

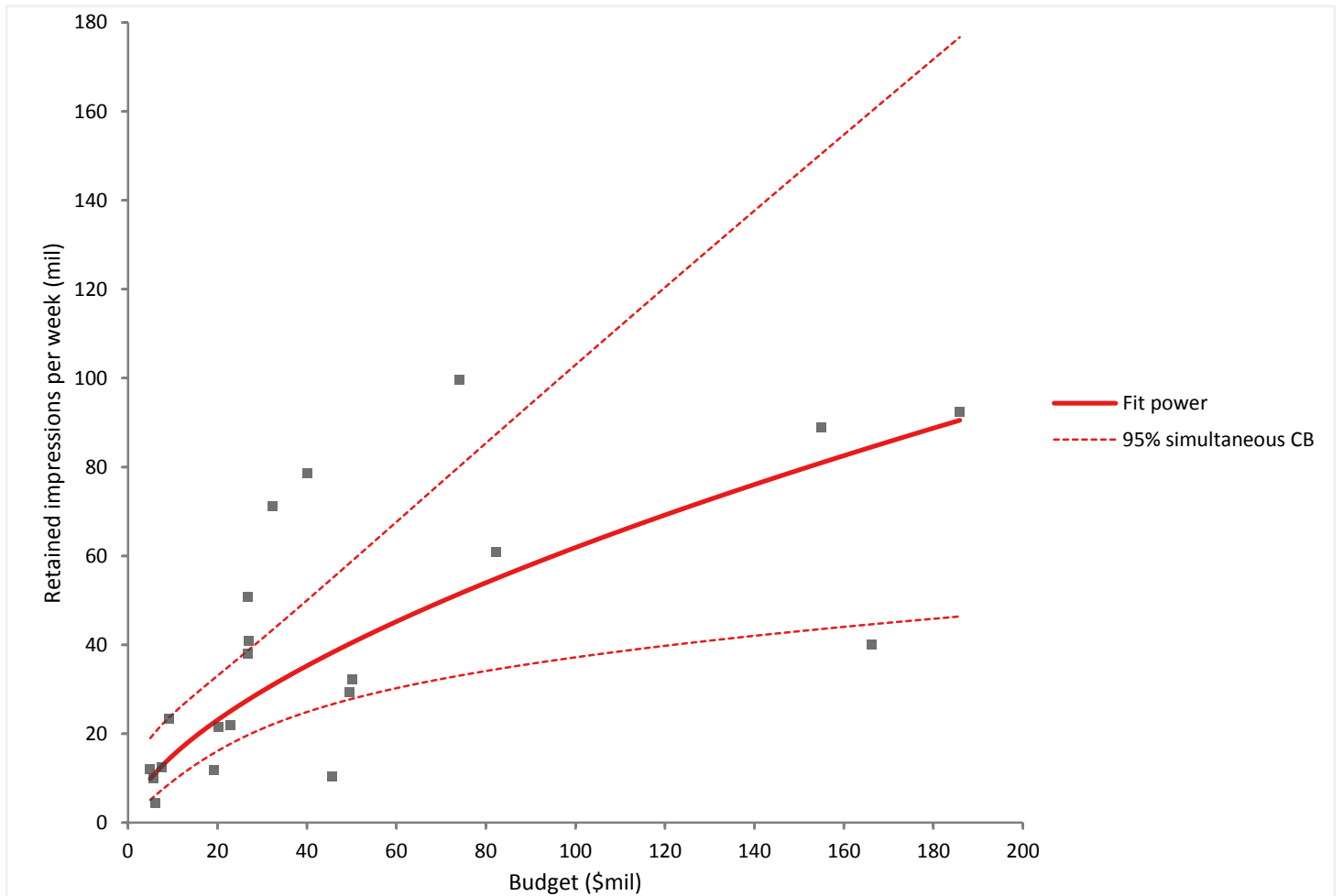
Fit: Retained impressions per week

TV Advertising Yields 1983

<http://lib.stat.cmu.edu/DASL/Stories/tvads.html>

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Descriptives



N | 21

Variable	Mean	SD	Minimum	Median	Maximum
In Budget	3.395	1.091	1.61	3.296	5.23
In Retained impressions per week	3.383	0.8768	1.48	3.469	4.60

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Fit

Equation | Retained impressions per week (mil) = 3.669 * Budget (\$mil)^{0.6135}

R ²	0.583
R ² adjusted	0.561
AICc	-20.244
BIC	-18.822
SE of fit (RMSE)	0.581

Parameter	Estimate	95% CI	SE
Constant	1.300	0.4133 to 2.187	0.42363
In Budget	0.6135	0.3643 to 0.8627	0.11905

Correlation of Estimates

	Constant	Budget
Constant	1.000	-0.954
Budget	-0.954	1.000

Covariance of Estimates

	Constant	Budget
Constant	0.1795	-0.04812
Budget	-0.04812	0.01417

Effect of Model

Source	SS	DF	MS	F	p-value
Difference	8.96	1	8.96	26.55	<0.0001
Error	6.41	19	0.34		
Null model	15.38	20	0.77		

H0: $E(Y|X=x) = \mu$

The model is no better than a null model $Y=\mu$.

