SAS program for RBD design with block - smoking status

Obs	bmi_level	smoke_status	glucose
1	bmi1	formerly	186.21
2	bmi1	never_sm	174.12
3	bmi1	smokes	104.51
4	bmi2	formerly	228.69
5	bmi2	never_sm	105.92
6	bmi2	smokes	171.23
7	bmi3	formerly	205.77
8	bmi3	never_sm	69.24
9	bmi3	smokes	129.54
10	bmi1	formerly	102.87
11	bmi1	never_sm	70.09
12	bmi1	smokes	221.29
13	bmi2	formerly	252.72
14	bmi2	never_sm	167.41
15	bmi2	smokes	120.46
16	bmi3	formerly	242.52
17	bmi3	never_sm	69.40
18	bmi3	smokes	71.16
19	bmi1	formerly	100.98
20	bmi1	never_sm	94.39
21	bmi1	smokes	193.94
22	bmi2	formerly	219.72
23	bmi2	never_sm	89.22
24	bmi2	smokes	191.61
25	bmi3	formerly	82.24
26	bmi3	never_sm	112.43
27	bmi3	smokes	74.44
28	bmi1	formerly	84.03
29	bmi1	never_sm	80.43
30	bmi1	smokes	195.23
31	bmi2	formerly	107.26
32	bmi2	never_sm	243.58

33	bmi2	smokes	212.08
34	bmi3	formerly	75.18
35	bmi3	never_sm	67.81
36	bmi3	smokes	170.05
37	bmi1	formerly	74.63
38	bmi1	never_sm	214.09
39	bmi1	smokes	144.90
40	bmi2	formerly	196.71
41	bmi2	never_sm	99.33
42	bmi2	smokes	58.09
43	bmi3	formerly	103.78
44	bmi3	never_sm	80.40
45	bmi3	smokes	188.11
46	bmi1	formerly	78.03
47	bmi1	never_sm	228.70
48	bmi1	smokes	213.03
49	bmi2	formerly	185.17
50	bmi2	never_sm	124.13
51	bmi2	smokes	240.59
52	bmi3	formerly	206.25
53	bmi3	never_sm	92.78
54	bmi3	smokes	85.62
55	bmi1	formerly	86.23
56	bmi1	never_sm	104.12
57	bmi1	smokes	61.94
58	bmi2	formerly	93.72
59	bmi2	never_sm	59.32
60	bmi2	smokes	191.82
61	bmi3	formerly	87.03
62	bmi3	never_sm	85.22
63	bmi3	smokes	100.15
64	bmi1	formerly	179.12
65	bmi1	never_sm	196.92
66	bmi1	smokes	96.97
67	bmi2	formerly	116.55

	bmi2	never_sm	194.99
69	bmi2	smokes	72.96
70	bmi3	formerly	67.53
71	bmi3	never_sm	195.04
72	bmi3	smokes	89.30
73	bmi1	formerly	66.72
74	bmi1	never_sm	84.20
75	bmi1	smokes	111.81
76	bmi2	formerly	59.35
77	bmi2	never_sm	68.02
78	bmi2	smokes	259.63
79	bmi3	formerly	79.18
80	bmi3	never_sm	66.13
81	bmi3	smokes	82.41
82	bmi1	formerly	110.85
83	bmi1	never_sm	60.91
84	bmi1	smokes	68.53
85	bmi2	formerly	86.94
86	bmi2	never_sm	235.63
87	bmi2	smokes	102.16
88	bmi3	formerly	68.78
89	bmi3	never_sm	206.40
90	bmi3	smokes	73.41
91	bmi1	formerly	76.34
92	bmi1	never_sm	71.22
93	bmi1	smokes	76.11
94	bmi2	formerly	231.61
95	bmi2	never_sm	190.32
96	bmi2	smokes	221.89
97	bmi3	formerly	97.52
98	bmi3	never_sm	78.99
99	bmi3	smokes	84.47
100	bmi1	formerly	78.92
101	bmi1	never_sm	127.29
102	bmi1	smokes	116.44

	bmi2	formerly	73.18
104	bmi2	never_sm	64.17
105	bmi2	smokes	112.24
106	bmi3	formerly	212.97
107	bmi3	never_sm	102.50
108	bmi3	smokes	69.99
109	bmi1	formerly	129.98
110	bmi1	never_sm	180.93
111	bmi1	smokes	77.82
112	bmi2	formerly	223.83
113	bmi2	never_sm	216.94
114	bmi2	smokes	118.03
115	bmi3	formerly	231.69
116	bmi3	never_sm	168.15
117	bmi3	smokes	89.11
118	bmi1	formerly	82.28
119	bmi1	never_sm	74.90
120	bmi1	smokes	97.43
121	bmi2	formerly	195.71
122	bmi2	never_sm	105.22
123	bmi2	smokes	271.74
124	bmi3	formerly	96.04
125	bmi3	never_sm	97.14
126	bmi3	smokes	105.19
127	bmi1	formerly	59.86
128	bmi1	never_sm	113.01
129	bmi1	smokes	76.13
130	bmi2	formerly	89.13
131	bmi2	never_sm	249.31
132	bmi2	smokes	87.85
133	bmi3	formerly	83.53
134	bmi3	never_sm	87.66
135	bmi3	smokes	87.10
136	bmi1	formerly	200.59
137	bmi1	never_sm	72.67

