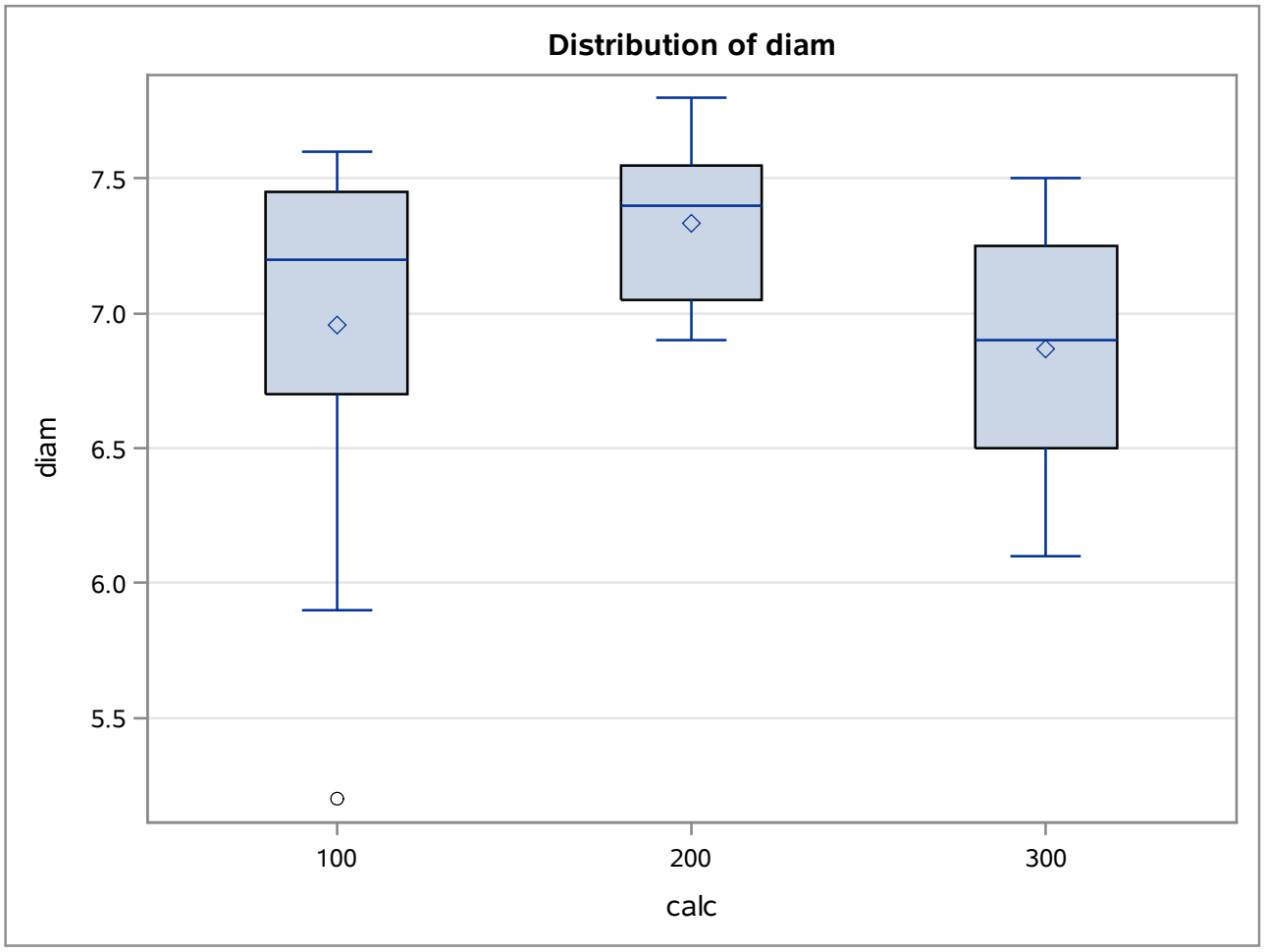
The GLM Procedure
Least Squares Means



The GLM Procedure
Least Squares Means

ph*calc Effect Sliced by ph for diam					
ph	DF	Sum of Squares	Mean Square	F Value	Pr > F
4	2	3.606667	1.803333	26.61	<.0001
5	2	0.008889	0.004444	0.07	0.9367
6	2	0.326667	0.163333	2.41	0.1112
7	2	0.780000	0.390000	5.75	0.0091