H1: $E(Y|X=x) = \alpha * x^\beta$

The model is better than the null model.

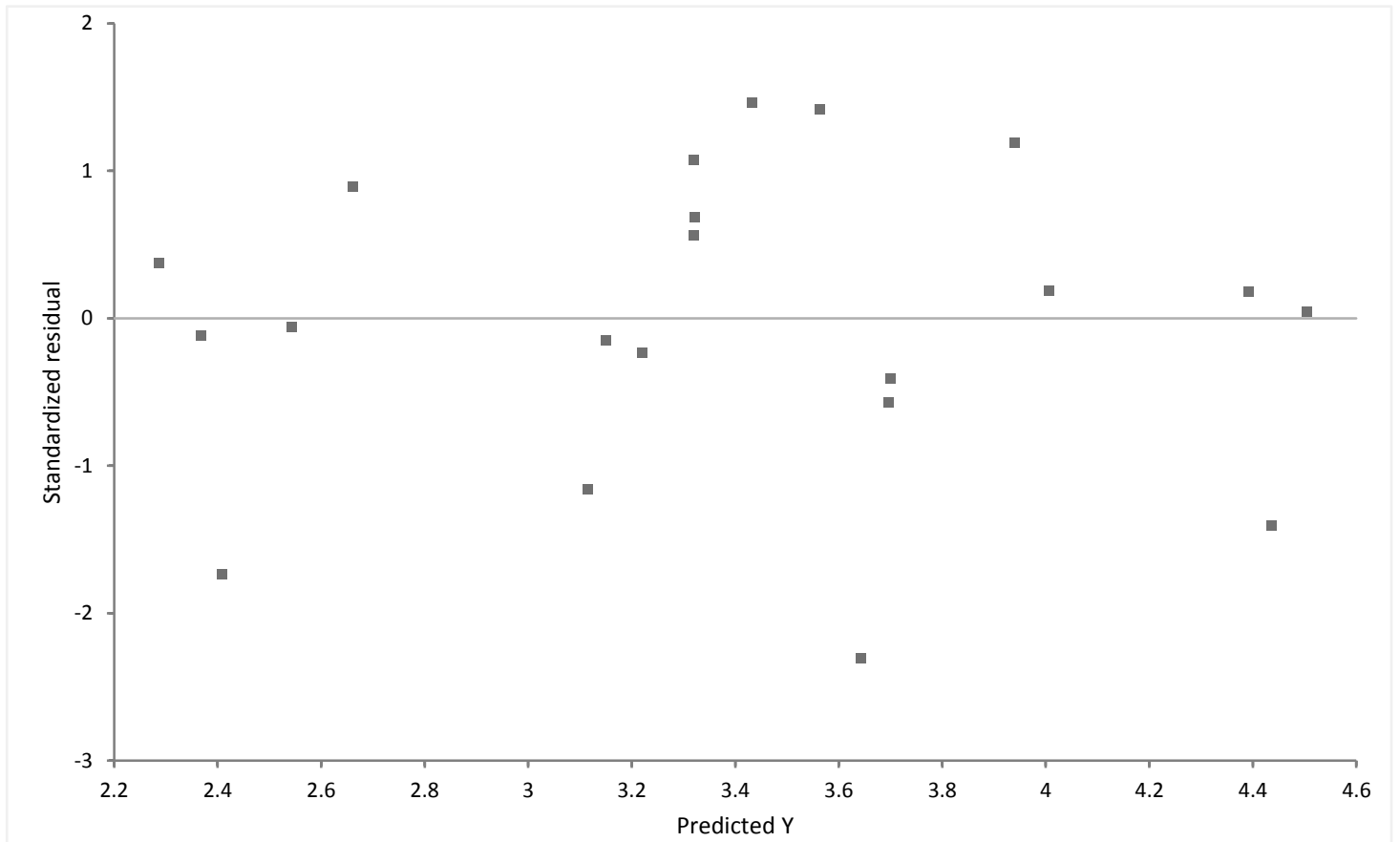
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Residuals

