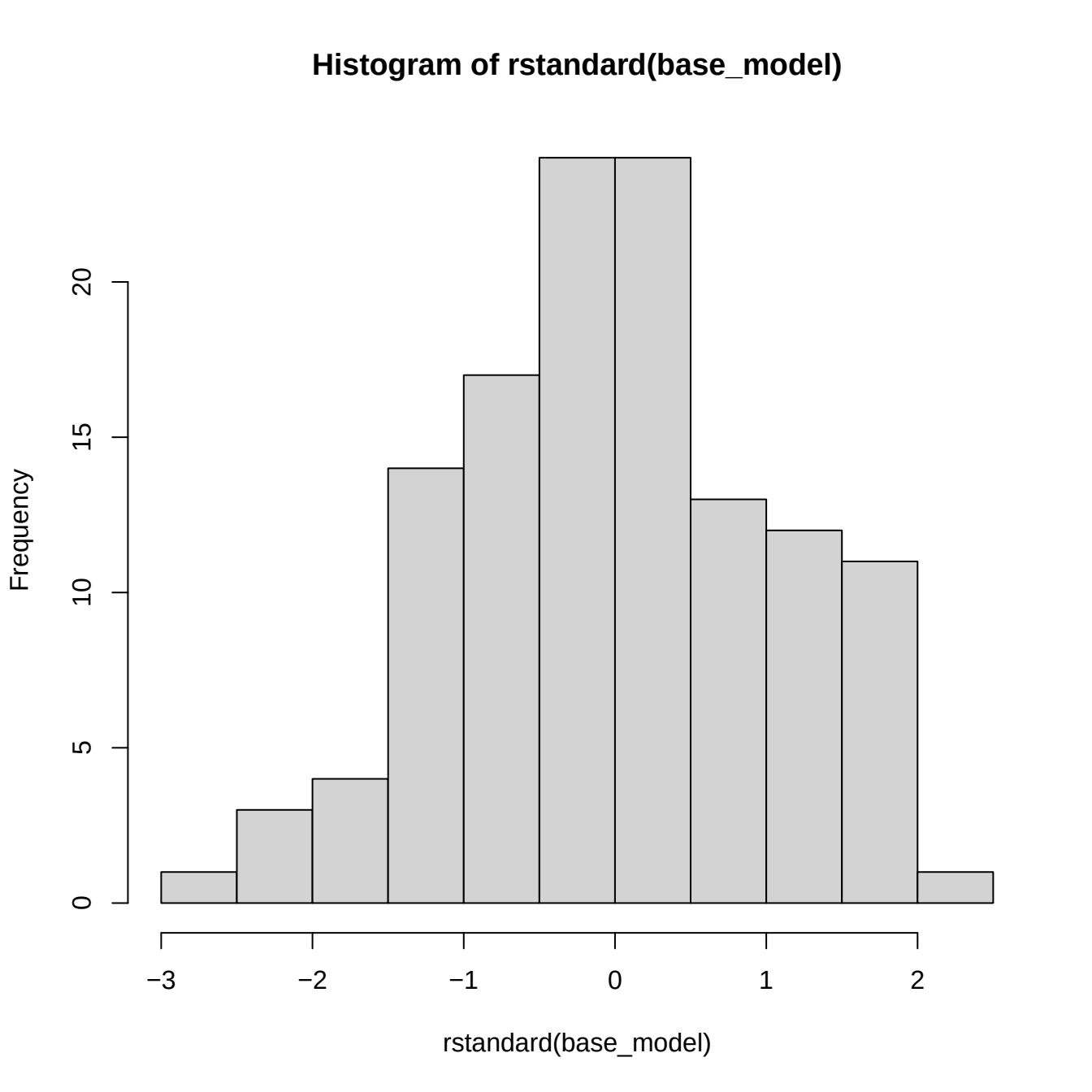
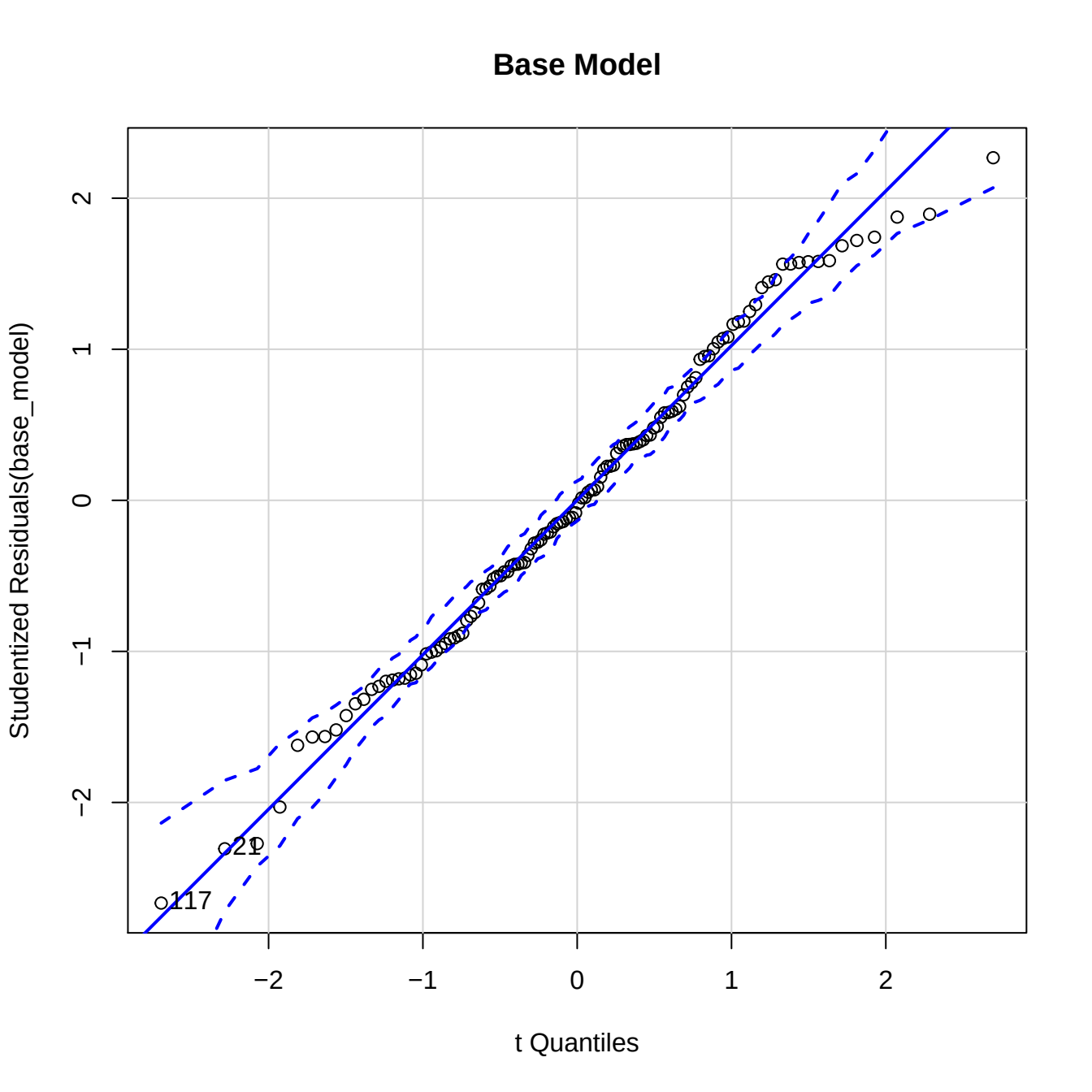
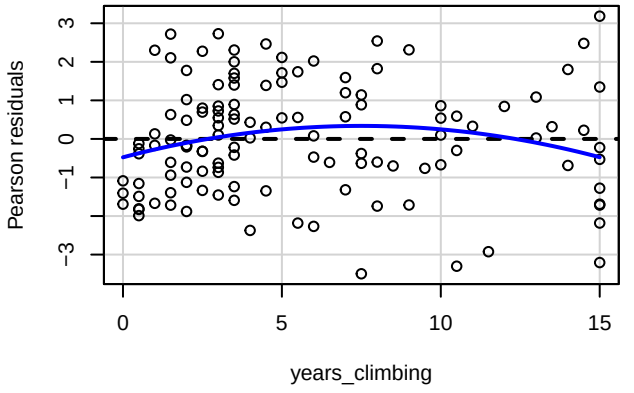
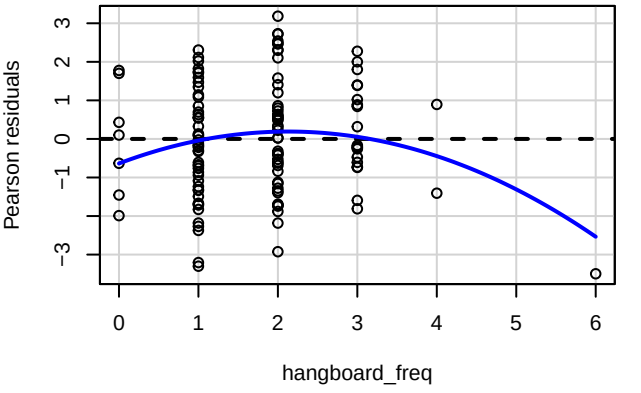
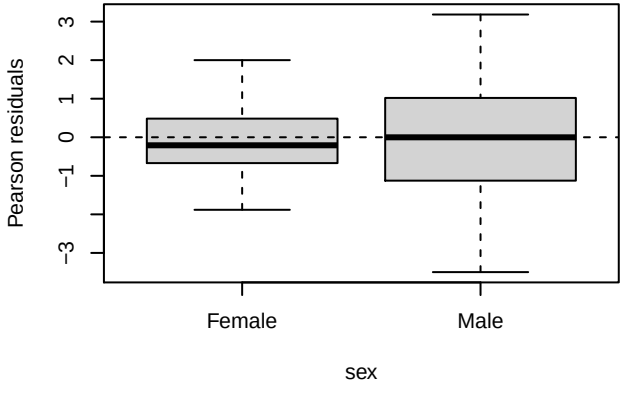

Histogram of rstandard(base_model)
Frequency
0
5
10
15
20
−3
−2
−1
0
1
2
rstandard(base_model)