The GLM Procedure



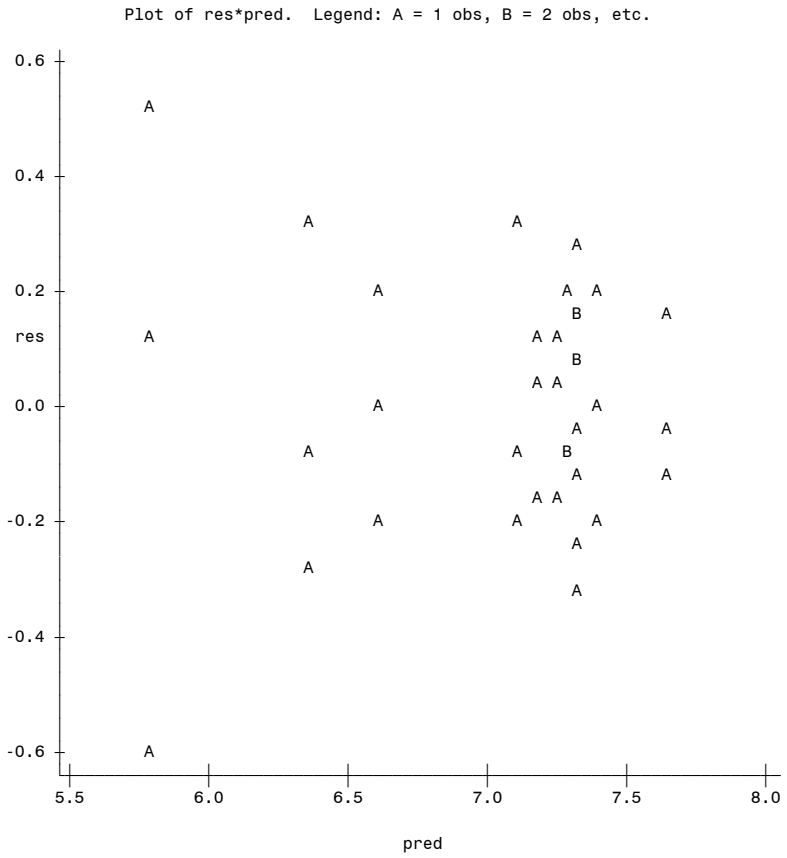
The GLM Procedure

Tukey's Studentized Range (HSD) Test for diam

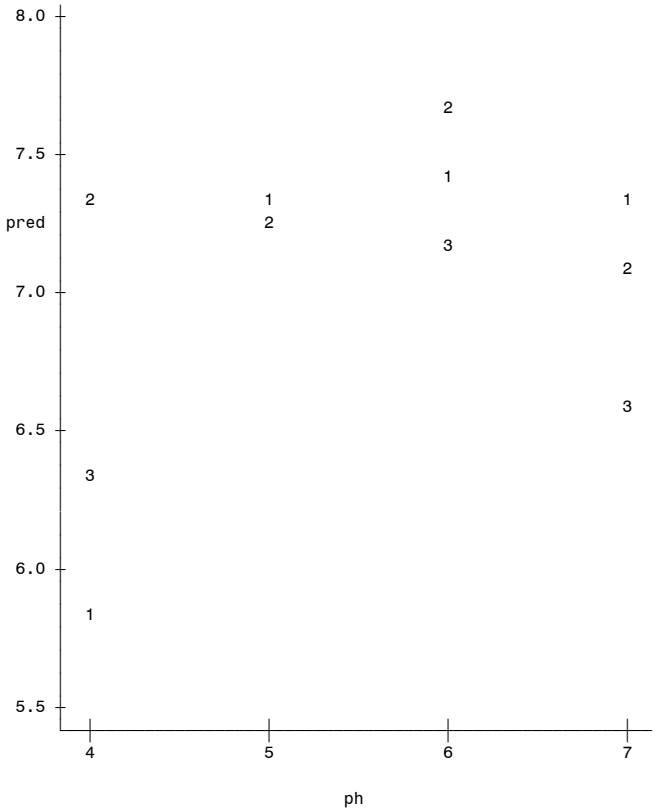
Note: This test controls the Type I experimentwise error rate, but it generally has a higher Type II error rate than REGWQ.