	bmi1	smokes	97.92
139	bmi2	formerly	91.02
140	bmi2	never_sm	190.14
141	bmi2	smokes	205.33
142	bmi3	formerly	89.95
143	bmi3	never_sm	56.63
144	bmi3	smokes	94.96
145	bmi1	formerly	140.10
146	bmi1	never_sm	228.56
147	bmi1	smokes	250.89
148	bmi2	formerly	111.04
149	bmi2	never_sm	182.99
150	bmi2	smokes	210.40
151	bmi3	formerly	57.43
152	bmi3	never_sm	234.82
153	bmi3	smokes	116.85
154	bmi1	formerly	194.37
155	bmi1	never_sm	96.59
156	bmi1	smokes	70.30
157	bmi2	formerly	137.30
158	bmi2	never_sm	263.32
159	bmi2	smokes	104.86
160	bmi3	formerly	172.33
161	bmi3	never_sm	187.52
162	bmi3	smokes	104.03
163	bmi1	formerly	151.16
164	bmi1	never_sm	240.09
165	bmi1	smokes	97.76
166	bmi2	formerly	116.69
167	bmi2	never_sm	72.17
168	bmi2	smokes	91.92
169	bmi3	formerly	99.23
170	bmi3	never_sm	83.34
171	bmi3	smokes	218.10
172	bmi1	formerly	133.19

	bmi1	never_sm	88.92
174	bmi1	smokes	97.73
175	bmi2	formerly	112.16
176	bmi2	never_sm	67.41
177	bmi2	smokes	77.67
178	bmi3	formerly	205.01
179	bmi3	never_sm	107.50
180	bmi3	smokes	118.55
181	bmi1	formerly	98.02
182	bmi1	never_sm	79.79
183	bmi1	smokes	84.62
184	bmi2	formerly	200.62
185	bmi2	never_sm	76.57
186	bmi2	smokes	60.22
187	bmi3	formerly	209.15
188	bmi3	never_sm	128.23
189	bmi3	smokes	63.90
190	bmi1	formerly	56.11
191	bmi1	never_sm	226.98
192	bmi1	smokes	57.33
193	bmi2	formerly	175.29
194	bmi2	never_sm	231.56
195	bmi2	smokes	242.30
196	bmi3	formerly	198.30
197	bmi3	never_sm	231.50
198	bmi3	smokes	100.88

SAS program for RBD design with block - smoking status

The MEANS Procedure

Smoke status=formerly

Analysis Variable : glucose Glucose Level				
N	Mean	Std Dev	Minimum	Maximum
66	132.5213636	59.0688742	56.1100000	252.7200000

Smoke status=never_sm

Analysis Variable : glucose Glucose Level				
N	Mean	Std Dev	Minimum	Maximum
66	133.5669697	65.0588396	56.6300000	263.3200000

Smoke status=smokes

Analysis Variable : glucose Glucose Level				
N	Mean	Std Dev	Minimum	Maximum
66	126.5913636	60.5107546	57.3300000	271.7400000

SAS program for RBD design with block - smoking status

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
smoke_status	3	formerly never_sm smokes
bmi_level	3	bmi1 bmi2 bmi3

Number of Observations Read	198
Number of Observations Used	198

SAS program for RBD design with block - smoking status

The GLM Procedure

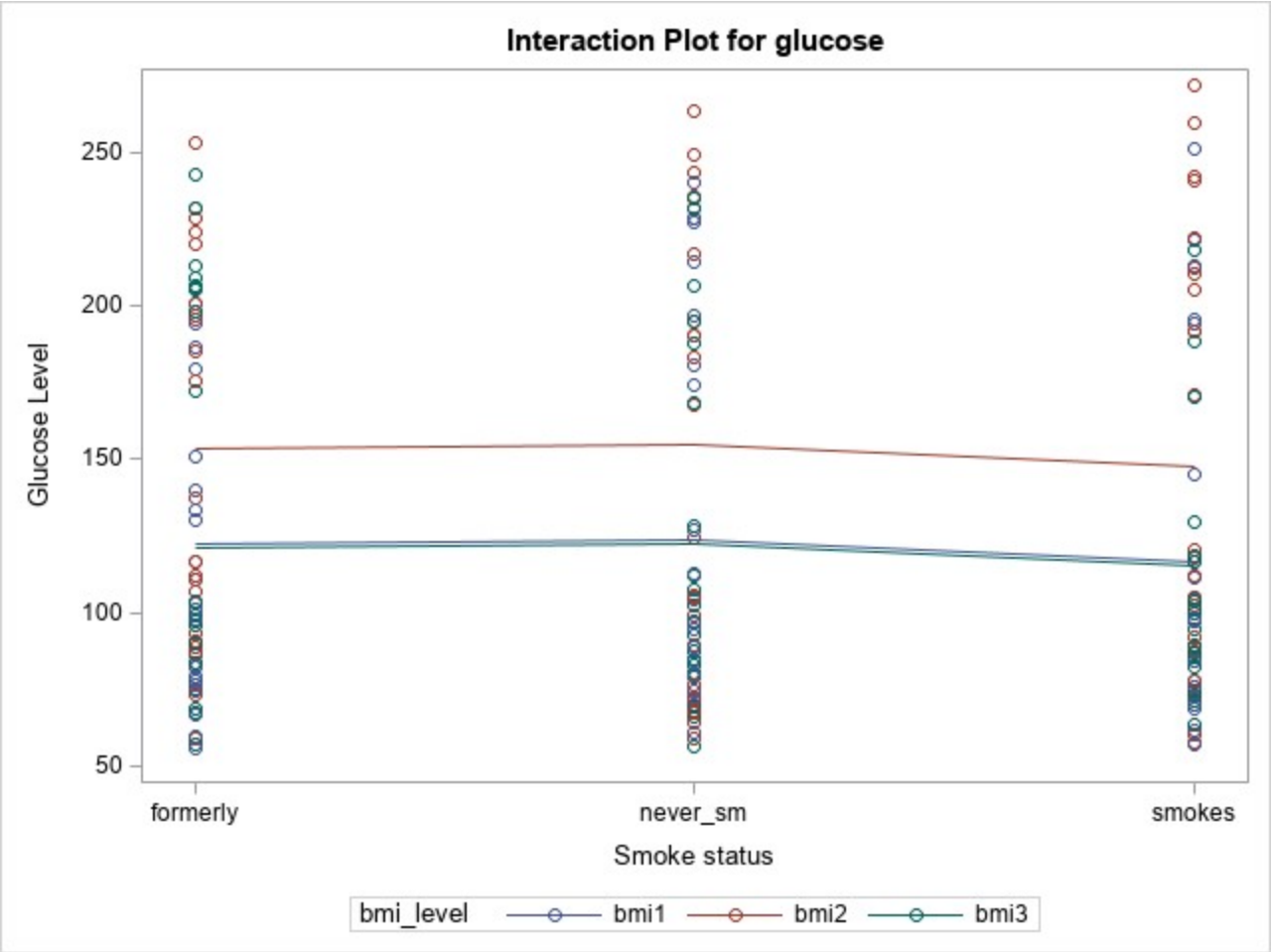
Dependent Variable: glucose Glucose Level