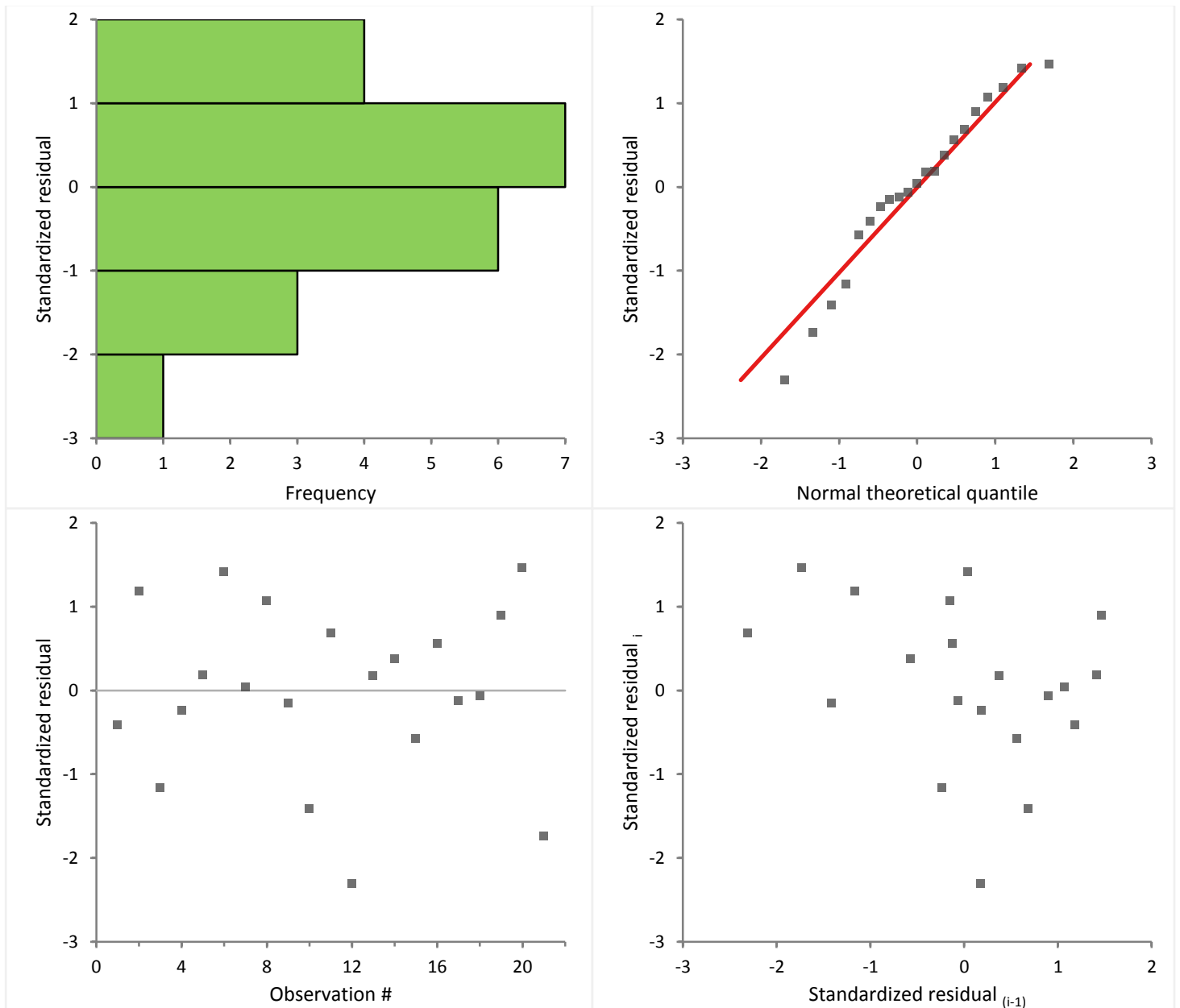


Fit: Retained impressions per week

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Normality

Shapiro-Wilk test

W statistic	0.96
p-value	0.4505 ¹

H0: $F(e) = N(\mu, \sigma)$

The distribution of the population is normal with unspecified mean and standard deviation.

H1: $F(e) \neq N(\mu, \sigma)$

The distribution of the population is not normal.

¹ Do not reject the null hypothesis at the 10% significance level.