Alpha	0.05
Error Degrees of Freedom	24
Error Mean Square	0.067778
Critical Value of Studentized Range	3.53170
Minimum Significant Difference	0.2654

Means with the same letter are not significantly different.			
Tukey Grouping	**Mean**	**N**	**calc**
A	7.3333	12	200
B	6.9583	12	100
B			
B	6.8667	12	300

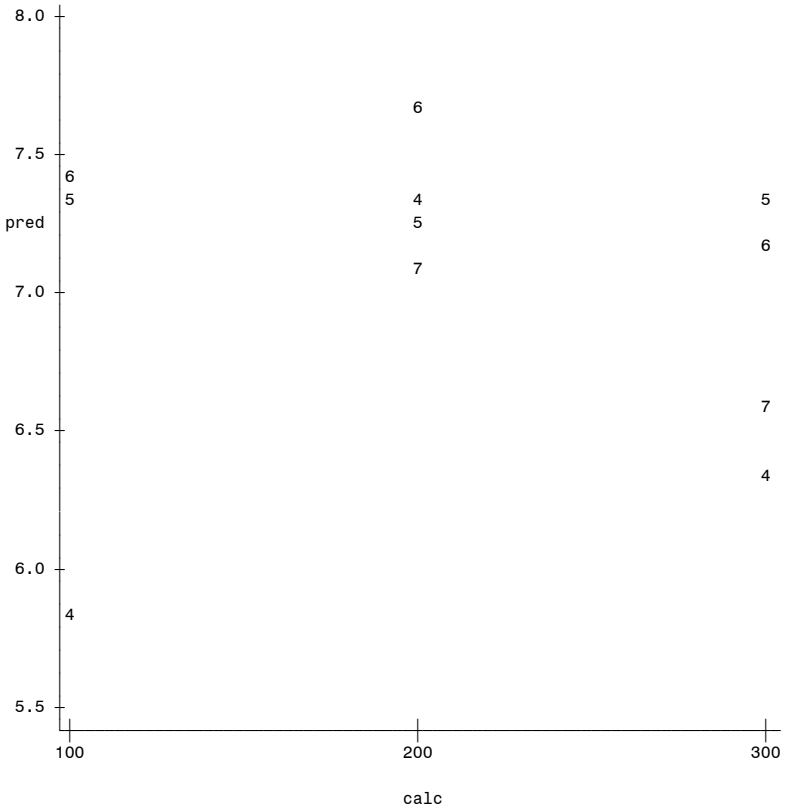

Plot of res*pred. Legend: A = 1 obs, B = 2 obs, etc.
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
res
5.5
6.0
6.5
7.0
7.5
8.0
pred

Plot of pred*ph. Symbol is value of calc.