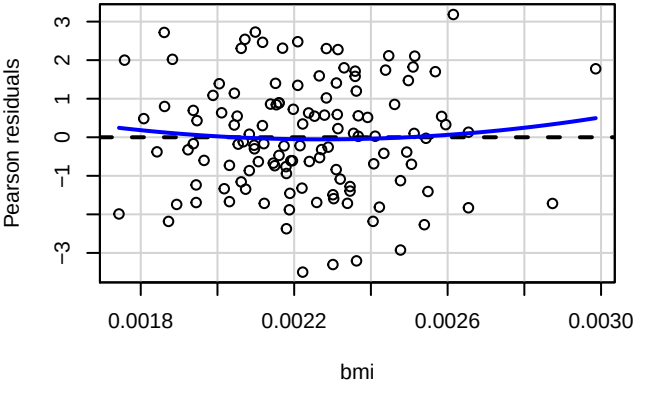

Base Model
Studentized Residuals(base_model)
t Quantiles
−2
−1
0
1
2
117
21

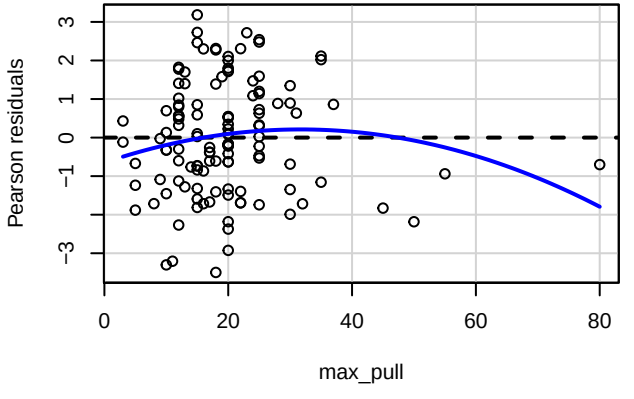
Base Model

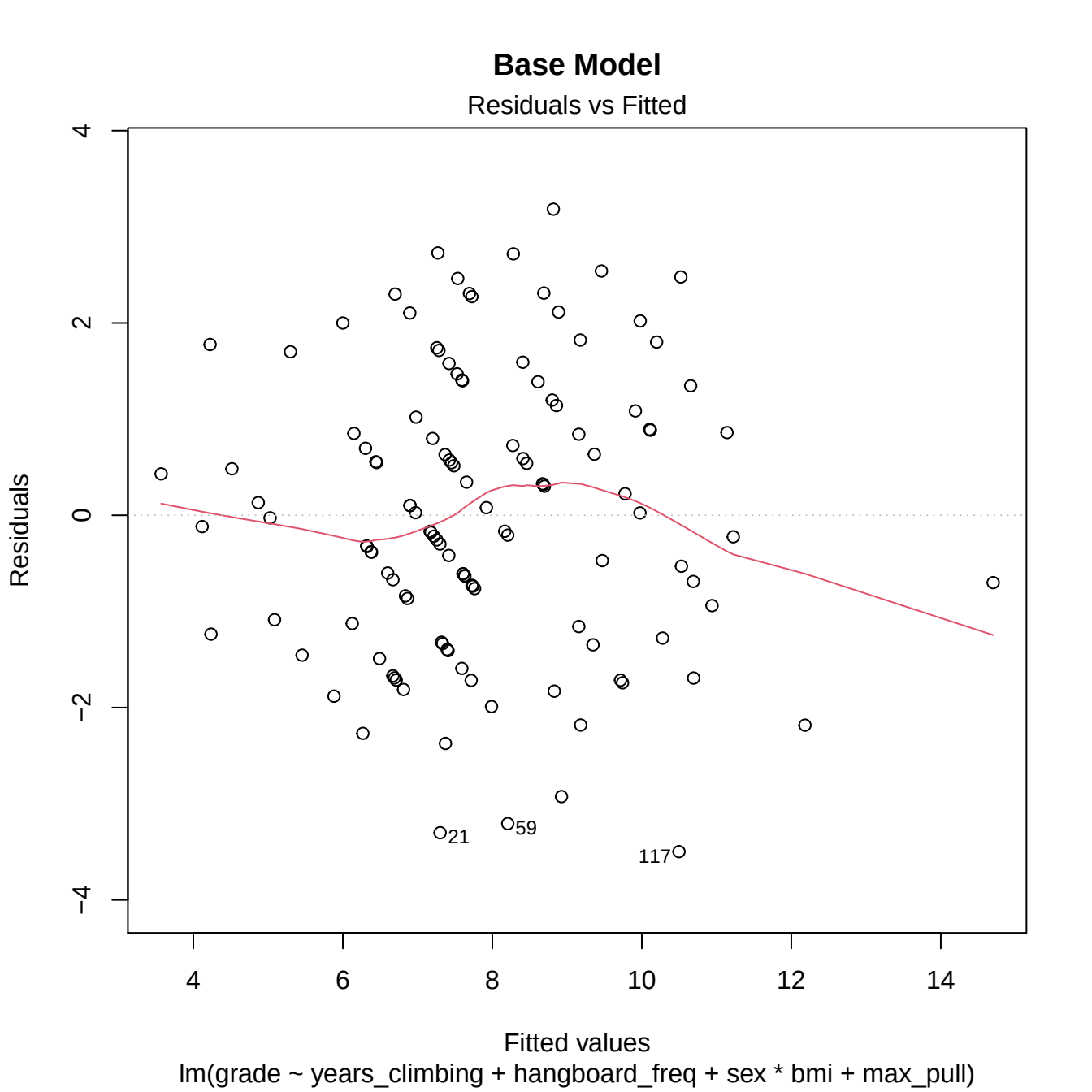

Pearson residuals
years_climbing

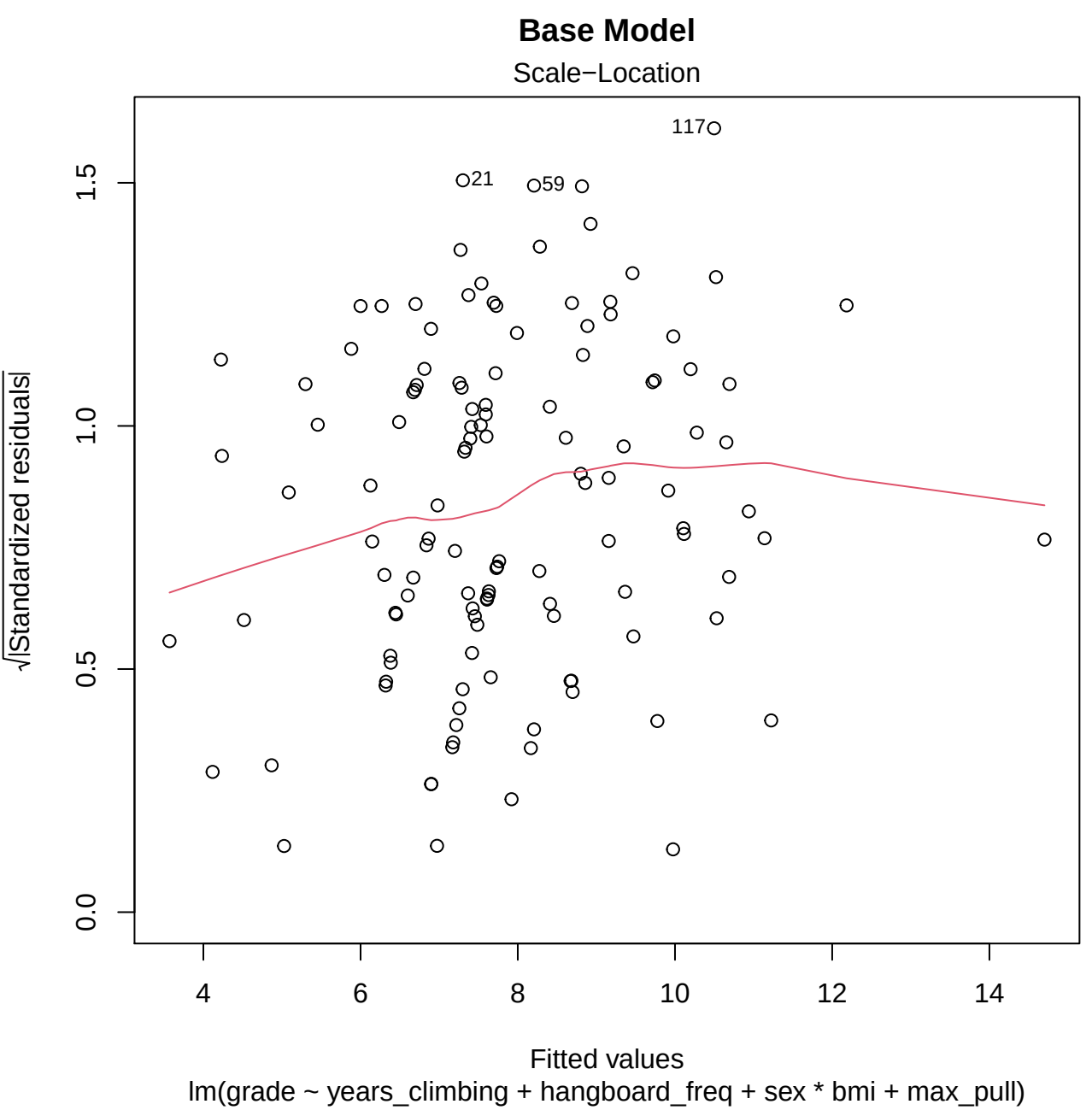

Pearson residuals
hangboard_freq

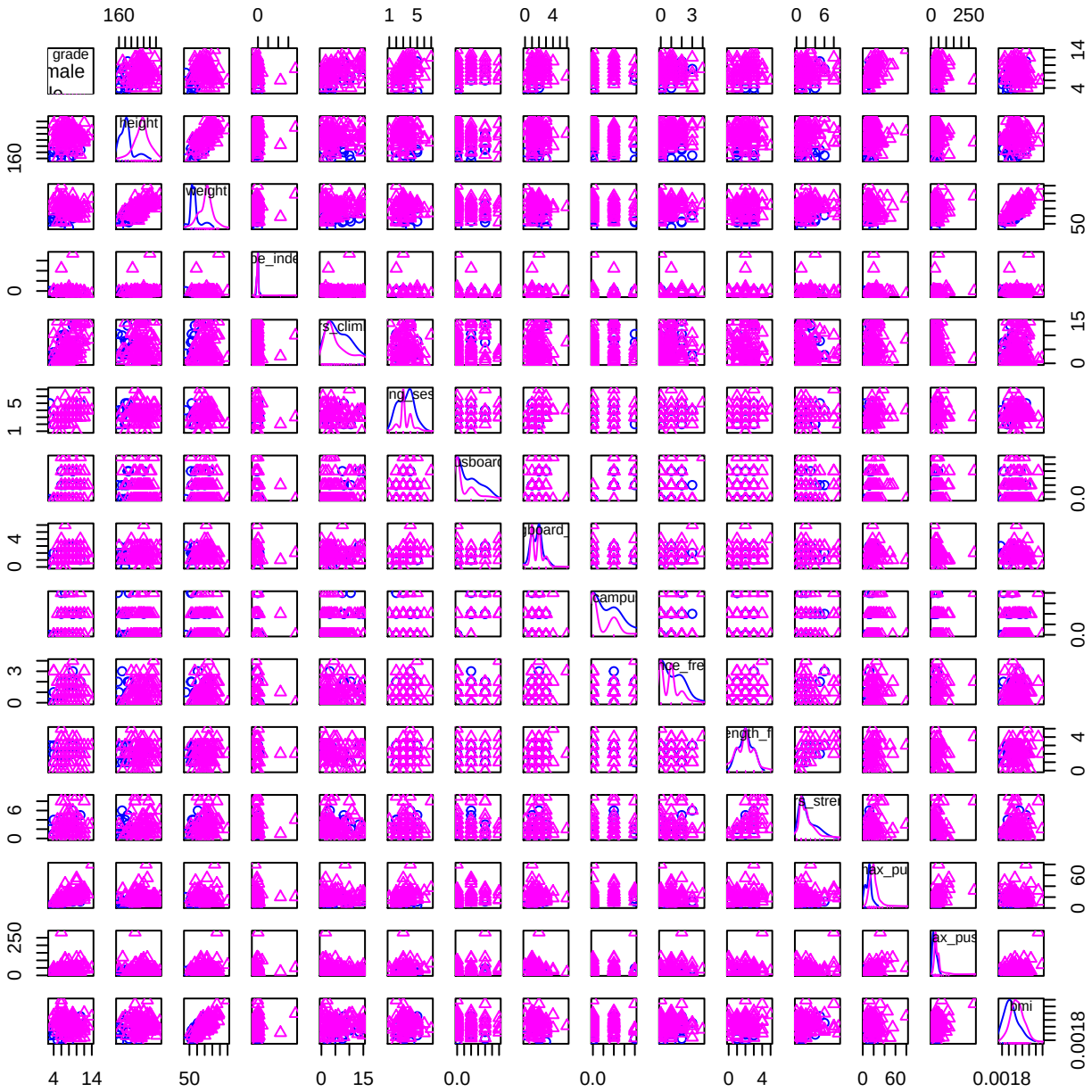

Pearson residuals
Female
Male
sex


Pearson residuals
bmi

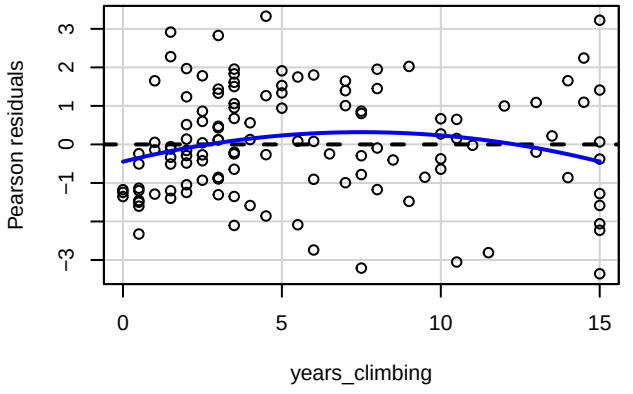

Pearson residuals
max_pull

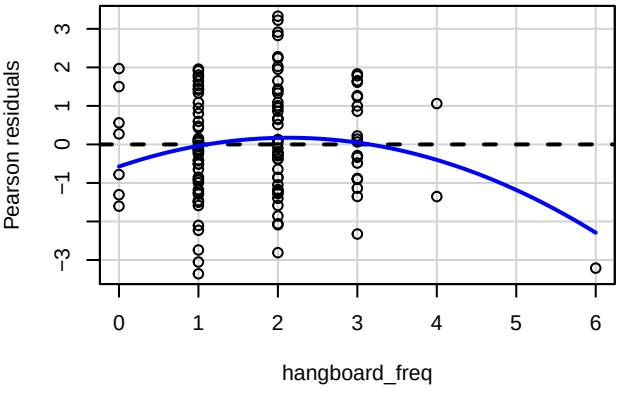