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	45734.0787	11433.5197	3.17	0.0150
Error	193	696050.9367	3606.4815		
Corrected Total	197	741785.0153			

R-Square	Coeff Var	Root MSE	glucose Mean
0.061654	45.88013	60.05399	130.8932

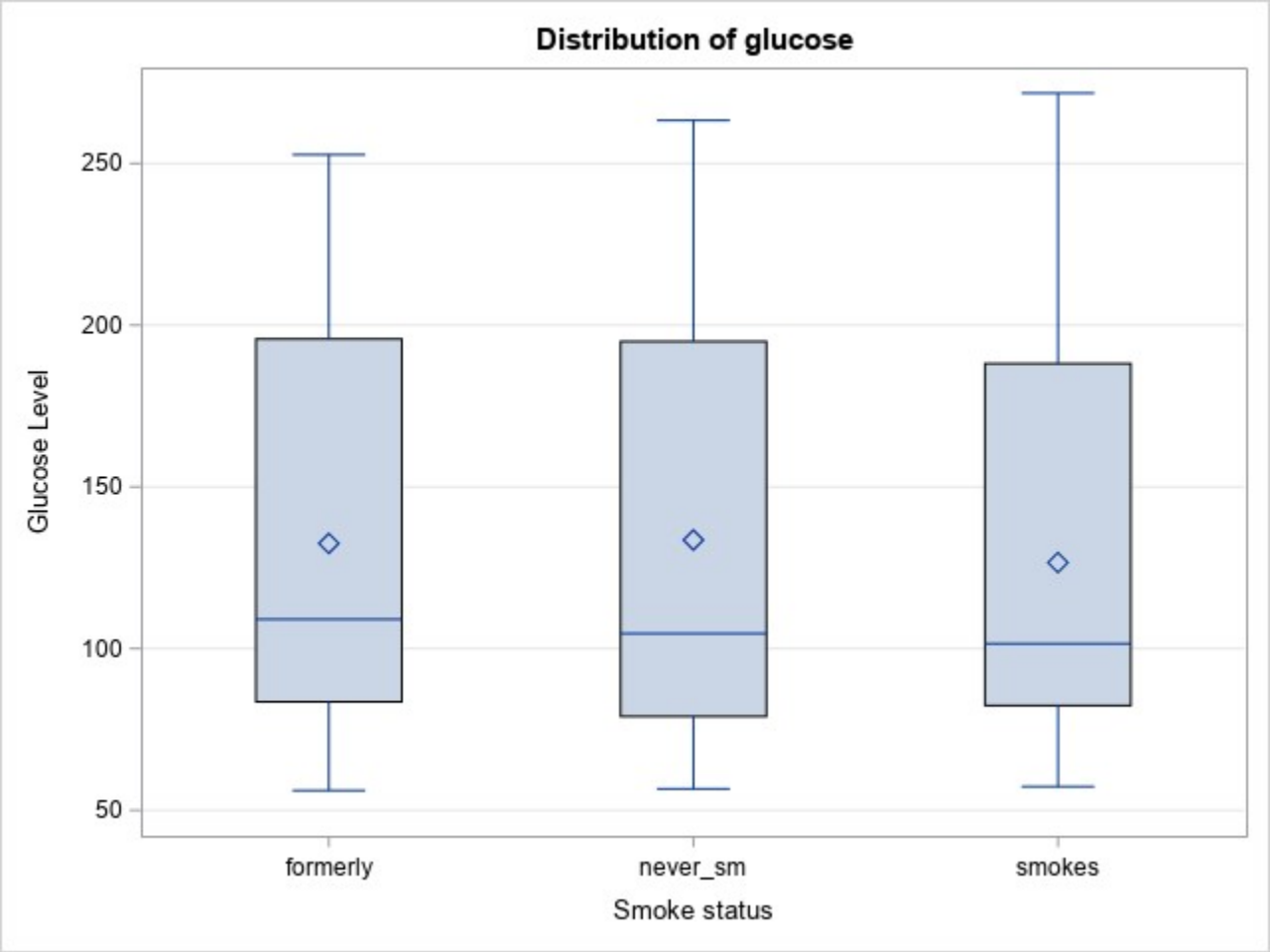
Source	DF	Type I SS	Mean Square	F Value	Pr > F
bmi_level	2	43865.89867	21932.94934	6.08	0.0027
smoke_status	2	1868.17998	934.08999	0.26	0.7721

Source	DF	Type III SS	Mean Square	F Value	Pr > F
bmi_level	2	43865.89867	21932.94934	6.08	0.0027
smoke_status	2	1868.17998	934.08999	0.26	0.7721


Interaction Plot for glucose
Glucose Level
250
200
150
100
50
formerly
never_sm
smokes
Smoke status
bmi_level
bmi1
bmi2
bmi3