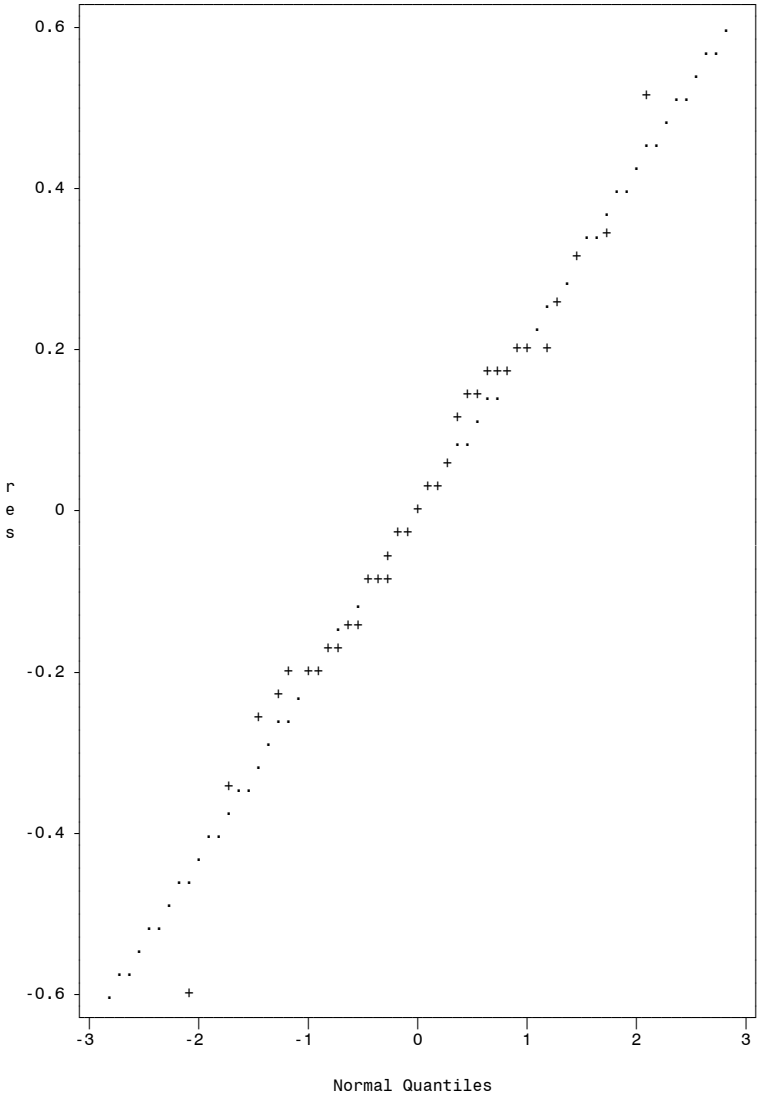


NOTE: 25 obs hidden.

Plot of pred*calc. Symbol is value of ph.



NOTE: 25 obs hidden.



Normal Line: ... Mu=0, Sigma=0.2156
Observations: + (2 Hidden)

Obs	length	species
1	20.05	MPipit
2	20.65	MPipit
3	20.85	MPipit
4	21.85	MPipit
5	22.05	MPipit
6	22.05	MPipit
7	22.25	MPipit
8	22.25	MPipit
9	22.45	MPipit
10	22.45	MPipit
11	22.65	MPipit
12	22.85	MPipit
13	23.65	MPipit
14	23.85	MPipit
15	24.25	MPipit
16	21.05	TPipit
17	21.85	TPipit
18	22.05	TPipit
19	22.45	TPipit
20	22.65	TPipit
21	23.25	TPipit
22	23.25	TPipit
23	23.25	TPipit
24	23.45	TPipit
25	23.45	TPipit
26	23.65	TPipit
27	23.85	TPipit
28	24.05	TPipit
29	24.05	TPipit
30	24.05	TPipit
31	20.85	HSprw
32	21.65	HSprw
33	22.05	HSprw
34	22.85	HSprw
35	23.05	HSprw
36	23.05	HSprw
37	23.05	HSprw
38	23.05	HSprw

Obs	length	species
39	23.45	HSprw
40	23.85	HSprw
41	23.85	HSprw
42	23.85	HSprw
43	24.05	HSprw
44	25.05	HSprw
45	23.85	HSprw
46	21.05	Robin
47	21.85	Robin
48	22.05	Robin
49	22.05	Robin
50	22.05	Robin
51	22.25	Robin
52	22.45	Robin
53	22.45	Robin
54	22.65	Robin
55	23.05	Robin
56	23.05	Robin
57	23.05	Robin
58	23.05	Robin
59	23.25	Robin
60	23.85	Robin
61	21.05	PWtail
62	21.85	PWtail
63	21.85	PWtail
64	21.85	PWtail
65	22.05	PWtail
66	22.45	PWtail
67	22.65	PWtail
68	23.05	PWtail
69	23.05	PWtail
70	23.25	PWtail
71	23.45	PWtail
72	24.05	PWtail
73	24.05	PWtail
74	24.05	PWtail
75	24.85	PWtail
76	19.85	Wren

Obs	length	species
77	20.05	Wren
78	20.25	Wren
79	20.85	Wren
80	20.85	Wren
81	20.85	Wren
82	21.05	Wren
83	21.05	Wren
84	21.05	Wren
85	21.25	Wren
86	21.45	Wren
87	22.05	Wren
88	22.05	Wren
89	22.05	Wren
90	22.25	Wren

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
species	6	HSprw MPipit PWtail Robin TPipit Wren