Base Model
Residuals vs Fitted
Residuals
Fitted values
lm(grade ~ years_climbing + hangboard_freq + sex * bmi + max_pull)
21
59
117
4
2
0
−2
−4
4
6
8
10
12
14

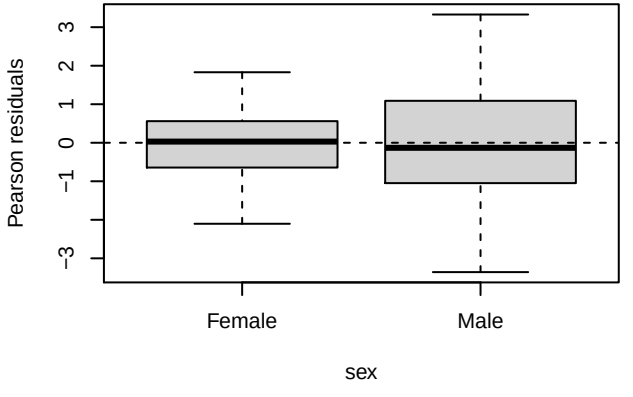

Base Model
Scale−Location
117
21
59
1.5
1.0
0.5
0.0
√|Standardized residuals|
4
6
8
10
12
14
Fitted values
lm(grade ~ years_climbing + hangboard_freq + sex * bmi + max_pull)

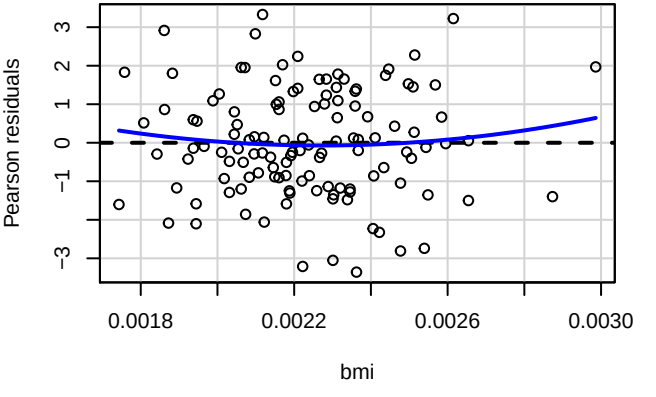

grade
nale
eight
eight
be_inde
s_clim
ng_ses
sboard
board_
campu
hoe_fre
ength_f
s_stree
ax_pu
ax_pus
bmi