SAS program for RBD design with block - smoking status

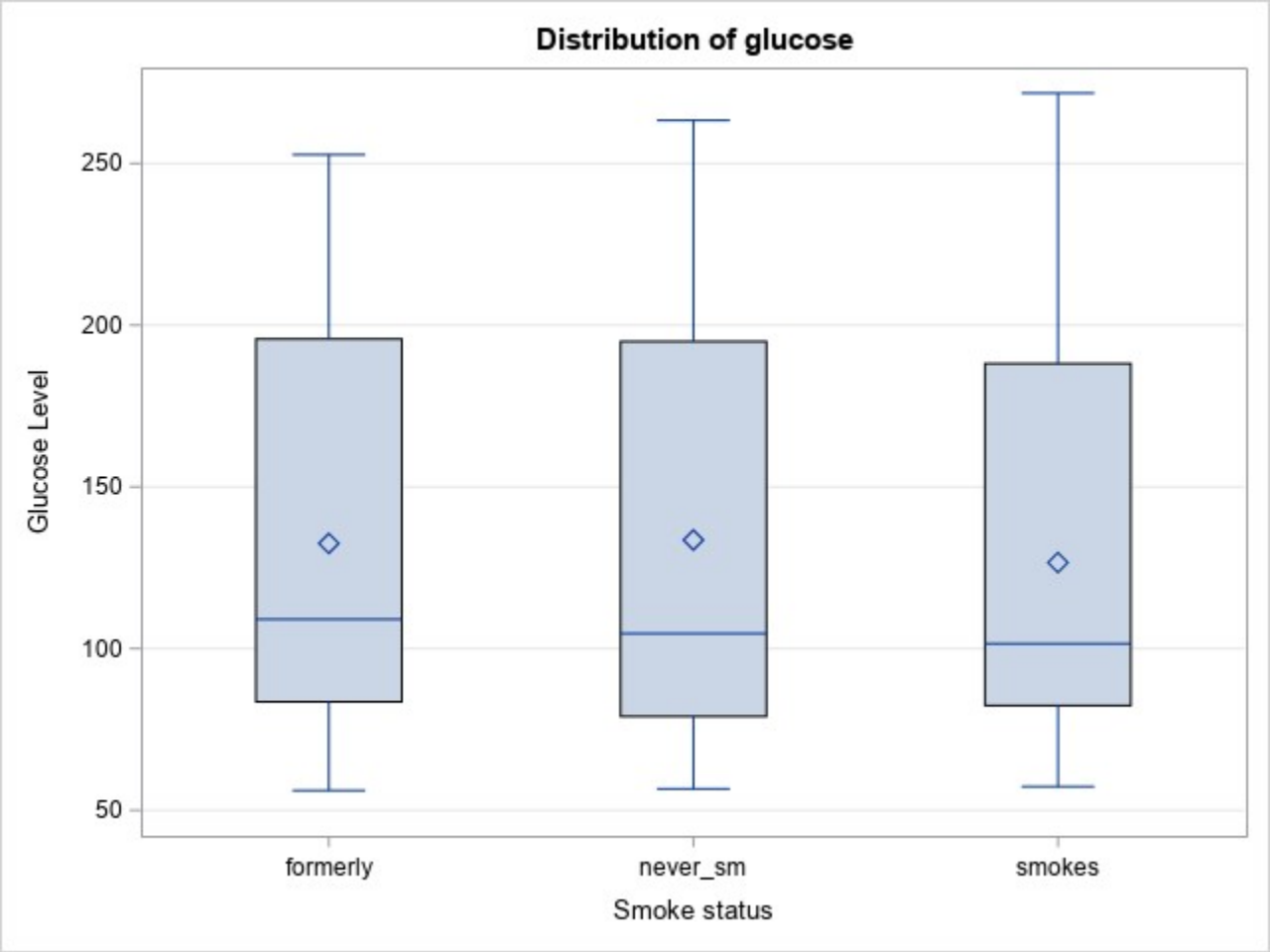
The GLM Procedure



Level of smoke_status	N	glucose	
		Mean	Std Dev
formerly	66	132.521364	59.0688742
never_sm	66	133.566970	65.0588396
smokes	66	126.591364	60.5107546