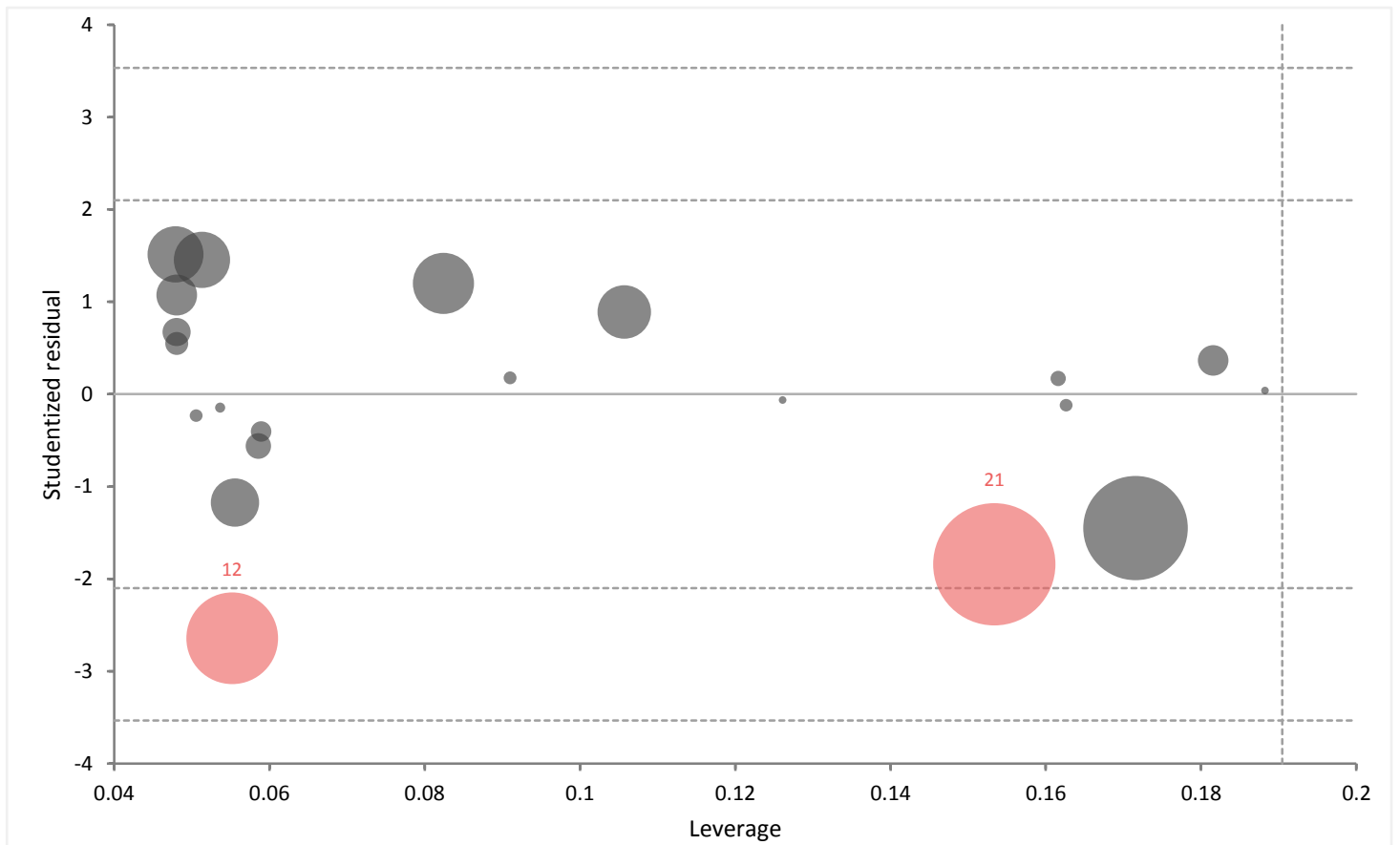
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Outliers, Leverage, Influence



Fit: Pulse1

Pulse rates before and after exercise

<http://www.statsci.org/data/oz/ms212.html>

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Fit

N	109
R ²	0.144
R ² adjusted	0.067
SE of fit (RMSE)	12.85

Parameter	Estimate	95% CI	SE	VIF
Constant	123.3	91.13 to 155.5	16.229	-
Height	-0.2188	-0.4101 to -0.02747	0.096419	1.59
Weight	-0.01951	-0.2518 to 0.2128	0.11708	2.08
Age	-0.5041	-1.163 to 0.1545	0.33194	1.12
Gender: 1	0.5860	-2.567 to 3.739	1.5889	-
Gender: 2	-0.5860	-3.739 to 2.567	1.5889	1.66
Smokes: 1	0.3794	-3.866 to 4.625	2.1398	-
Smokes: 2	-0.3794	-4.625 to 3.866	2.1398	1.10
Alcohol: 1	1.251	-1.560 to 4.062	1.4167	-
Alcohol: 2	-1.251	-4.062 to 1.560	1.4167	1.26
Exercise: 1	-5.539	-10.78 to -0.2948	2.6427	-
Exercise: 2	1.593	-1.943 to 5.130	1.7822	1.04
Exercise: 3	3.945	-0.1036 to 7.994	2.0406	1.16
Ran: 1	-0.3319	-2.855 to 2.191	1.2716	-
Ran: 2	0.3319	-2.191 to 2.855	1.2716	1.04

Effect of Model

Source	SS	DF	MS	F	p-value
Difference	2757.8	9	306.4	1.86	0.0674 ¹
Error	16339.6	99	165.0		
Null model	19097.4	108	176.8		