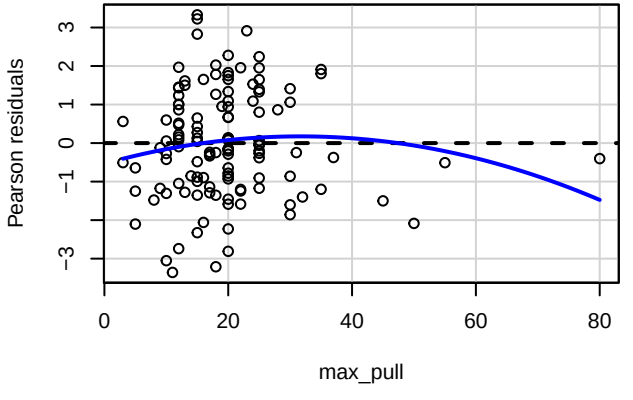
Base Model Plus Climbing Sessions

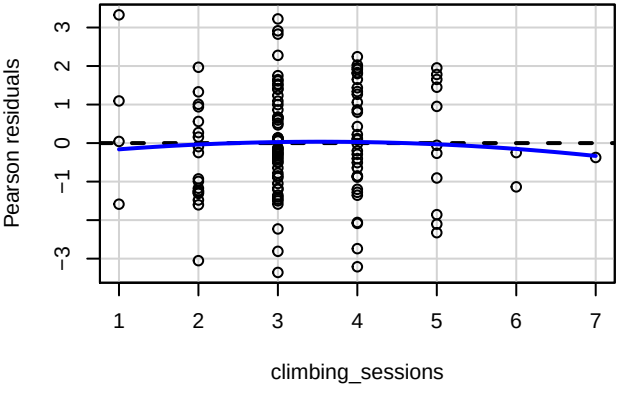


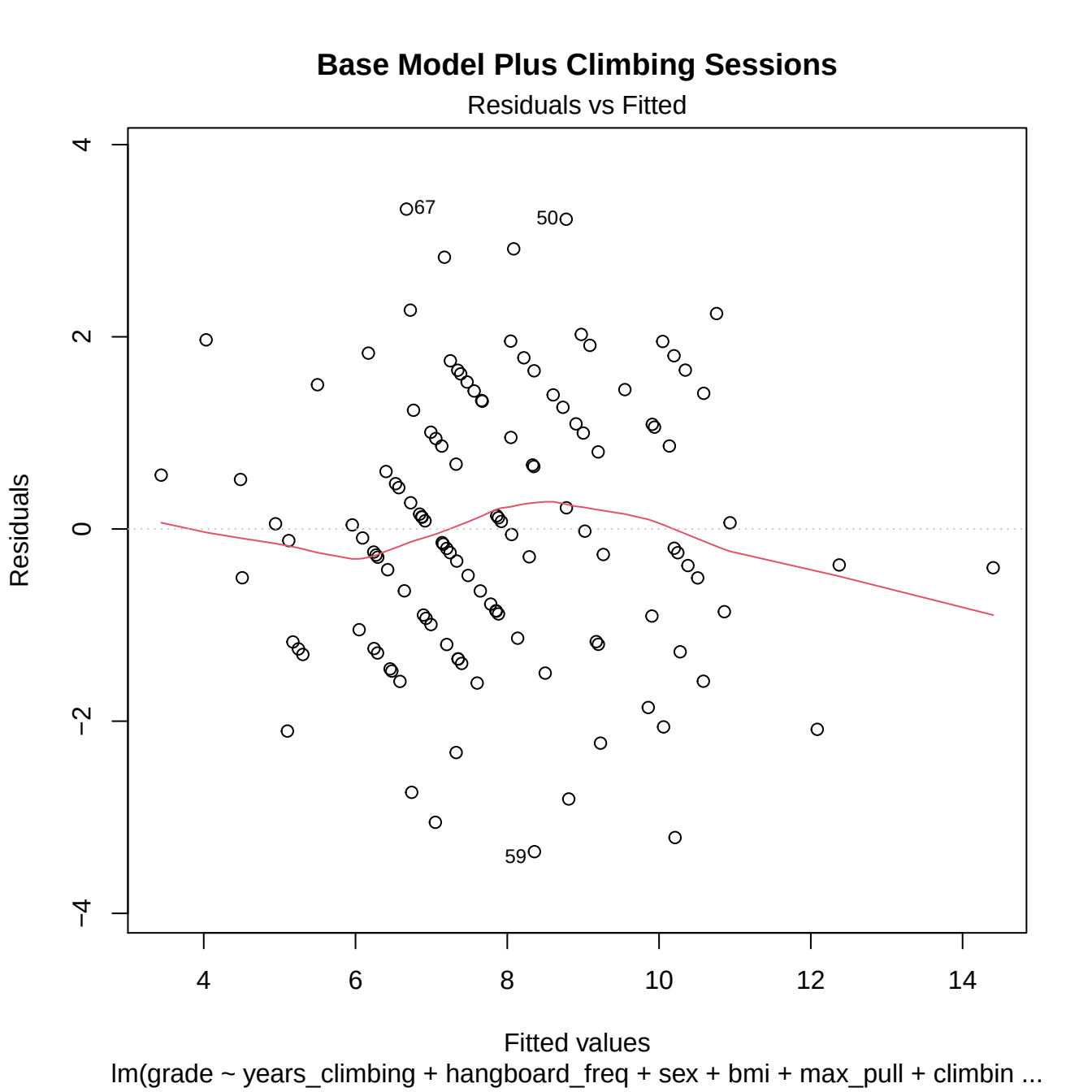


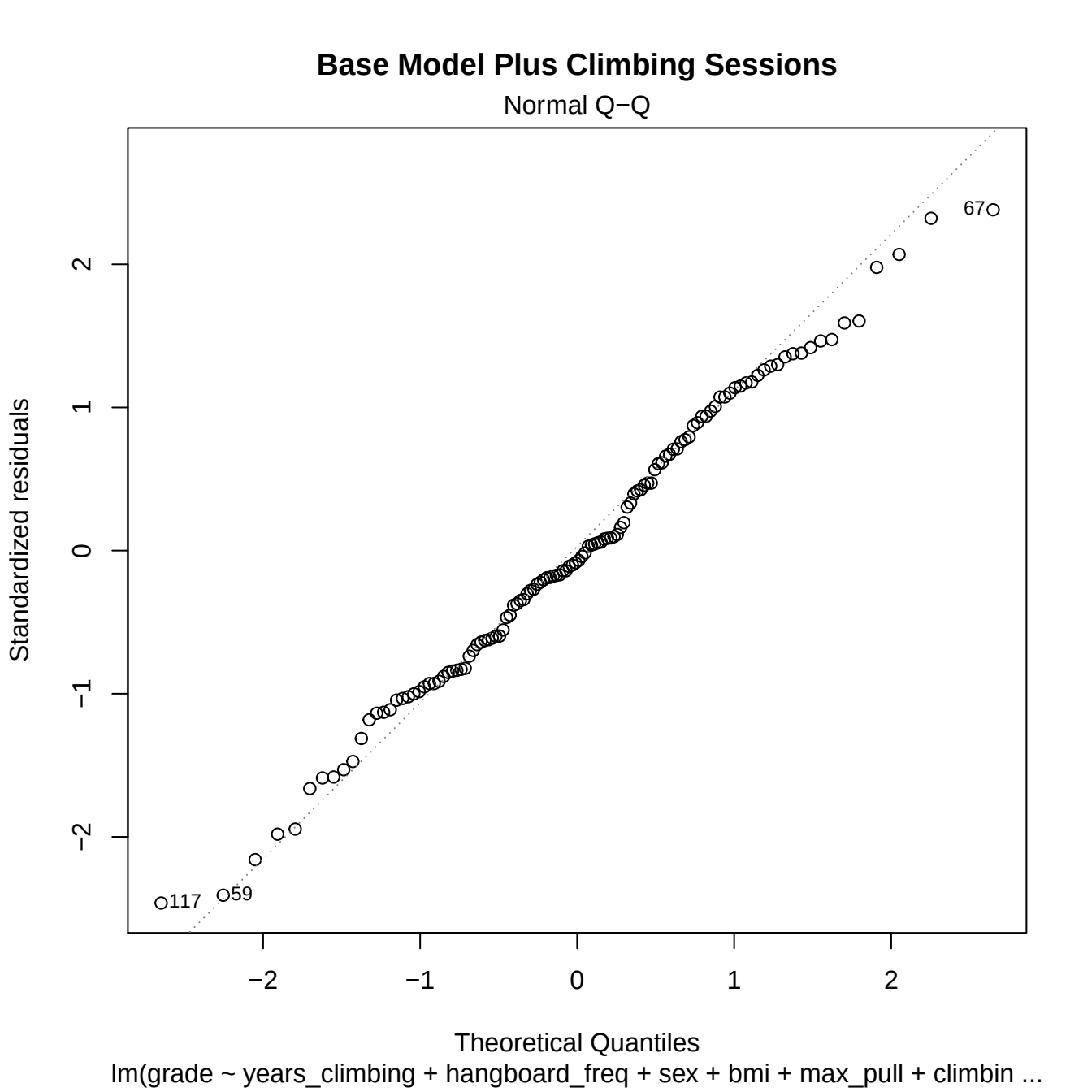


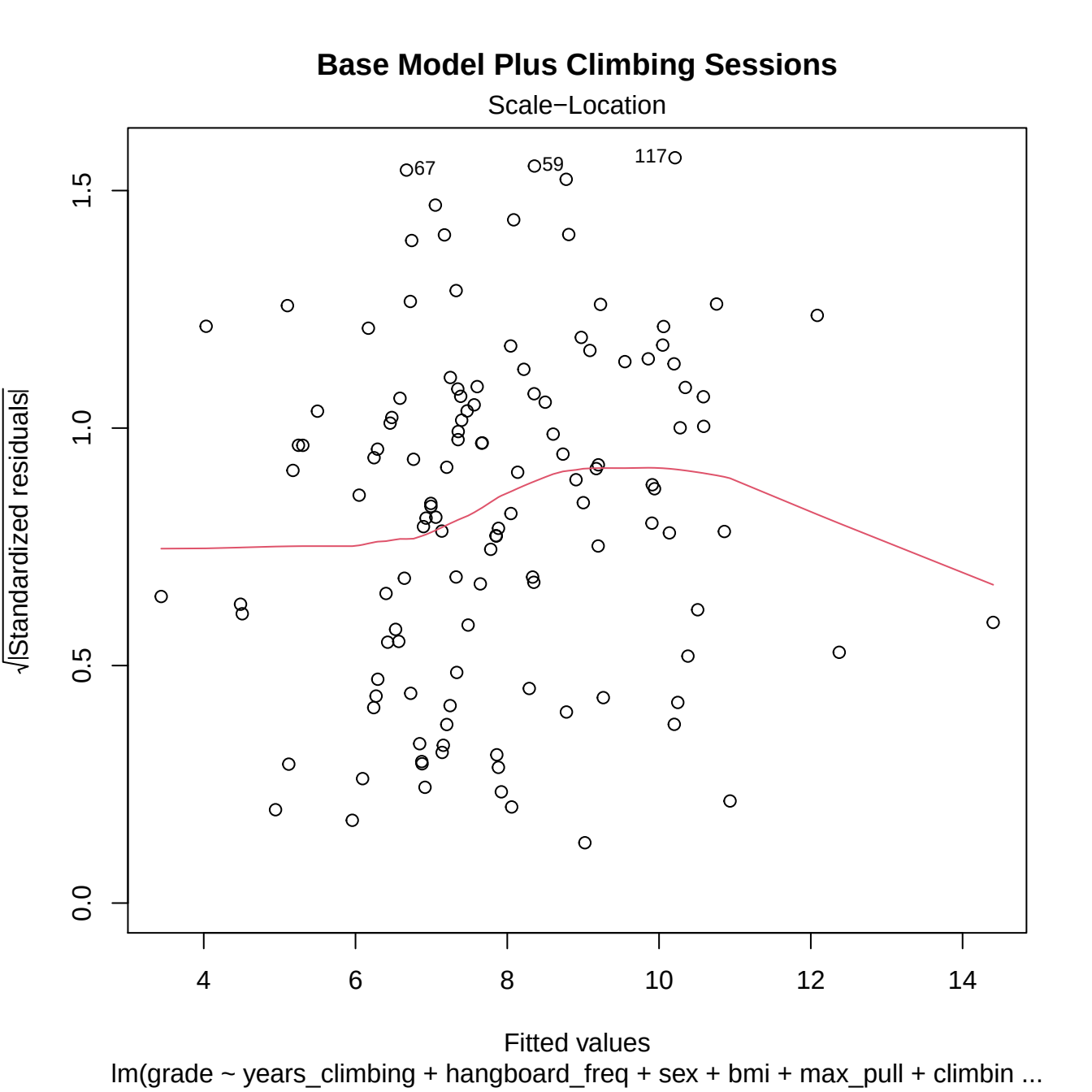


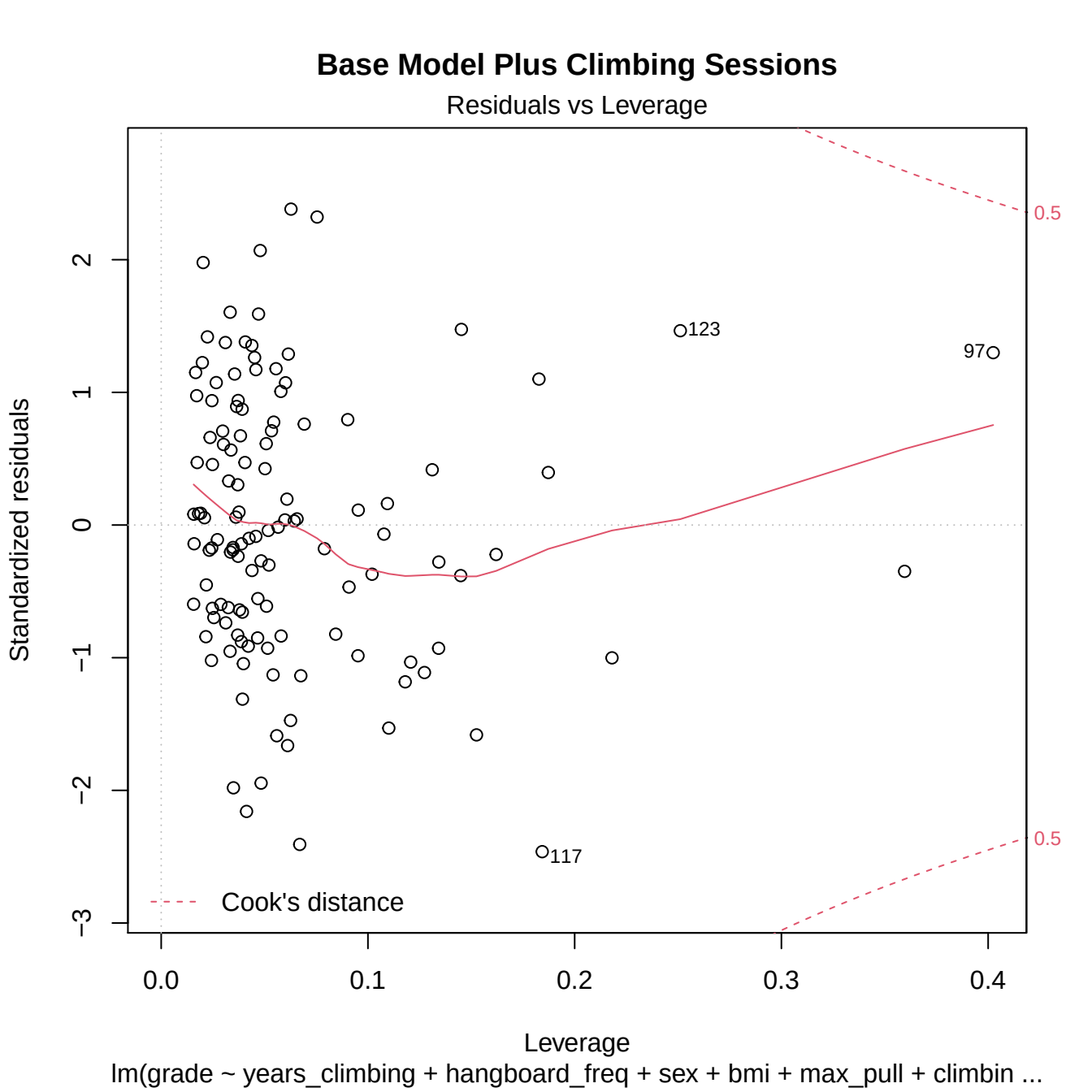