SAS program for RBD design with block - smoking status

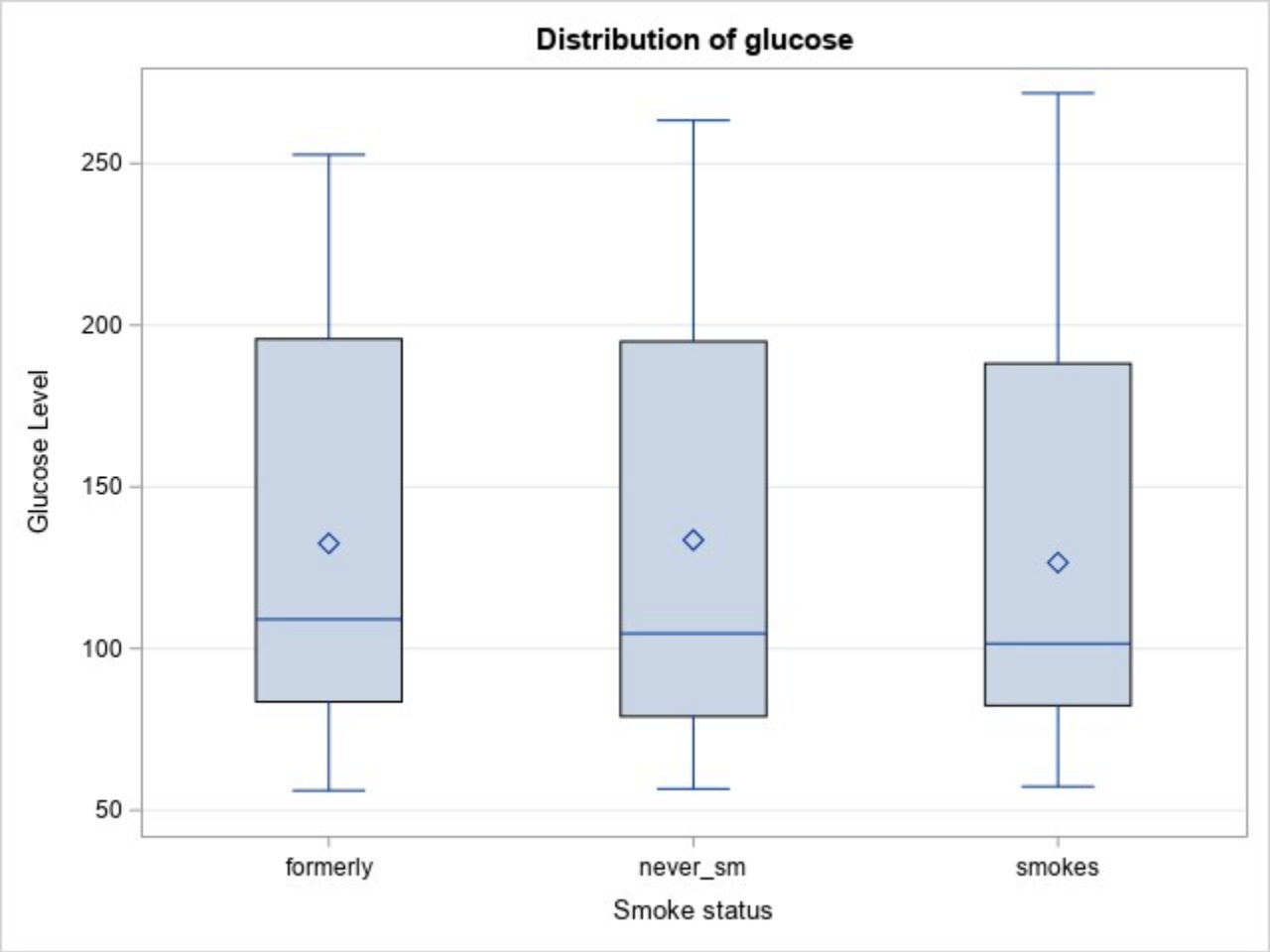
The GLM Procedure



Level of smoke_status	N	glucose	
		Mean	Std Dev
formerly	66	132.521364	59.0688742
never_sm	66	133.566970	65.0588396
smokes	66	126.591364	60.5107546

SAS program for RBD design with block - smoking status

The GLM Procedure



Level of smoke_status	N	glucose	
		Mean	Std Dev
formerly	66	132.521364	59.0688742
never_sm	66	133.566970	65.0588396
smokes	66	126.591364	60.5107546

SAS program for RBD design with block - smoking status

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
smoke_status	3	formerly never_sm smokes
bmi_level	3	bmi1 bmi2 bmi3

Number of Observations Read	198
Number of Observations Used	198

SAS program for RBD design with block - smoking status

The GLM Procedure

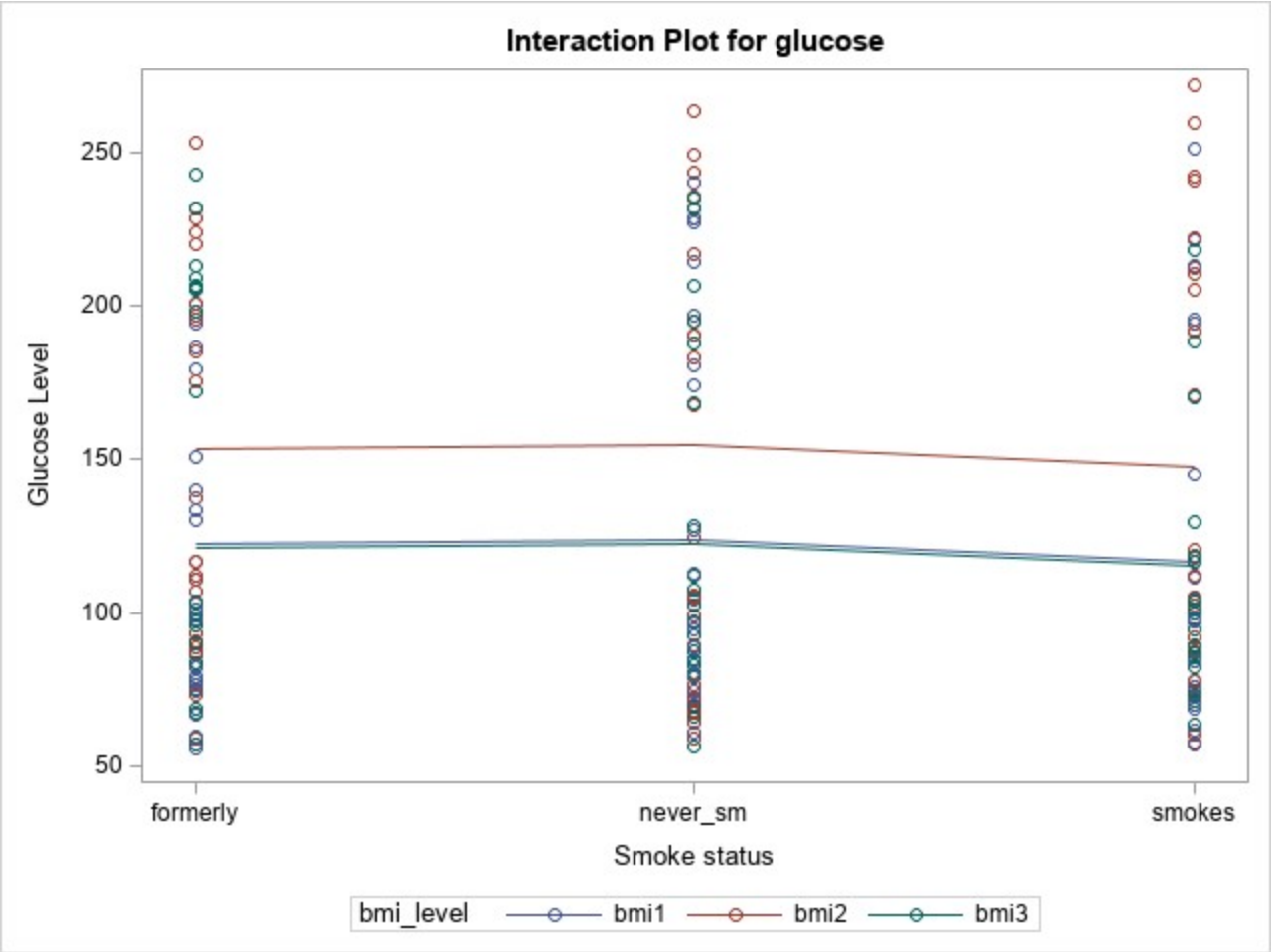
Dependent Variable: glucose Glucose Level