H0: $E(Y|X=x) = \mu$

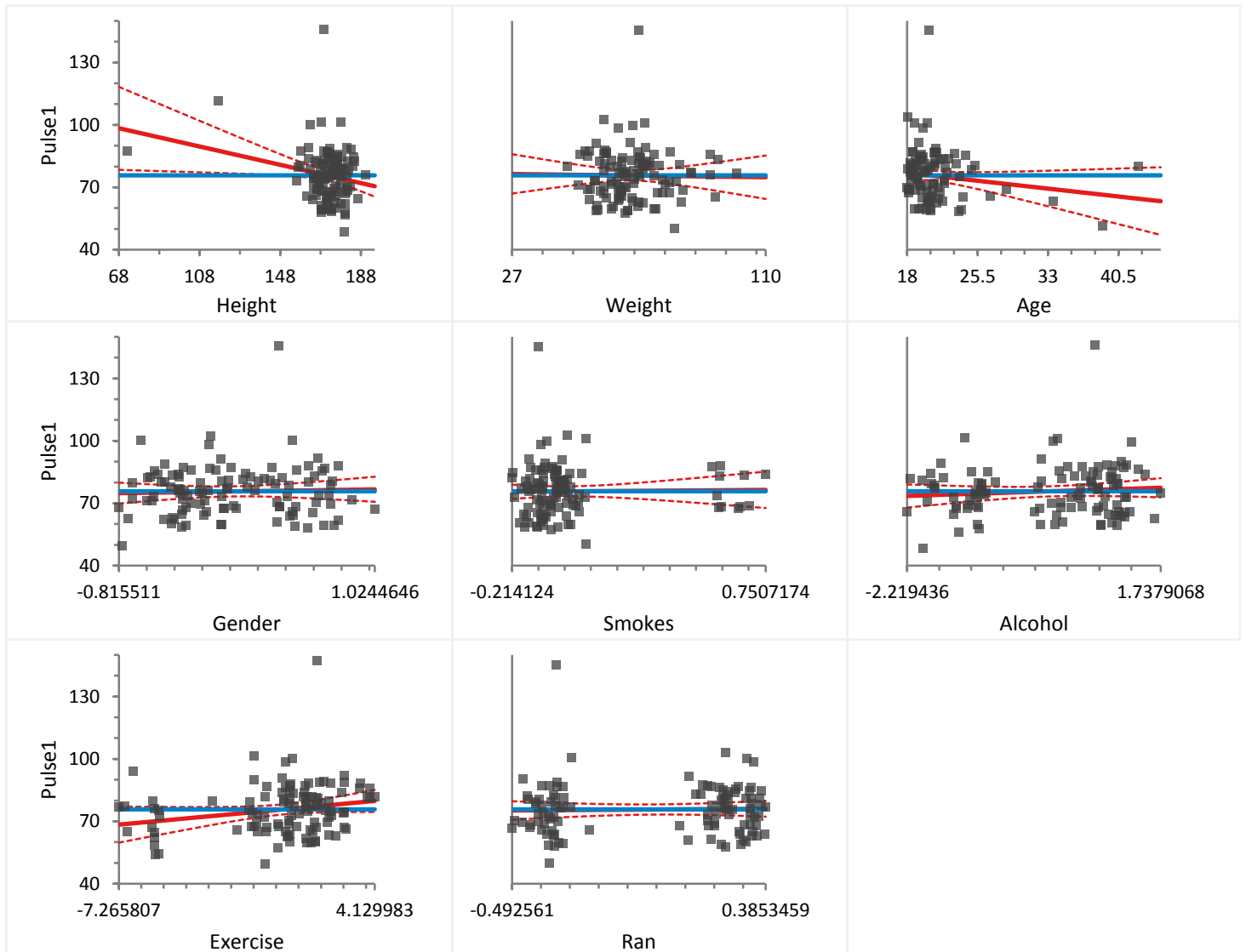
The model is no better than a null model $Y=\mu$.

H1: $E(Y|X=x) = \beta_0 + \beta_1x_1 + \beta_2x_2 + \dots$

The model is better than the null model.

¹ Do not reject the null hypothesis at the 5% significance level.

Effect of Terms



Term	SS	DF	MS	F	p-value
Height	849.8	1	849.8	5.15	0.0254 ¹
Weight	4.6	1	4.6	0.03	0.8680 ²
Age	380.7	1	380.7	2.31	0.1320 ²
Gender	22.5	1	22.5	0.14	0.7131 ²
Smokes	5.2	1	5.2	0.03	0.8596 ²
Alcohol	128.8	1	128.8	0.78	0.3792 ²
Exercise	778.7	2	389.3	2.36	0.0998 ²
Ran	11.2	1	11.2	0.07	0.7946 ²

H0: $\beta_{Term} = 0$

The term does not contribute to the model.