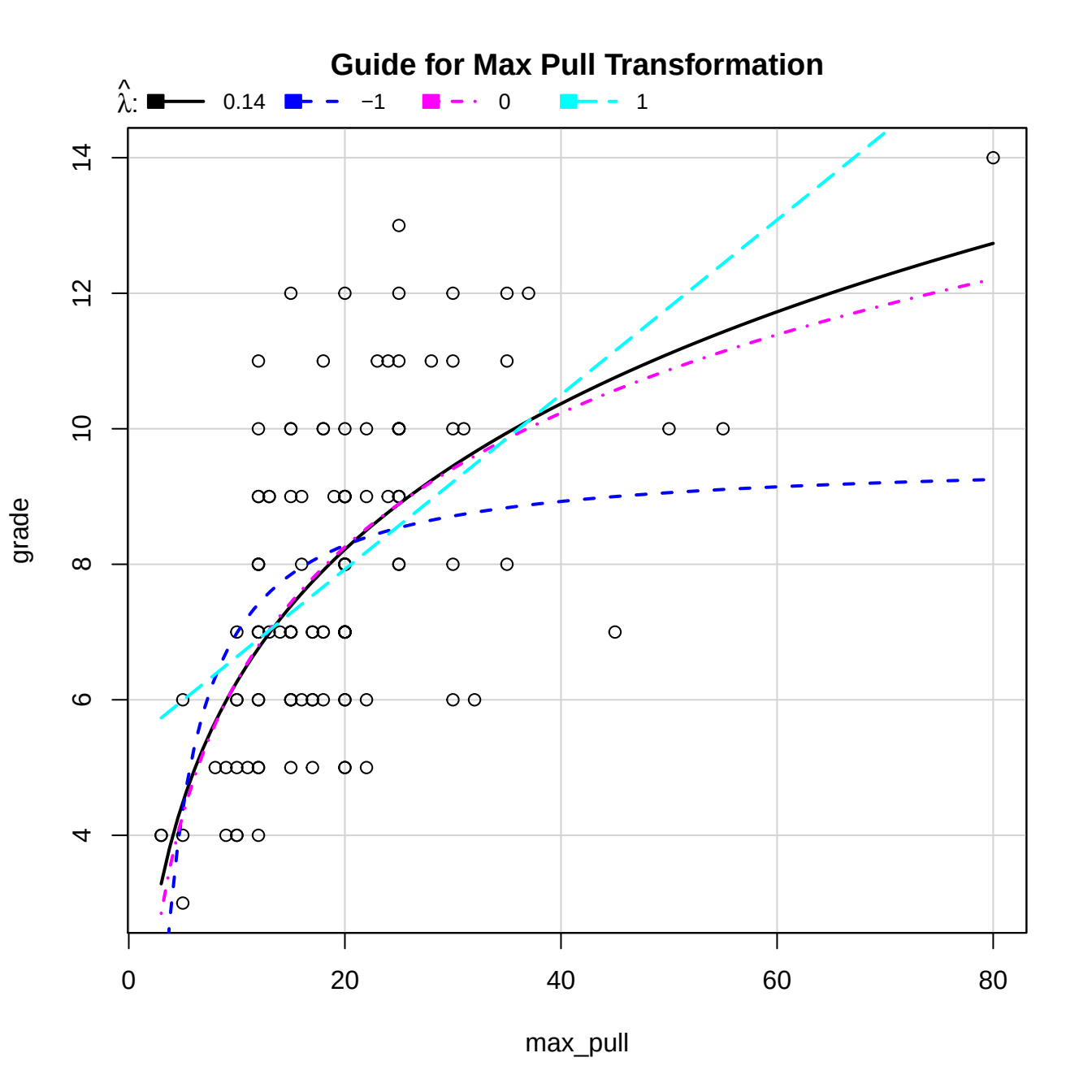


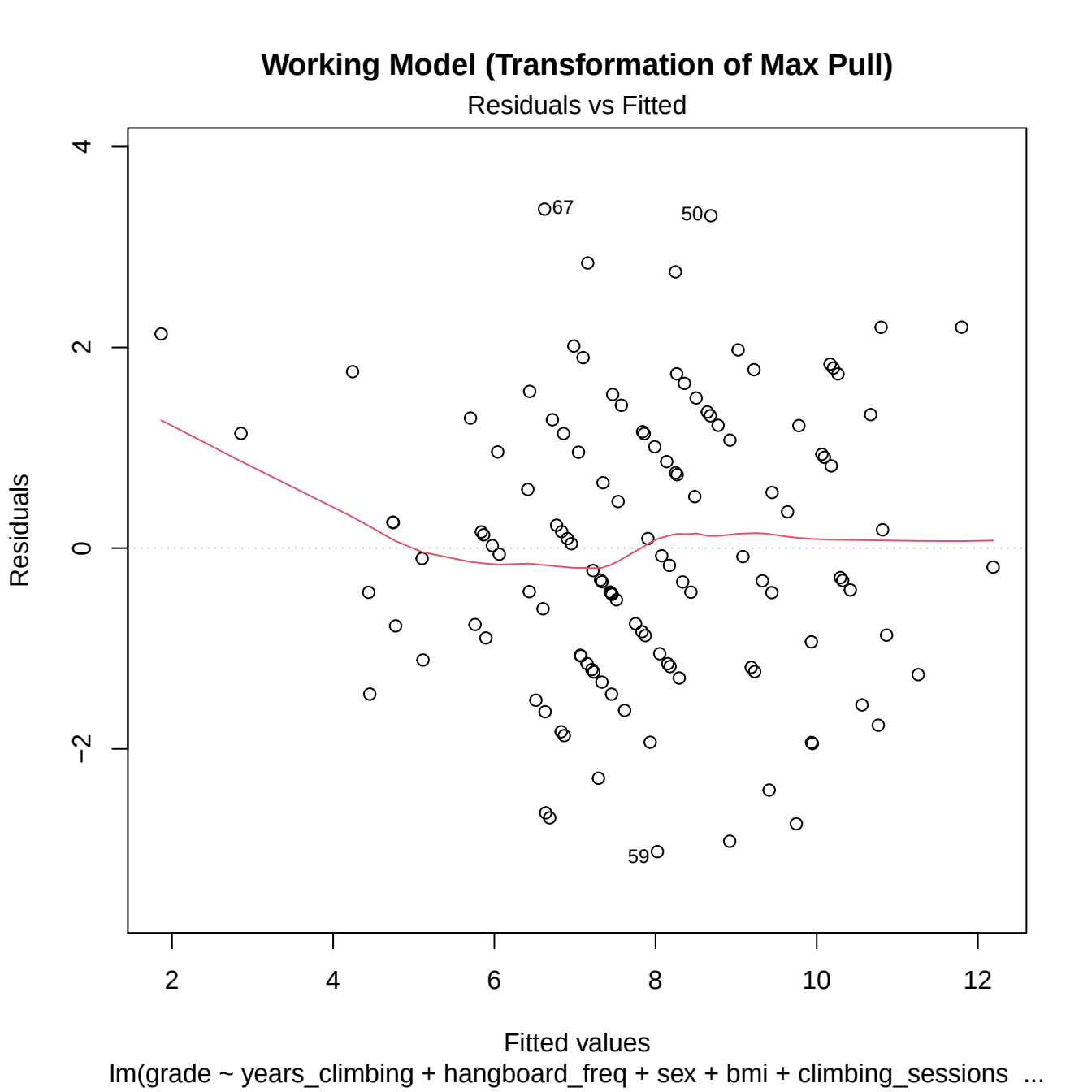

Base Model Plus Climbing Sessions
Residuals vs Fitted
Residuals
Fitted values
lm(grade ~ years_climbing + hangboard_freq + sex + bmi + max_pull + climbin ...
67
50
59
4
2
0
−2
−4
4
6
8
10
12
14