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	45734.0787	11433.5197	3.17	0.0150
Error	193	696050.9367	3606.4815		
Corrected Total	197	741785.0153			

R-Square	Coeff Var	Root MSE	glucose Mean
0.061654	45.88013	60.05399	130.8932

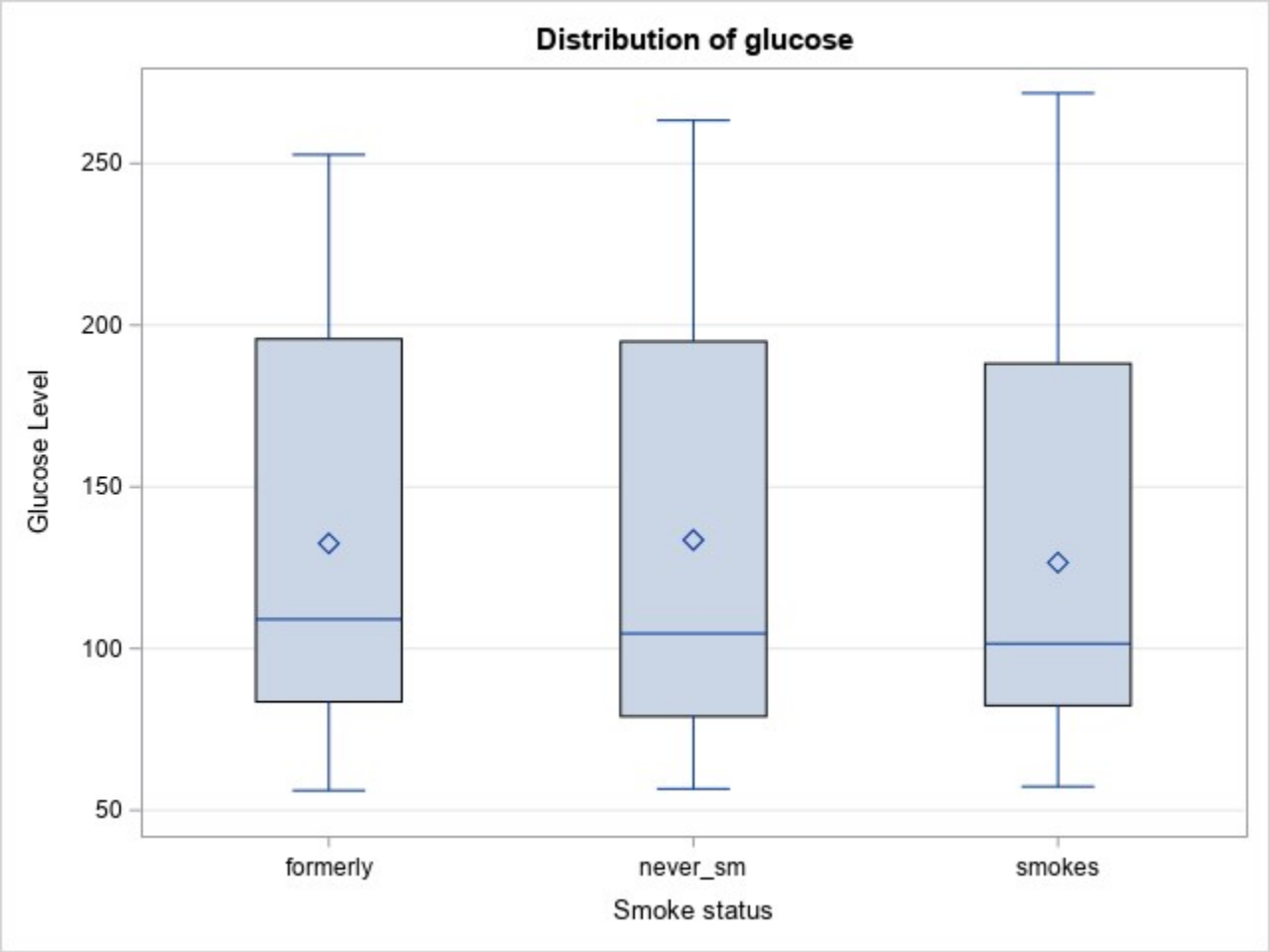
Source	DF	Type I SS	Mean Square	F Value	Pr > F
bmi_level	2	43865.89867	21932.94934	6.08	0.0027
smoke_status	2	1868.17998	934.08999	0.26	0.7721

Source	DF	Type III SS	Mean Square	F Value	Pr > F
bmi_level	2	43865.89867	21932.94934	6.08	0.0027
smoke_status	2	1868.17998	934.08999	0.26	0.7721


Interaction Plot for glucose
Glucose Level
250
200
150
100
50
formerly
never_sm
smokes
Smoke status
bmi_level
bmi1
bmi2
bmi3

SAS program for RBD design with block - smoking status

The GLM Procedure



SAS program for RBD design with block - smoking status

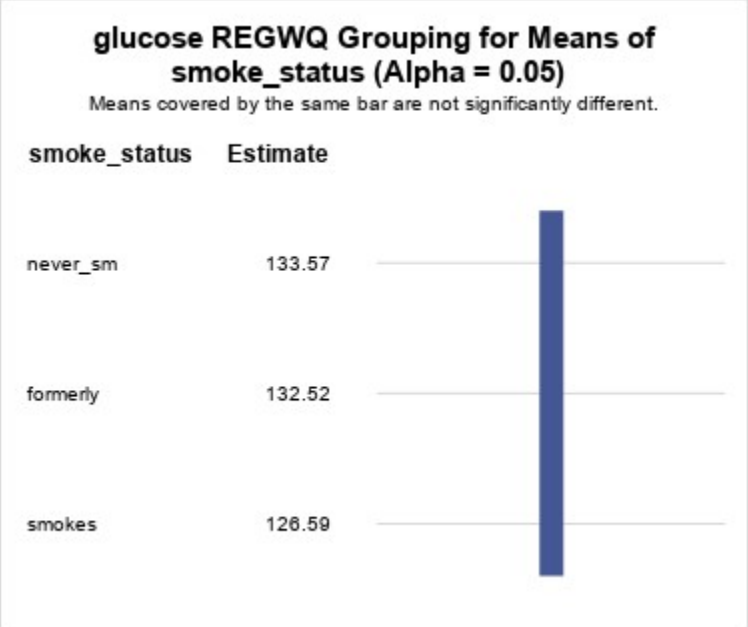
The GLM Procedure

Ryan-Einot-Gabriel-Welsch Multiple Range Test for glucose

Note: This test controls the Type I experimentwise error rate.