Number of Observations Read	90
Number of Observations Used	90

The GLM Procedure

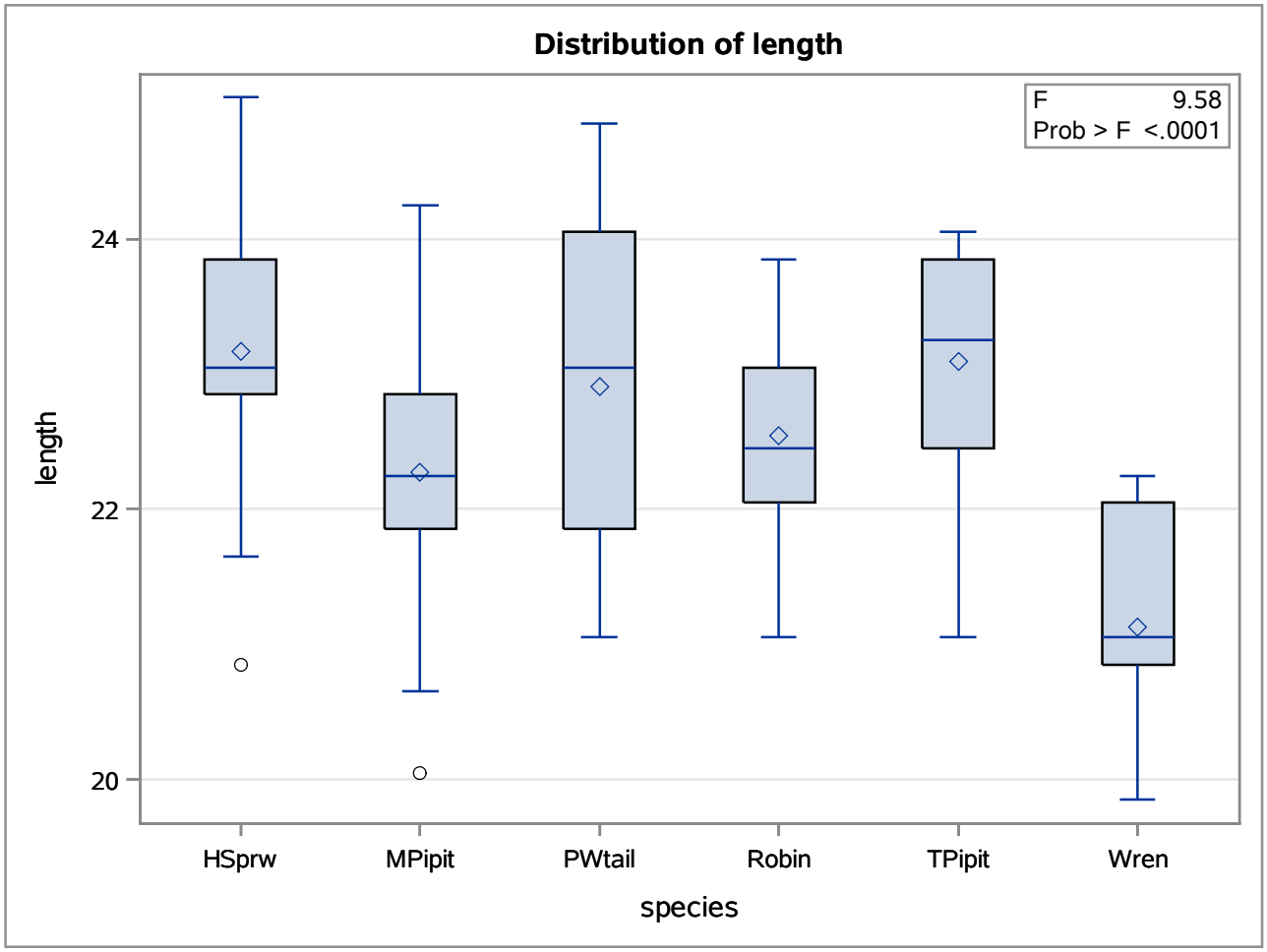
Dependent Variable: length

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	43.2928889	8.6585778	9.58	<.0001
Error	84	75.9200000	0.9038095		
Corrected Total	89	119.2128889			