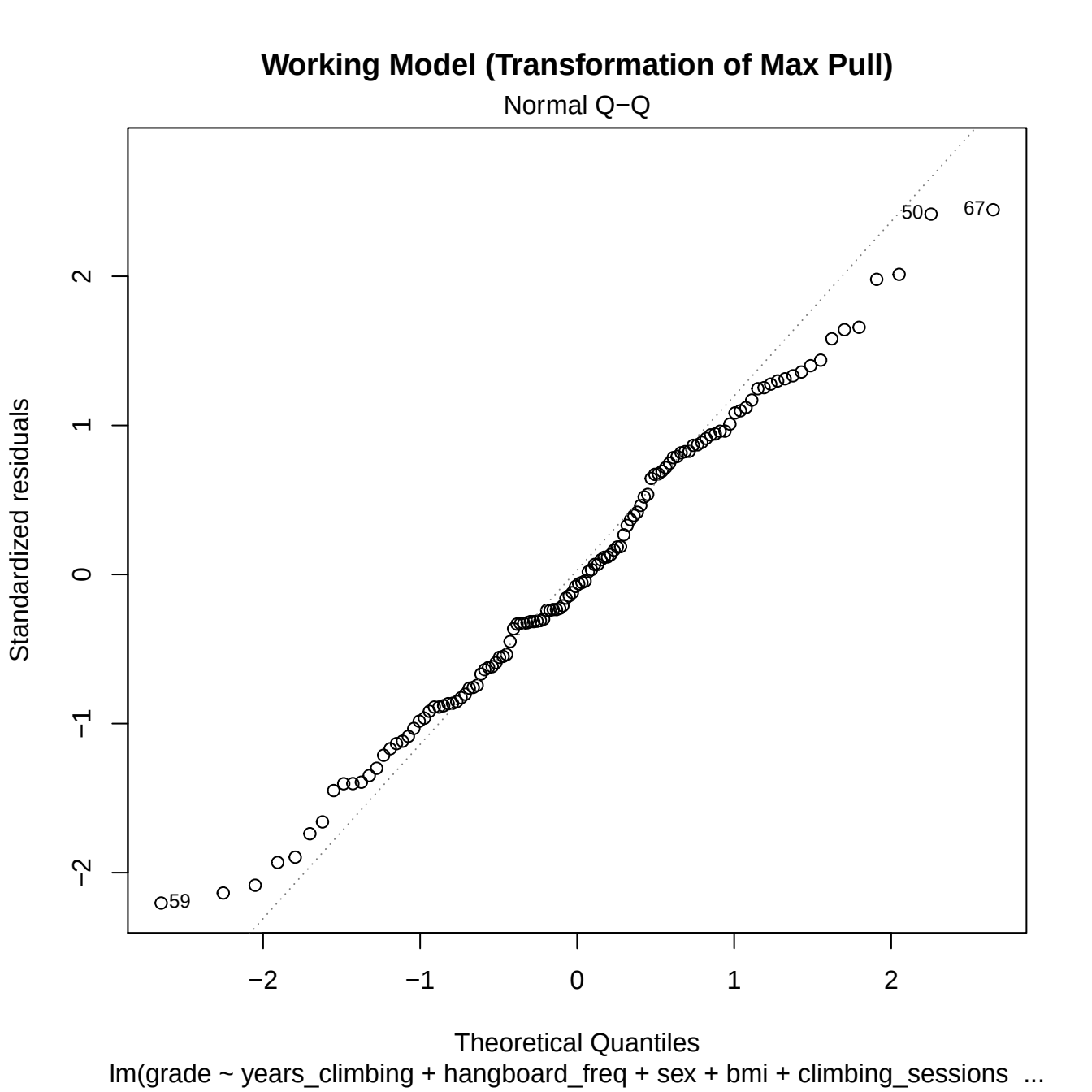

Base Model Plus Climbing Sessions
Normal Q−Q
Standardized residuals
Theoretical Quantiles
lm(grade ~ years_climbing + hangboard_freq + sex + bmi + max_pull + climbin ...
67
117
59
−2
−1
0
1
2

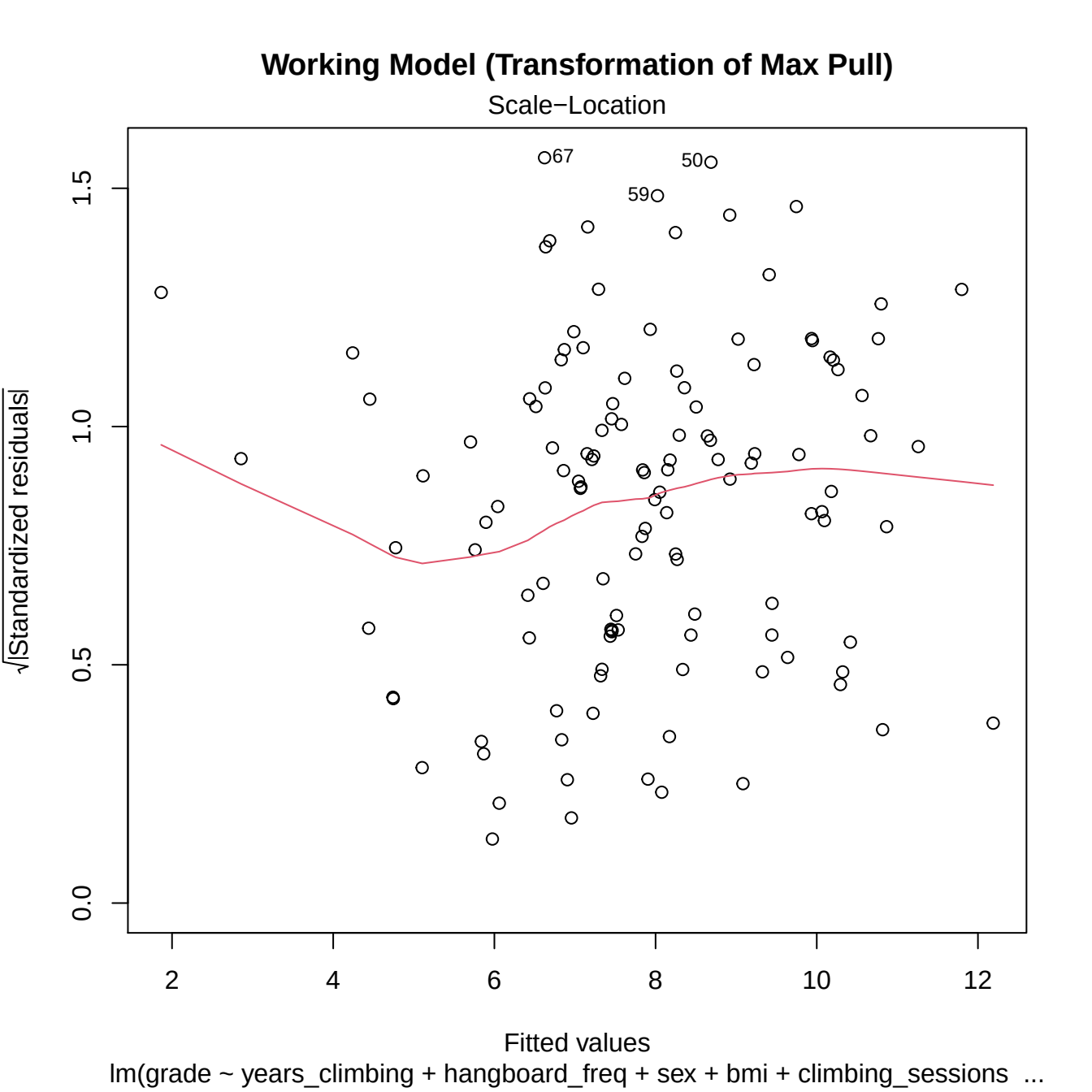

Base Model Plus Climbing Sessions
Scale−Location
67
59
117
√|Standardized residuals|
0.0
0.5
1.0
1.5
4
6
8
10
12
14
Fitted values
lm(grade ~ years_climbing + hangboard_freq + sex + bmi + max_pull + climbin ...

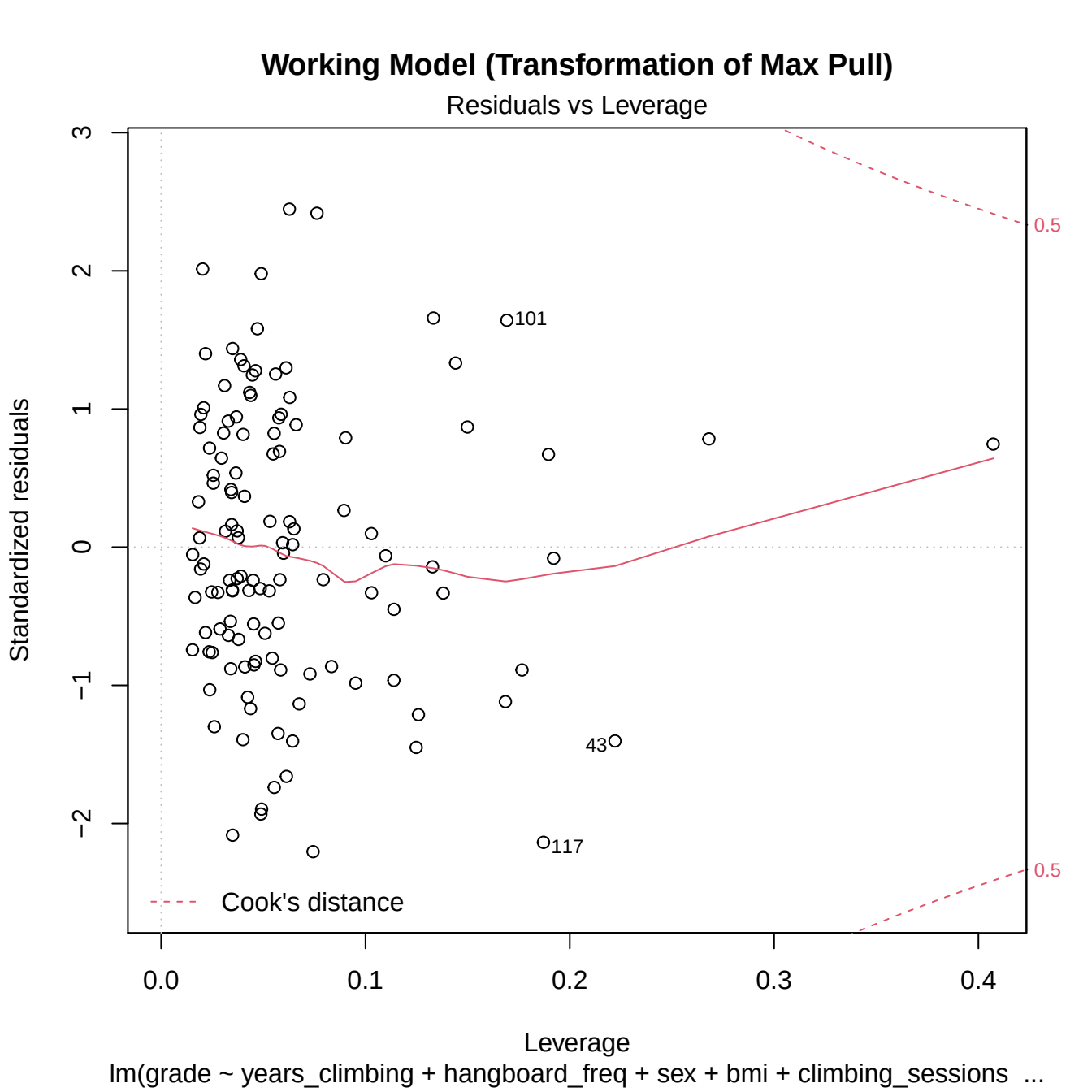

Base Model Plus Climbing Sessions
Residuals vs Leverage
Standardized residuals
Leverage
lm(grade ~ years_climbing + hangboard_freq + sex + bmi + max_pull + climbin ...
Cook's distance
0.5
0.5
123
97
117
2
1
0
−1
−2
−3
0.0
0.1
0.2
0.3
0.4