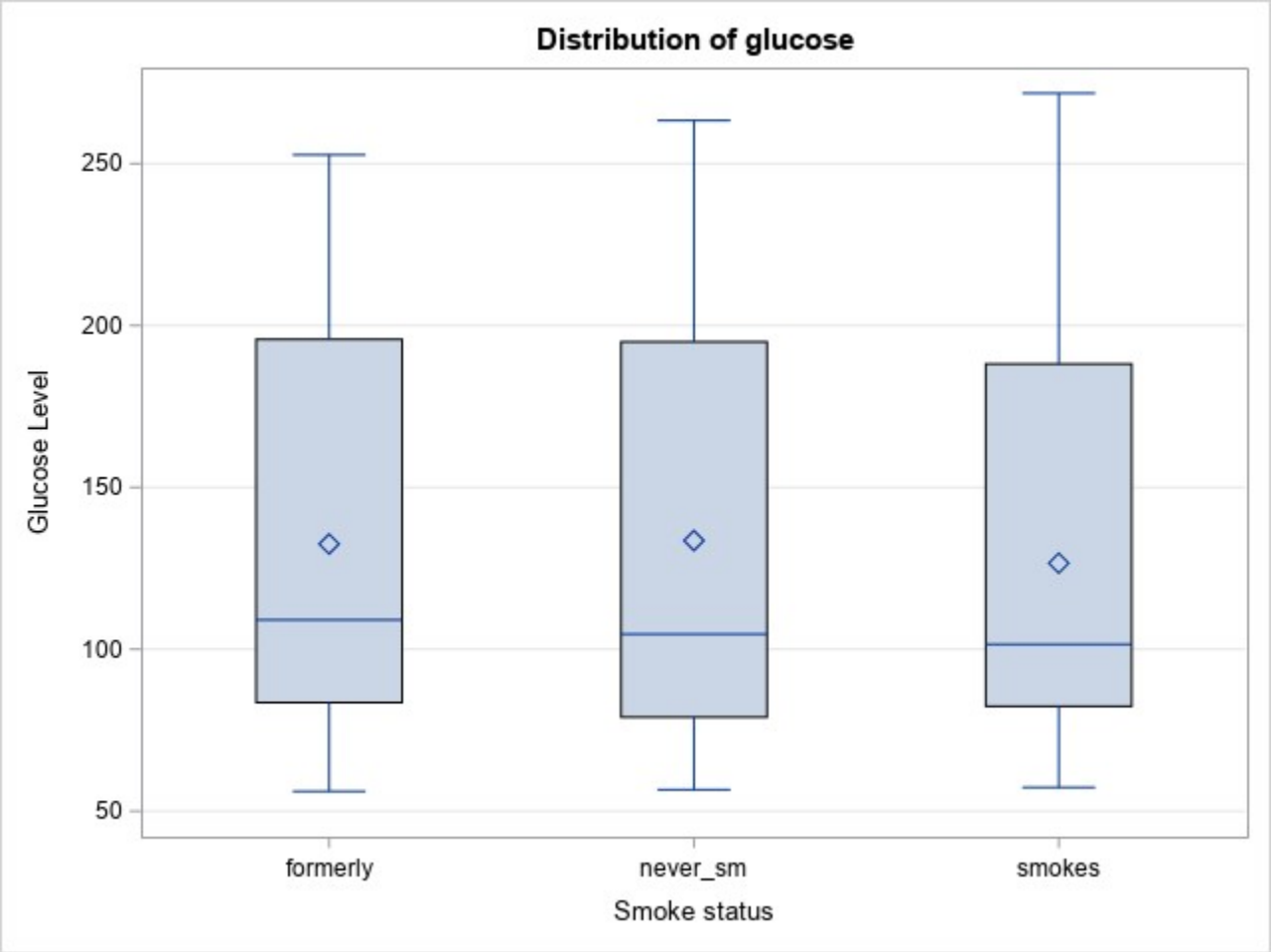
Alpha	0.05
Error Degrees of Freedom	193
Error Mean Square	3606.482

Number of Means	**2**	**3**
Critical Range	20.618871	24.691836



SAS program for RBD design with block - smoking status

The GLM Procedure



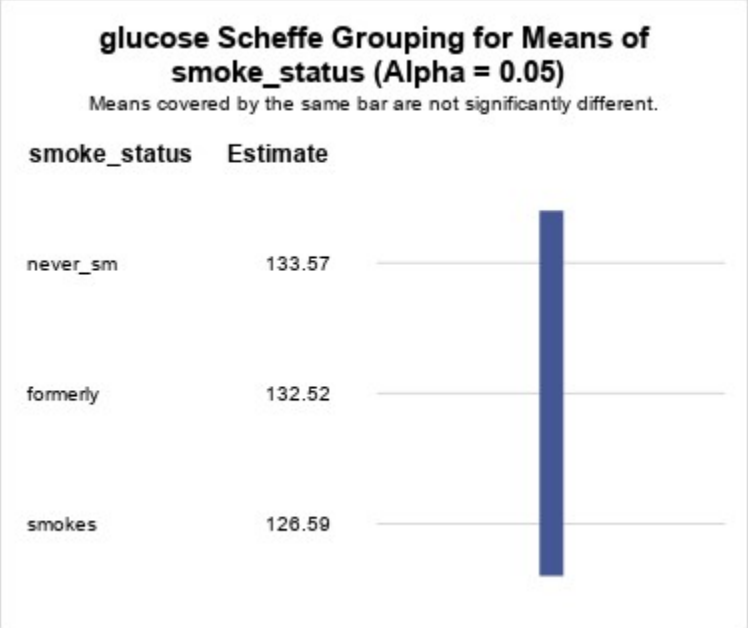
SAS program for RBD design with block - smoking status