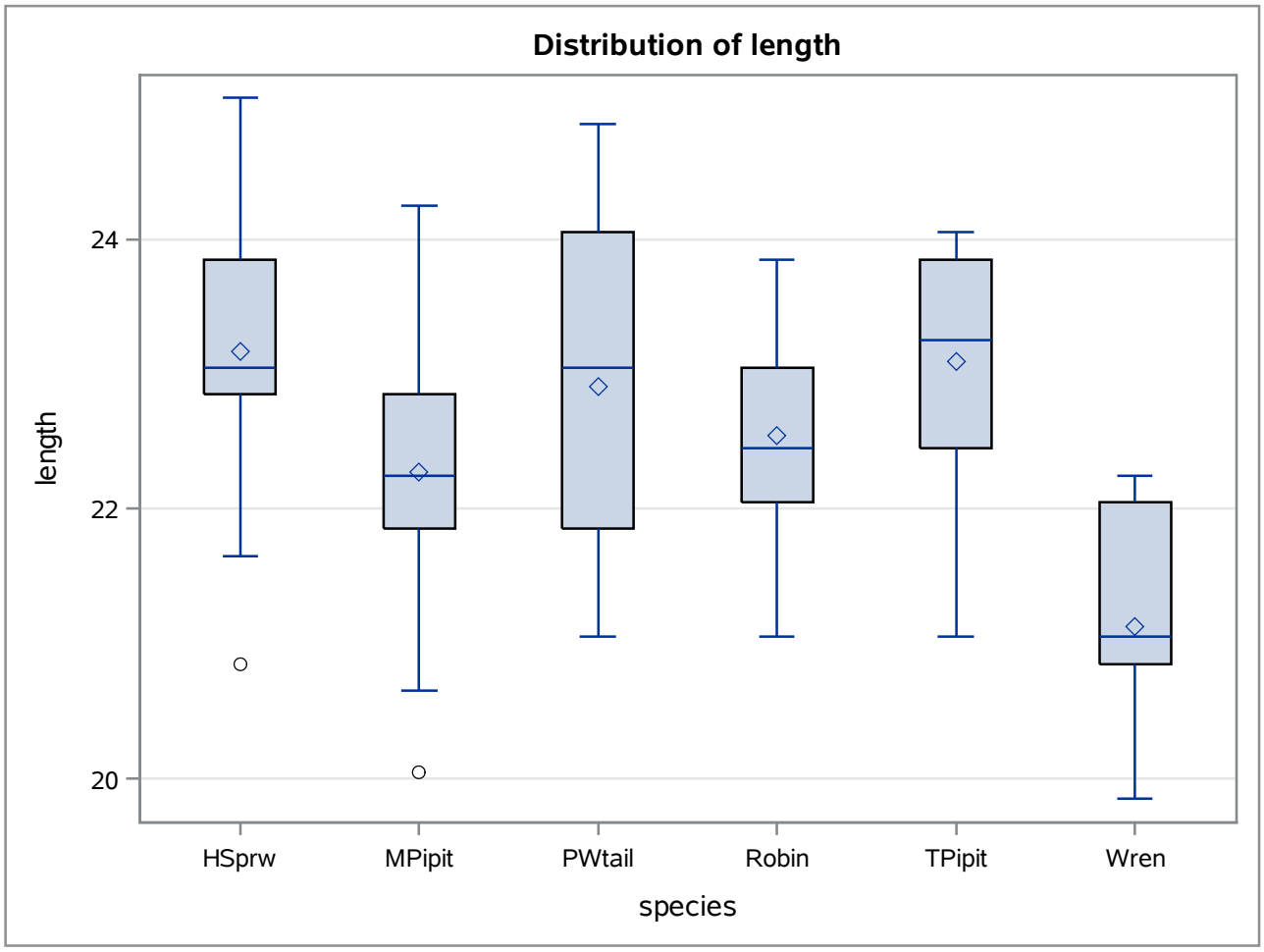
R-Square	Coeff Var	Root MSE	length Mean
0.363156	4.221740	0.950689	22.51889

Source	DF	Type I SS	Mean Square	F Value	Pr > F
species	5	43.29288889	8.65857778	9.58	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
species	5	43.29288889	8.65857778	9.58	<.0001



The GLM Procedure



Level of species	N	length	
		Mean	Std Dev
HSprw	15	23.1700000	1.04690019
MPipit	15	22.2766667	1.15601944
PWtail	15	22.9033333	1.06761862
Robin	15	22.5433333	0.69638522
TPipit	15	23.0900000	0.90142744
Wren	15	21.1300000	0.74373574

The GLM Procedure

Coefficients for Contrast Pipit vs others	
	Row 1
Intercept	0
species HSprw	-0.25
species MPipit	0.5
species PWtail	-0.25
species Robin	-0.25
species TPipit	0.5
species Wren	-0.25

The GLM Procedure

Coefficients for Estimate Pipit vs others	
	Row 1
Intercept	0
species HSprw	-0.25
species MPipit	0.5
species PWtail	-0.25
species Robin	-0.25
species TPipit	0.5
species Wren	-0.25

The GLM Procedure

Dependent Variable: length

Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Pipit vs others	1	1.21688889	1.21688889	1.35	0.2492

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Pipit vs others	0.24666667	0.21258052	1.16	0.2492