Guide for Max Pull Transformation
λ̂:
0.14
−1
0
1
grade
max_pull
4
6
8
10
12
14
0
20
40
60
80

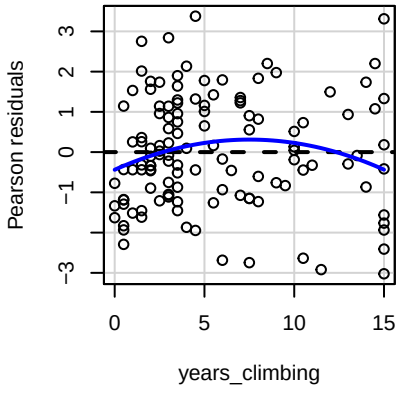

Working Model (Transformation of Max Pull)
Residuals vs Fitted
Residuals
Fitted values
lm(grade ~ years_climbing + hangboard_freq + sex + bmi + climbing_sessions ...
67
50
59
4
2
0
−2
2
4
6
8
10
12

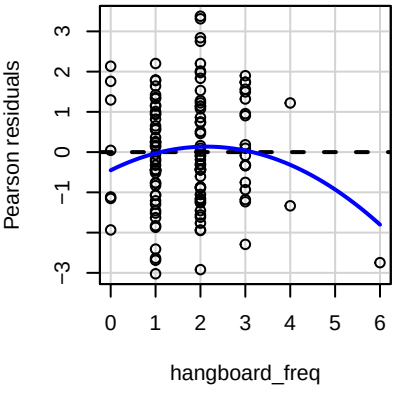

Working Model (Transformation of Max Pull)
Normal Q−Q
Standardized residuals
Theoretical Quantiles
lm(grade ~ years_climbing + hangboard_freq + sex + bmi + climbing_sessions ...
50
67
59
−2
−1
0
1
2

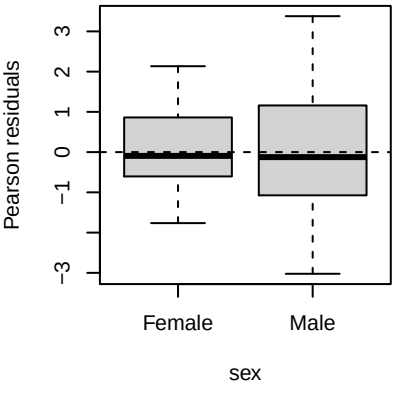

Working Model (Transformation of Max Pull)
Scale−Location
67
50
59
√|Standardized residuals|
0.0
0.5
1.0
1.5
2
4
6
8
10
12
Fitted values
lm(grade ~ years_climbing + hangboard_freq + sex + bmi + climbing_sessions ...

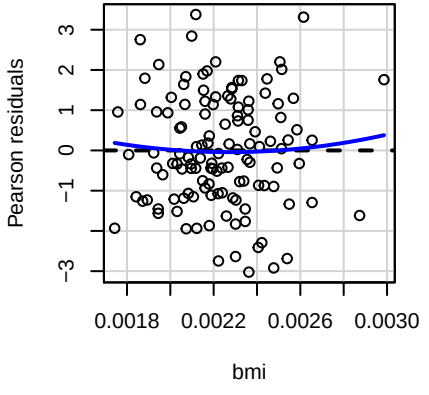

Working Model (Transformation of Max Pull)
Residuals vs Leverage
Standardized residuals
Leverage
lm(grade ~ years_climbing + hangboard_freq + sex + bmi + climbing_sessions ...
Cook's distance
0.5
0.5
101
43
117
3
2
1
0
−1
−2
0.0
0.1
0.2
0.3
0.4

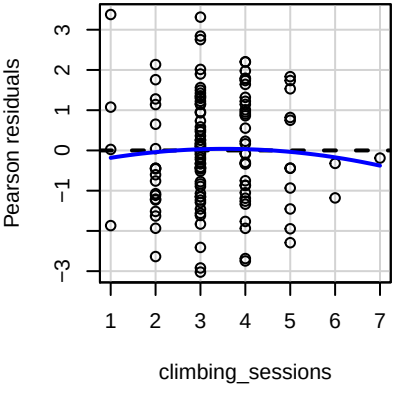
Working Model (Transformation of Max Pull)

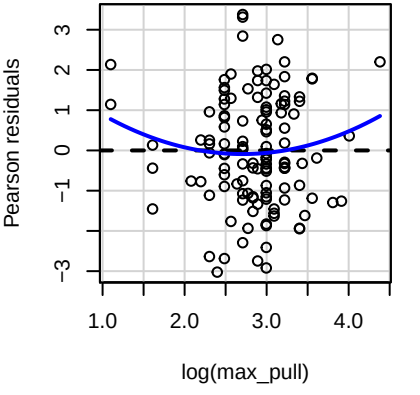


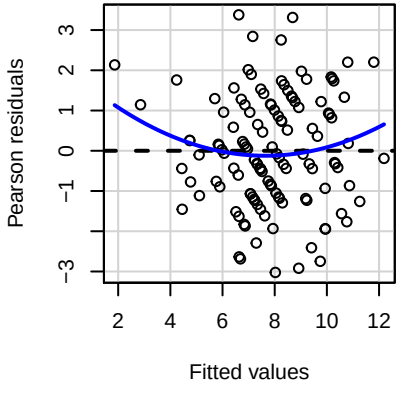


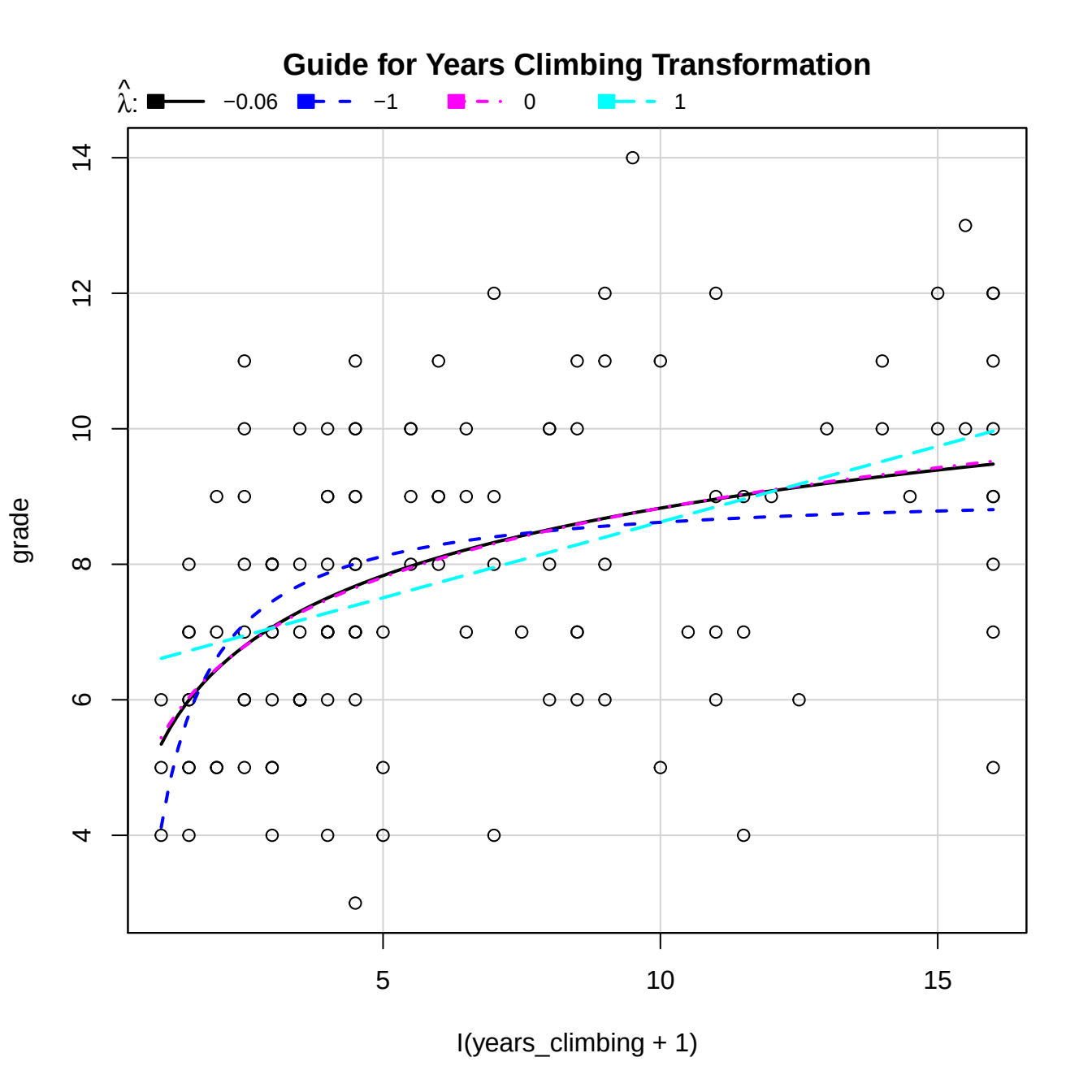




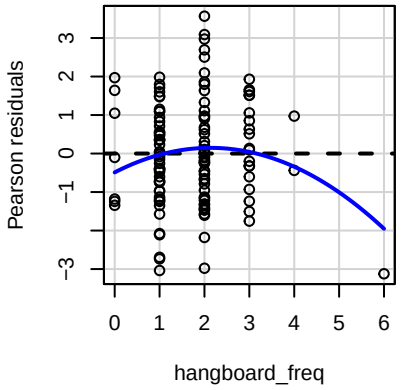


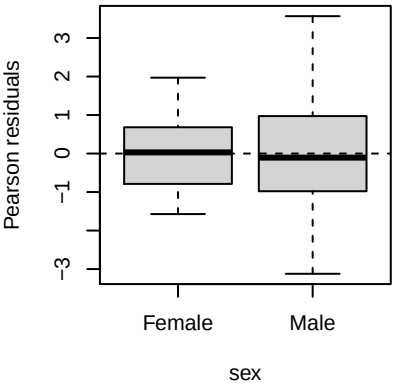


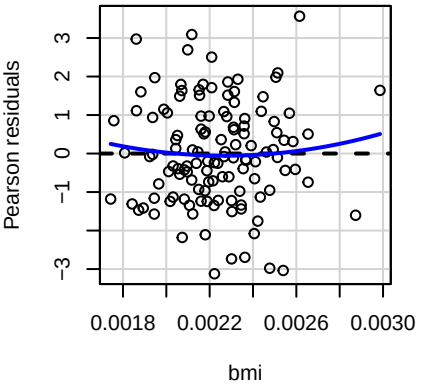


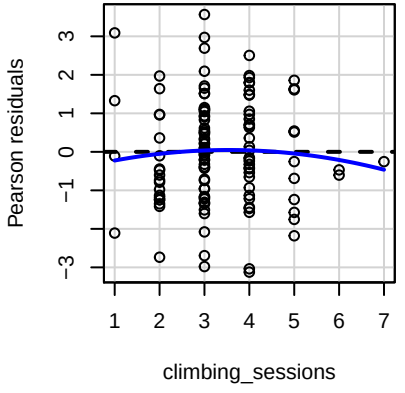

Guide for Years Climbing Transformation
λ̂:
−0.06
−1
0
1
grade
4
6
8
10
12
14
5
10
15
I(years_climbing + 1)