H1: $\beta_{Term} \neq 0$

The term contributes to the model.

¹ Reject the null hypothesis in favour of the alternative hypothesis at the 5% significance level.

² Do not reject the null hypothesis at the 5% significance level.

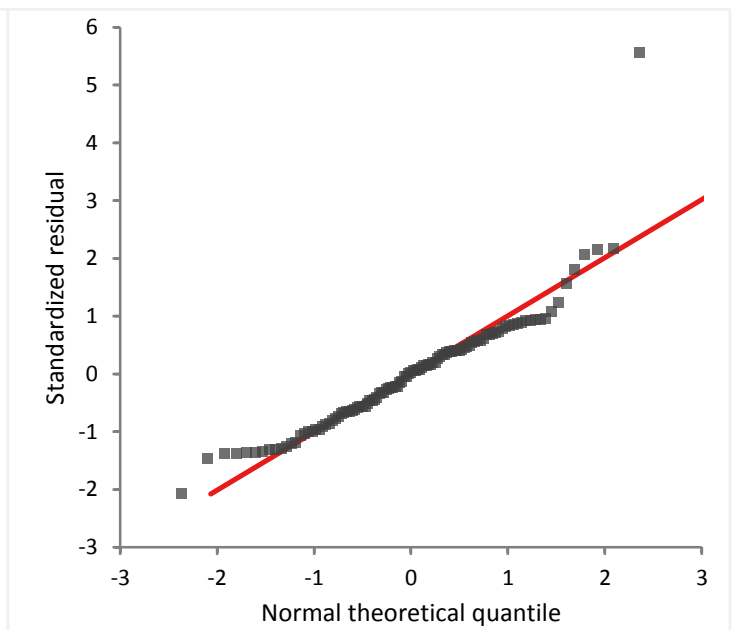
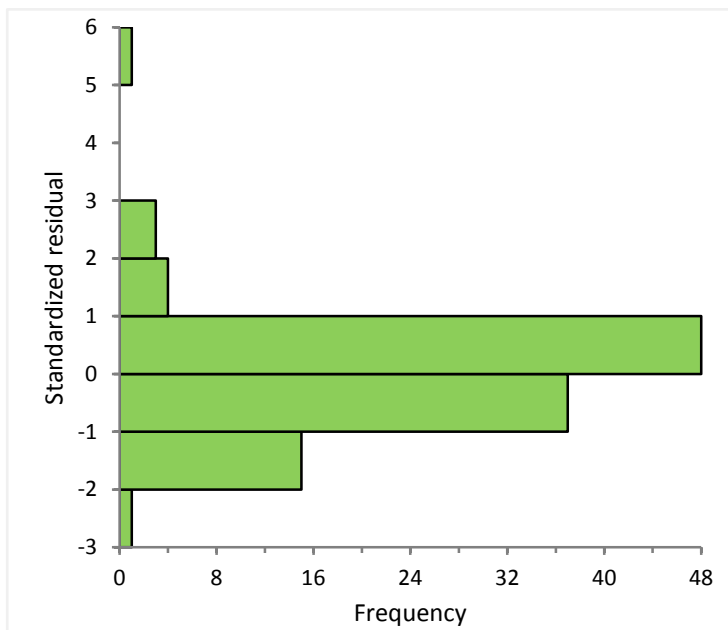
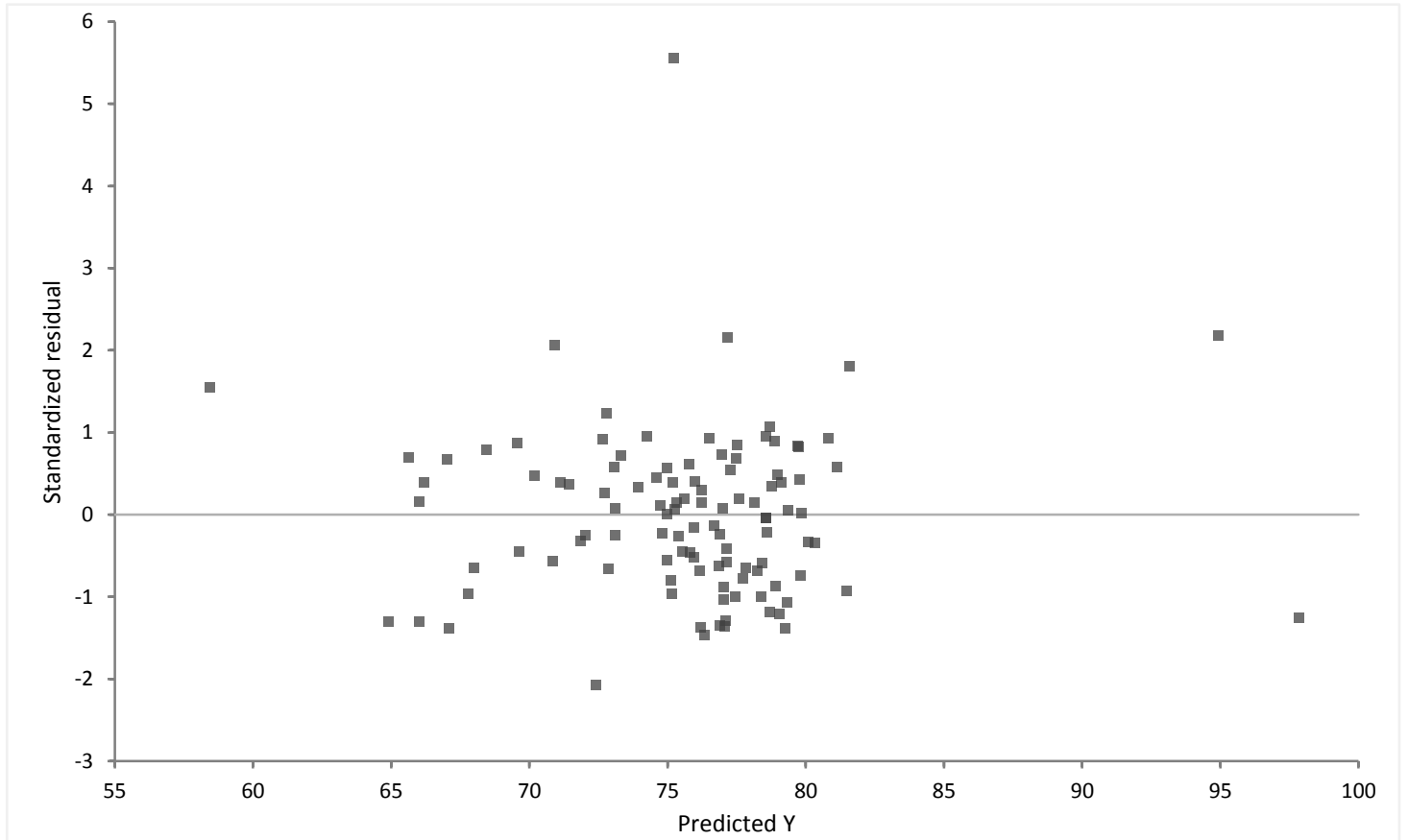
Fit: Pulse1