The GLM Procedure

Scheffe's Test for glucose

Note: This test controls the Type I experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	193
Error Mean Square	3606.482
Critical Value of F	3.04272
Minimum Significant Difference	25.789



SAS program for RBD design with block - smoking status

The UNIVARIATE Procedure
Variable: glucose (Glucose Level)

Smoke status=formerly

Moments			
N	66	Sum Weights	66
Mean	132.521364	Sum Observations	8746.41
Std Deviation	59.0688742	Variance	3489.1319
Skewness	0.51027088	Kurtosis	-1.254165
Uncorrected SS	1385879.75	Corrected SS	226793.573
Coeff Variation	44.5730957	Std Error Mean	7.27087579

Basic Statistical Measures			
Location		Variability	
Mean	132.5214	Std Deviation	59.06887
Median	109.0550	Variance	3489
Mode	.	Range	196.61000
		Interquartile Range	112.18000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	18.22633	Pr > |t|	<.0001
Sign	M	33	Pr >= |M|	<.0001
Signed Rank	S	1105.5	Pr >= |S|	<.0001

Tests for Normality				
Test	Statistic		p Value	
Shapiro-Wilk	W	0.88522	Pr < W	<0.0001
Kolmogorov-Smirnov	D	0.181414	Pr > D	<0.0100
Cramer-von Mises	W-Sq	0.555686	Pr > W-Sq	<0.0050
Anderson-Darling	A-Sq	3.0717	Pr > A-Sq	<0.0050

Quantiles (Definition 5)	
Level	Quantile
100% Max	252.720

99%	252.720
95%	231.610
90%	219.720
75% Q3	195.710
50% Median	109.055
25% Q1	83.530
10%	68.780
5%	59.860
1%	56.110
0% Min	56.110

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
56.11	64	228.69	2
57.43	51	231.61	32
59.35	26	231.69	39
59.86	43	242.52	6
66.72	25	252.72	5

SAS program for RBD design with block - smoking status

The UNIVARIATE Procedure
Variable: glucose (Glucose Level)

Smoke status=never_sm

Moments			
N	66	Sum Weights	66
Mean	133.56697	Sum Observations	8815.42
Std Deviation	65.0588396	Variance	4232.65261
Skewness	0.55417049	Kurtosis	-1.2877785
Uncorrected SS	1452571.36	Corrected SS	275122.419
Coeff Variation	48.7087786	Std Error Mean	8.00818956

Basic Statistical Measures			
Location		Variability	
Mean	133.5670	Std Deviation	65.05884
Median	104.6700	Variance	4233
Mode	.	Range	206.69000
		Interquartile Range	116.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	16.6788	Pr > |t|	<.0001
Sign	M	33	Pr >= |M|	<.0001
Signed Rank	S	1105.5	Pr >= |S|	<.0001

Tests for Normality				
Test	Statistic		p Value	
Shapiro-Wilk	W	0.859733	Pr < W	<0.0001
Kolmogorov-Smirnov	D	0.201122	Pr > D	<0.0100
Cramer-von Mises	W-Sq	0.664005	Pr > W-Sq	<0.0050
Anderson-Darling	A-Sq	3.710631	Pr > A-Sq	<0.0050

Quantiles (Definition 5)	
Level	Quantile
100% Max	263.32

99%	263.32
95%	240.09
90%	231.56
75% Q3	194.99
50% Median	104.67
25% Q1	78.99
10%	67.81
5%	64.17
1%	56.63
0% Min	56.63

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
56.63	114	235.63	95
59.32	86	240.09	121
60.91	94	243.58	77
64.17	101	249.31	110
66.13	93	263.32	119

SAS program for RBD design with block - smoking status

The UNIVARIATE Procedure
Variable: glucose (Glucose Level)

Smoke status=smokes

Moments			
N	66	Sum Weights	66
Mean	126.591364	Sum Observations	8355.03
Std Deviation	60.5107546	Variance	3661.55142
Skewness	0.91890948	Kurtosis	-0.5120356
Uncorrected SS	1295675.48	Corrected SS	238000.843
Coeff Variation	47.8000654	Std Error Mean	7.44835901

Basic Statistical Measures			
Location		Variability	
Mean	126.5914	Std Deviation	60.51075
Median	101.5200	Variance	3662
Mode	.	Range	214.41000
		Interquartile Range	105.70000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	16.99587	Pr > |t|	<.0001
Sign	M	33	Pr >= |M|	<.0001
Signed Rank	S	1105.5	Pr >= |S|	<.0001

Tests for Normality				
Test	Statistic		p Value	
Shapiro-Wilk	W	0.852056	Pr < W	<0.0001
Kolmogorov-Smirnov	D	0.222173	Pr > D	<0.0100
Cramer-von Mises	W-Sq	0.765383	Pr > W-Sq	<0.0050
Anderson-Darling	A-Sq	4.036129	Pr > A-Sq	<0.0050

Quantiles (Definition 5)	
Level	Quantile
100% Max	271.74

99%	271.74
95%	242.30
90%	221.29
75% Q3	188.11
50% Median	101.52
25% Q1	82.41
10%	69.99
5%	61.94
1%	57.33
0% Min	57.33

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
57.33	196	240.59	149
58.09	146	242.30	197
60.22	194	250.89	181
61.94	151	259.63	158
63.90	195	271.74	173