

Predicting MPG

The REG Procedure
 Model: MODEL1
 Dependent Variable: MPG

Number of Observations Read	38
Number of Observations Used	18
Number of Observations with Missing Values	20

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	774.27999	129.04667	22.39	<.0001
Error	11	63.40945	5.76450		
Corrected Total	17	837.68944			

Root MSE	2.40094	R-Square	0.9243
Dependent Mean	26.60556	Adj R-Sq	0.8830
Coeff Var	9.02419		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	70.14772	8.03838	8.73	<.0001
CYLINDERS	1	-3.33403	1.56072	-2.14	0.0560
SIZE	1	0.02280	0.03207	0.71	0.4918
HP	1	-0.19546	0.08065	-2.42	0.0338
WEIGHT	1	-0.30623	5.13263	-0.06	0.9535
ACCEL	1	-0.78199	0.58264	-1.34	0.2066
ENG_TYPE	1	6.59880	3.59008	1.84	0.0932

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Missing Data Patterns										
Group	MPG	CYLINDERS	SIZE	HP	WEIGHT	ACCEL	ENG_TYPE	Freq	Percent	Group MPG
1	X	X	X	X	X	X	X	18	47.37	26.605556
2	X	X	X	X	X	X	.	2	5.26	31.350000
3	X	X	X	X	X	.	X	1	2.63	18.200000
4	X	X	X	X	X	.	.	1	2.63	17.600000
5	X	X	X	X	.	X	X	3	7.89	28.133333
6	X	X	X	X	.	.	X	1	2.63	21.500000
7	X	X	X	.	X	X	X	5	13.16	22.320000
8	X	X	.	X	X	X	X	2	5.26	19.100000
9	X	X	.	X	.	X	X	1	2.63	30.500000
10	X	.	X	X	X	X	X	2	5.26	21.100000
11	X	.	X	X	X	.	X	1	2.63	18.100000
12	X	.	X	X	.	X	X	1	2.63	17.000000

Missing Data Patterns						
Group Means						
CYLINDERS	SIZE	HP	WEIGHT	ACCEL	ENG_TYPE	
5.333333	177.055556	101.888889	2.795333	14.355556	0.333333	
4.000000	95.000000	70.000000	2.125000	16.850000	.	
8.000000	318.000000	135.000000	3.830000	.	1.000000	
8.000000	302.000000	129.000000	3.725000	.	.	
4.666667	128.000000	72.666667	.	16.166667	0	
4.000000	121.000000	110.000000	.	.	0	
5.400000	182.800000	.	3.009800	15.240000	0.400000	
6.000000	.	115.000000	3.112500	15.150000	0	
4.000000	.	78.000000	.	14.100000	0	
.	176.000000	110.000000	3.087500	15.750000	0	
.	258.000000	120.000000	3.410000	.	0	
.	305.000000	130.000000	.	15.400000	1.000000	

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Model Information	
Data Set	WORK.CARMPG
Method	MCMC
Multiple Imputation Chain	Single Chain
Initial Estimates for MCMC	EM Posterior Mode
Start	Starting Value
Prior	Jeffreys
Number of Imputations	5
Number of Burn-in Iterations	200
Number of Iterations	100
Seed for random number generator	35399

Missing Data Patterns										
Group	MPG	CYLINDERS	SIZE	HP	WEIGHT	ACCEL	ENG_TYPE	Freq	Percent	Group MPG
1	X	X	X	X	X	X	X	18	47.37	26.605556
2	X	X	X	X	X	X	.	2	5.26	31.350000
3	X	X	X	X	X	.	X	1	2.63	18.200000
4	X	X	X	X	X	.	.	1	2.63	17.600000
5	X	X	X	X	.	X	X	3	7.89	28.133333
6	X	X	X	X	.	.	X	1	2.63	21.500000
7	X	X	X	.	X	X	X	5	13.16	22.320000
8	X	X	.	X	X	X	X	2	5.26	19.100000
9	X	X	.	X	.	X	X	1	2.63	30.500000
10	X	.	X	X	X	X	X	2	5.26	21.100000
11	X	.	X	X	X	.	X	1	2.63	18.100000
12	X	.	X	X	.	X	X	1	2.63	17.000000

Missing Data Patterns						
Group Means						
CYLINDERS	SIZE	HP	WEIGHT	ACCEL	ENG_TYPE	
5.333333	177.055556	101.888889	2.795333	14.355556	0.333333	
4.000000	95.000000	70.000000	2.125000	16.850000	.	
8.000000	318.000000	135.000000	3.830000	.	1.000000	
8.000000	302.000000	129.000000	3.725000	.	.	
4.666667	128.000000	72.666667	.	16.166667	0	
4.000000	121.000000	110.000000	.	.	0	
5.400000	182.800000	.	3.009800	15.240000	0.400000	
6.000000	.	115.000000	3.112500	15.150000	0	
4.000000	.	78.000000	.	14.100000	0	
.	176.000000	110.000000	3.087500	15.750000	0	
.	258.000000	120.000000	3.410000	.	0	
.	305.000000	130.000000	.	15.400000	1.000000	