Pulse rates before and after exercise

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Residuals



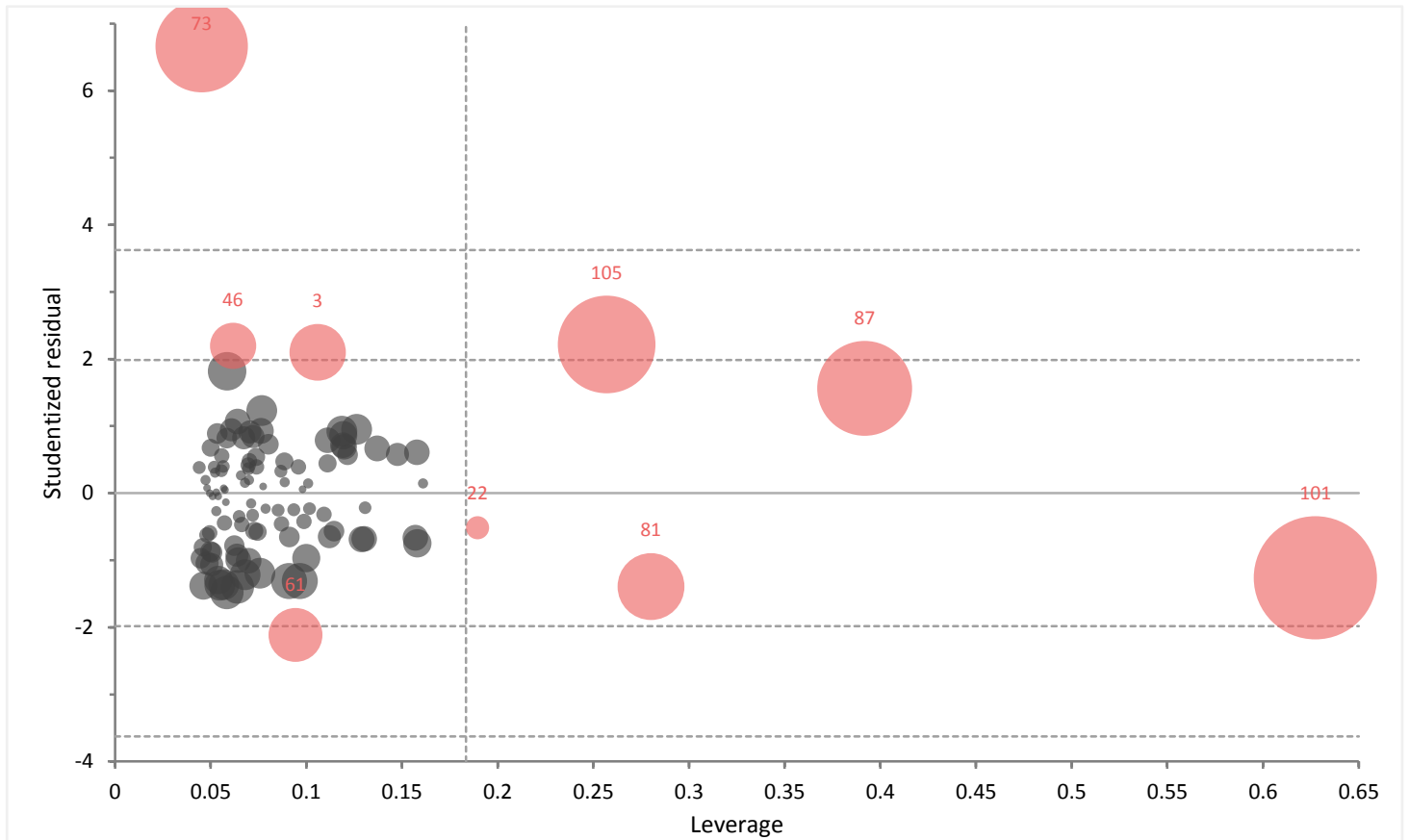
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Pulse rates before and after exercise