Predicting MPG

The MI Procedure

EM (Posterior Mode) Estimates							
TYPE	_NAME_	MPG	CYLINDERS	SIZE	HP	WEIGHT	ACCEL
MEAN		24.760526	5.411220	179.470021	103.030389	2.862541	14.944001
COV	MPG	34.480235	-6.851366	-379.329303	-121.545981	-3.352778	-0.708852
COV	CYLINDERS	-6.851366	2.046710	108.346315	28.953605	0.827227	-0.341880
COV	SIZE	-379.329303	108.346315	6374.643988	1653.816199	48.298613	-19.565007
COV	HP	-121.545981	28.953605	1653.816199	562.886837	13.743836	-7.692393
COV	WEIGHT	-3.352778	0.827227	48.298613	13.743836	0.398921	-0.045478
COV	ACCEL	-0.708852	-0.341880	-19.565007	-7.692393	-0.045478	1.939075
COV	ENG_TYPE	-1.179815	0.479699	24.503029	6.866233	0.169615	-0.173039

EM (Posterior Mode) Estimates
ENG_TYPE
0.288001
-1.179815
0.479699
24.503029
6.866233
0.169615
-0.173039
0.168736

Variance Information							
Variable	Variance			DF	Relative Increase in Variance	Fraction Missing Information	Relative Efficiency
	Between	Within	Total				
CYLINDERS	0.000238	0.067196	0.067481	34.996	0.004242	0.004233	0.999154
SIZE	0.437624	209.591060	210.116208	35.06	0.002506	0.002502	0.999500
HP	0.144206	18.784569	18.957616	34.804	0.009212	0.009169	0.998169
WEIGHT	0.000063479	0.012967	0.013043	34.934	0.005874	0.005857	0.998830
ACCEL	0.003511	0.065708	0.069921	32.07	0.064126	0.061963	0.987759
ENG_TYPE	0.000081952	0.005427	0.005525	34.43	0.018122	0.017955	0.996422

Parameter Estimates							
Variable	Mean	Std Error	95% Confidence Limits		DF	Minimum	Maximum
CYLINDERS	5.408733	0.259770	4.8814	5.9361	34.996	5.395728	5.431822
							Mu0
							0

Predicting MPG

The MI Procedure

Parameter Estimates	
t for H0: Mean=Mu0	Pr > t
20.82	<.0001

Parameter Estimates								
Variable	Mean	Std Error	95% Confidence Limits		DF	Minimum	Maximum	Mu0
SIZE	179.554826	14.495386	150.1294	208.9802	35.06	179.069351	180.695923	0
HP	103.056213	4.354035	94.2153	111.8972	34.804	102.544009	103.555236	0
WEIGHT	2.864336	0.114207	2.6325	3.0962	34.934	2.850770	2.871197	0
ACCEL	14.901253	0.264426	14.3627	15.4398	32.07	14.810038	14.952625	0
ENG_TYPE	0.285951	0.074331	0.1350	0.4369	34.43	0.275788	0.296527	0

Parameter Estimates	
t for H0: Mean=Mu0	Pr > t
12.39	<.0001
23.67	<.0001
25.08	<.0001
56.35	<.0001
3.85	0.0005

Predicting MPG

The REG Procedure
 Model: MODEL1
 Dependent Variable: MPG

Imputation Number=1

Number of Observations Read	38
Number of Observations Used	38

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	1475.92029	245.98672	69.22	<.0001
Error	31	110.17050	3.55389		
Corrected Total	37	1586.09079			

Root MSE	1.88518	R-Square	0.9305
Dependent Mean	24.76053	Adj R-Sq	0.9171
Coeff Var	7.61363		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	71.07423	4.09818	17.34	<.0001
CYLINDERS	1	-3.03737	0.75954	-4.00	0.0004
SIZE	1	0.02391	0.01830	1.31	0.2010
HP	1	-0.15919	0.03985	-3.99	0.0004
WEIGHT	1	-2.03889	2.81135	-0.73	0.4737
ACCEL	1	-0.91547	0.27746	-3.30	0.0024
ENG_TYPE	1	5.74751	1.43032	4.02	0.0003

Predicting MPG

The REG Procedure
 Model: MODEL1
 Dependent Variable: MPG

Imputation Number=2

Number of Observations Read	38
Number of Observations Used	38

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	1480.23596	246.70599	72.25	<.0001
Error	31	105.85483	3.41467		
Corrected Total	37	1586.09079			

Root MSE	1.84788	R-Square	0.9333
Dependent Mean	24.76053	Adj R-Sq	0.9203
Coeff Var	7.46302		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	72.39109	4.09768	17.67	<.0001
CYLINDERS	1	-2.93460	0.70873	-4.14	0.0002
SIZE	1	0.02052	0.01918	1.07	0.2930
HP	1	-0.19765	0.04055	-4.87	<.0001
WEIGHT	1	-0.26845	3.07210	-0.09	0.9309
ACCEL	1	-1.07191	0.28020	-3.83	0.0006
ENG_TYPE	1	6.22872	1.37736	4.52	<.0001

Predicting MPG

The REG Procedure
 Model: MODEL1
 Dependent Variable: MPG

Imputation Number=3

Number of Observations Read	38
Number of Observations Used	38

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	1478.18064	246.36344	70.77	<.0001
Error	31	107.91015	3.48097		
Corrected Total	37	1586.09079			

Root MSE	1.86574	R-Square	0.9320
Dependent Mean	24.76053	Adj R-Sq	0.9188
Coeff Var	7.53512		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	68.68430	3.61127	19.02	<.0001
CYLINDERS	1	-2.93177	0.72111	-4.07	0.0003
SIZE	1	0.02557	0.01705	1.50	0.1438
HP	1	-0.14873	0.03608	-4.12	0.0003
WEIGHT	1	-2.97682	2.72964	-1.09	0.2839
ACCEL	1	-0.69925	0.23397	-2.99	0.0054
ENG_TYPE	1	5.80842	1.56651	3.71	0.0008

Predicting MPG

The REG Procedure
 Model: MODEL1
 Dependent Variable: MPG

Imputation Number=4

Number of Observations Read	38
Number of Observations Used	38

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	1472.16820	245.36137	66.77	<.0001
Error	31	113.92259	3.67492		
Corrected Total	37	1586.09079			

Root MSE	1.91701	R-Square	0.9282
Dependent Mean	24.76053	Adj R-Sq	0.9143
Coeff Var	7.74220		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	68.55240	4.11623	16.65	<.0001
CYLINDERS	1	-2.85923	0.76768	-3.72	0.0008
SIZE	1	0.04358	0.01883	2.31	0.0274
HP	1	-0.15208	0.04107	-3.70	0.0008
WEIGHT	1	-4.65964	2.80249	-1.66	0.1065
ACCEL	1	-0.57066	0.27764	-2.06	0.0483
ENG_TYPE	1	5.19245	1.39093	3.73	0.0008

Predicting MPG

The REG Procedure
 Model: MODEL1
 Dependent Variable: MPG

Imputation Number=5

Number of Observations Read	38
Number of Observations Used	38

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	1460.37396	243.39566	60.02	<.0001
Error	31	125.71683	4.05538		
Corrected Total	37	1586.09079			

Root MSE	2.01380	R-Square	0.9207
Dependent Mean	24.76053	Adj R-Sq	0.9054
Coeff Var	8.13310		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	67.01166	4.22996	15.84	<.0001
CYLINDERS	1	-2.69887	0.81016	-3.33	0.0022
SIZE	1	0.04106	0.01801	2.28	0.0296
HP	1	-0.13697	0.03464	-3.95	0.0004
WEIGHT	1	-6.12984	2.49776	-2.45	0.0199
ACCEL	1	-0.35255	0.26993	-1.31	0.2011
ENG_TYPE	1	6.29941	1.72013	3.66	0.0009

Predicting MPG

The MIANALYZE Procedure

Model Information

Data Set	WORK.OUTREG
Number of Imputations	5

Variance Information

Parameter	Variance			DF	Relative Increase in Variance	Fraction Missing Information	Relative Efficiency
	Between	Within	Total				
CYLINDERS	0.015726	0.568977	0.587847	3881.6	0.033166	0.032600	0.993522
SIZE	0.000112	0.000335	0.000469	48.531	0.402702	0.314759	0.940776
HP	0.000533	0.001484	0.002124	44.079	0.431107	0.330924	0.937924
WEIGHT	5.176341	7.777031	13.988640	20.286	0.798712	0.491796	0.910449
ACCEL	0.079946	0.072036	0.167971	12.262	1.331762	0.627338	0.888520
ENG_TYPE	0.197465	2.258081	2.495039	443.48	0.104938	0.099026	0.980579
Intercept	4.645655	16.292645	21.867431	61.546	0.342166	0.278022	0.947325

Parameter Estimates

Parameter	Estimate	Std Error	95% Confidence Limits		DF	Minimum	Maximum	Theta0
CYLINDERS	-2.892369	0.766712	-4.3956	-1.38917	3881.6	-3.037374	-2.698869	0
SIZE	0.030931	0.021663	-0.0126	0.07447	48.531	0.020523	0.043585	0
HP	-0.158924	0.046085	-0.2518	-0.06605	44.079	-0.197652	-0.136972	0
WEIGHT	-3.214728	3.740139	-11.0095	4.58001	20.286	-6.129836	-0.268453	0
ACCEL	-0.721966	0.409842	-1.6128	0.16889	12.262	-1.071906	-0.352546	0
ENG_TYPE	5.855301	1.579569	2.7509	8.95967	443.48	5.192451	6.299408	0
Intercept	69.542738	4.676262	60.1937	78.89183	61.546	67.011662	72.391093	0

Parameter Estimates

t for H0:	
Parameter=Theta0	Pr > t
-3.77	0.0002
1.43	0.1597
-3.45	0.0013
-0.86	0.4001
-1.76	0.1030
3.71	0.0002
14.87	<.0001