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Outliers, Leverage, Influence



Fit

N		200	
Parameter	Odds ratio	Wald 95% CI	
AGE	1.044	1.016 to 1.074	
SEX : 1	1.0000		
2	0.6170	0.2533 to 1.503	
SER : 1	1.0000		
2	0.7495	0.2698 to 2.082	
CAN : 1	1.0000		
2	8.224	1.400 to 48.31	
CRN : 1	1.0000		
2	1.295	0.3573 to 4.693	
INF : 1	1.0000		
2	1.231	0.4970 to 3.048	
CPR : 1	1.0000		
2	4.770	1.107 to 20.54	
SYS	0.9864	0.9730 to 0.9999	
HRA	0.9881	0.9713 to 1.005	
PRE : 1	1.0000		
2	1.964	0.6329 to 6.097	
TYP : 1	1.0000		
2	16.29	2.566 to 103.4	
FRA : 1	1.0000		
2	1.823	0.2910 to 11.42	
PO2 : 1	1.0000		
2	1.327	0.2815 to 6.256	
PH : 1	1.0000		
2	1.868	0.2916 to 11.97	
PCO : 1	1.0000		
2	0.3770	0.06533 to 2.175	
BIC : 1	1.0000		
2	0.7491	0.1621 to 3.463	
CRE : 1	1.0000		
2	1.643	0.2679 to 10.08	

 Φ_1

Effect of Model

Source	-LogLikelihood	DF	G ² statistic	p
Difference	24.064	17	48.13	<0.0001
Fitted model	76.016	182		
Null model	100.08	199		

H0: $g(x) = \beta_0$ The model is no better than a null model $Y = \pi$.H1: $g(x) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots$

The model is better than the null model.

Effect of Terms

Term	-LogLikelihood	DF	G ² statistic	p-value
AGE	5.8878	1	11.78	0.0006 ¹
SEX	0.58091	1	1.16	0.2811 ²
SER	0.15375	1	0.31	0.5792 ²
CAN	2.6685	1	5.34	0.0209 ¹
CRN	0.076689	1	0.15	0.6953 ²
INF	0.10064	1	0.20	0.6537 ²
CPR	2.2281	1	4.46	0.0348 ¹
SYS	2.1073	1	4.21	0.0401 ¹
HRA	0.96729	1	1.93	0.1643 ²
PRE	0.65945	1	1.32	0.2508 ²
TYP	6.1922	1	12.38	0.0004 ¹
FRA	0.19472	1	0.39	0.5326 ²
PO2	0.063679	1	0.13	0.7212 ²
PH	0.21753	1	0.44	0.5095 ²
PCO	0.64880	1	1.30	0.2547 ²
BIC	0.069044	1	0.14	0.7102 ²
CRE	0.14271	1	0.29	0.5932 ²

H0: $\beta_{\text{Term}} = 0$

The term does not contribute to the model.

H1: $\beta_{\text{Term}} \neq 0$

The term contributes to the model.

¹ Reject the null hypothesis in favour of the alternative hypothesis at the 5% significance level.

² Do not reject the null hypothesis at the 5% significance level.