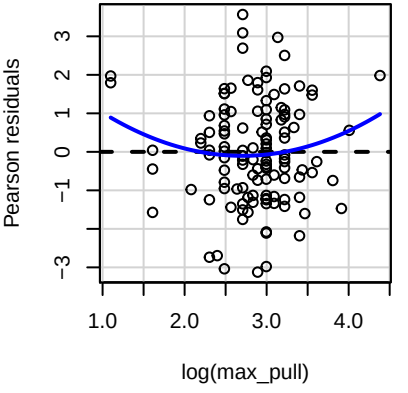
Working Model (Transformation of Years Climbing)

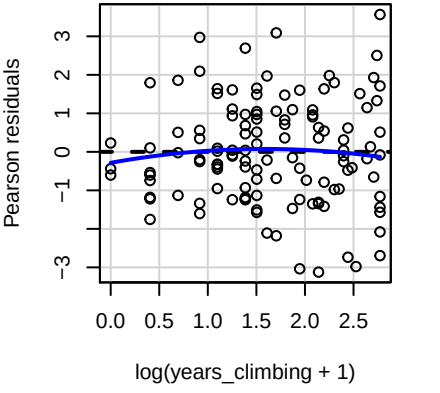


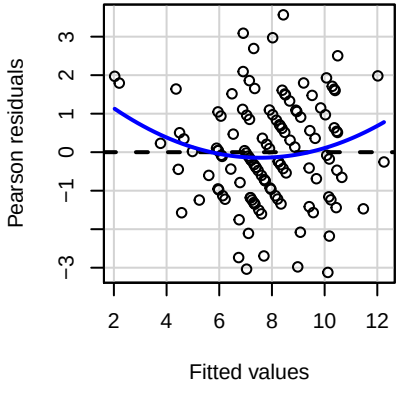


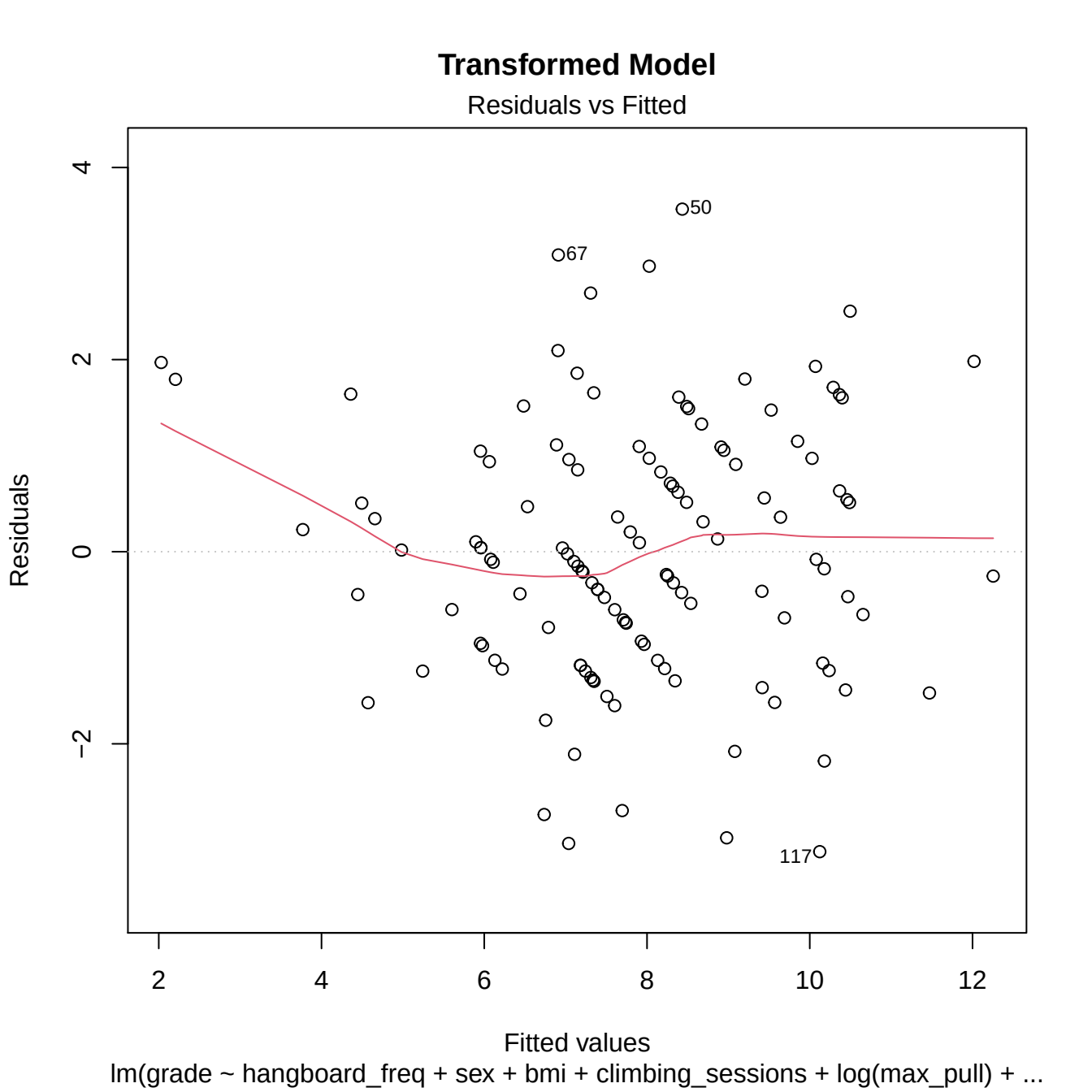


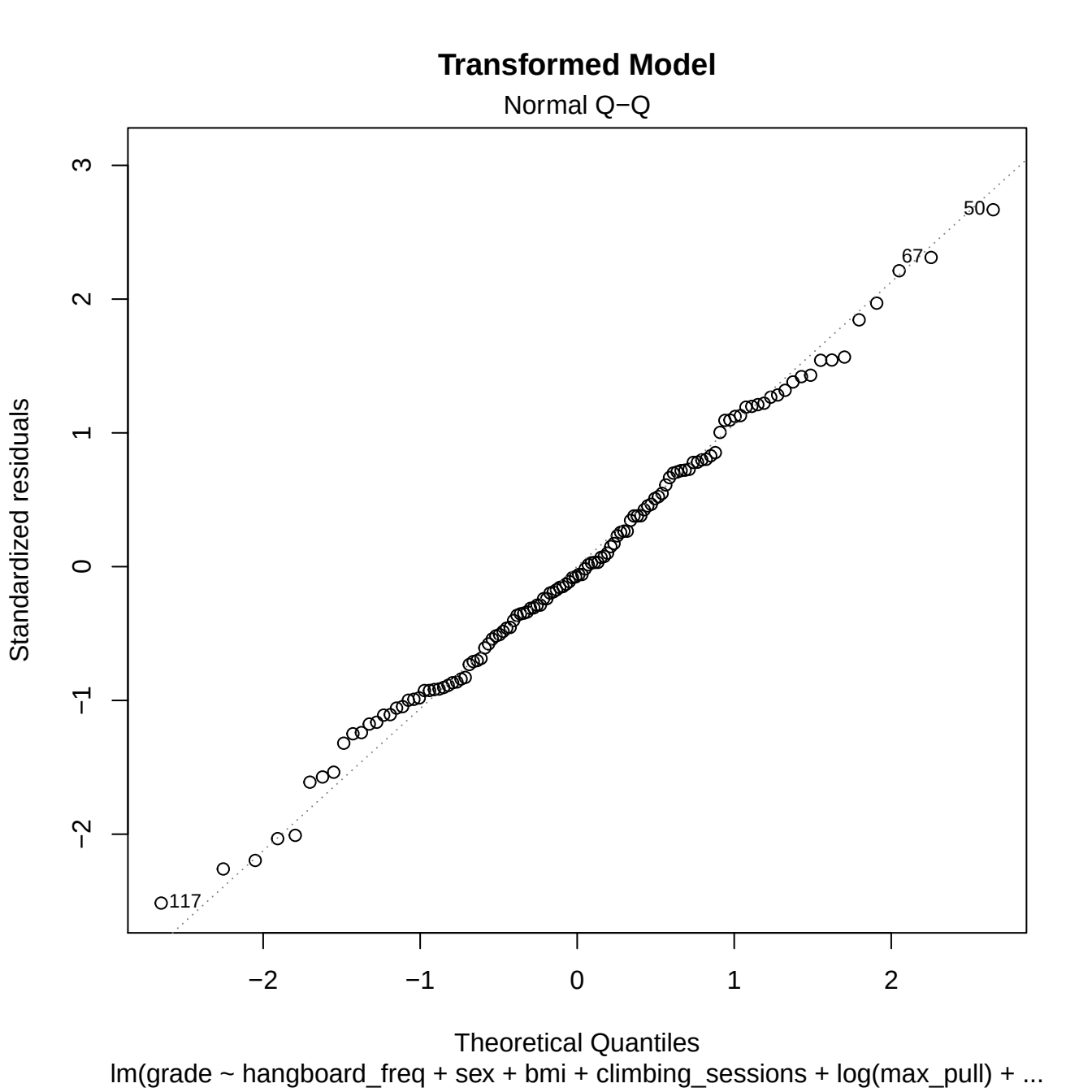






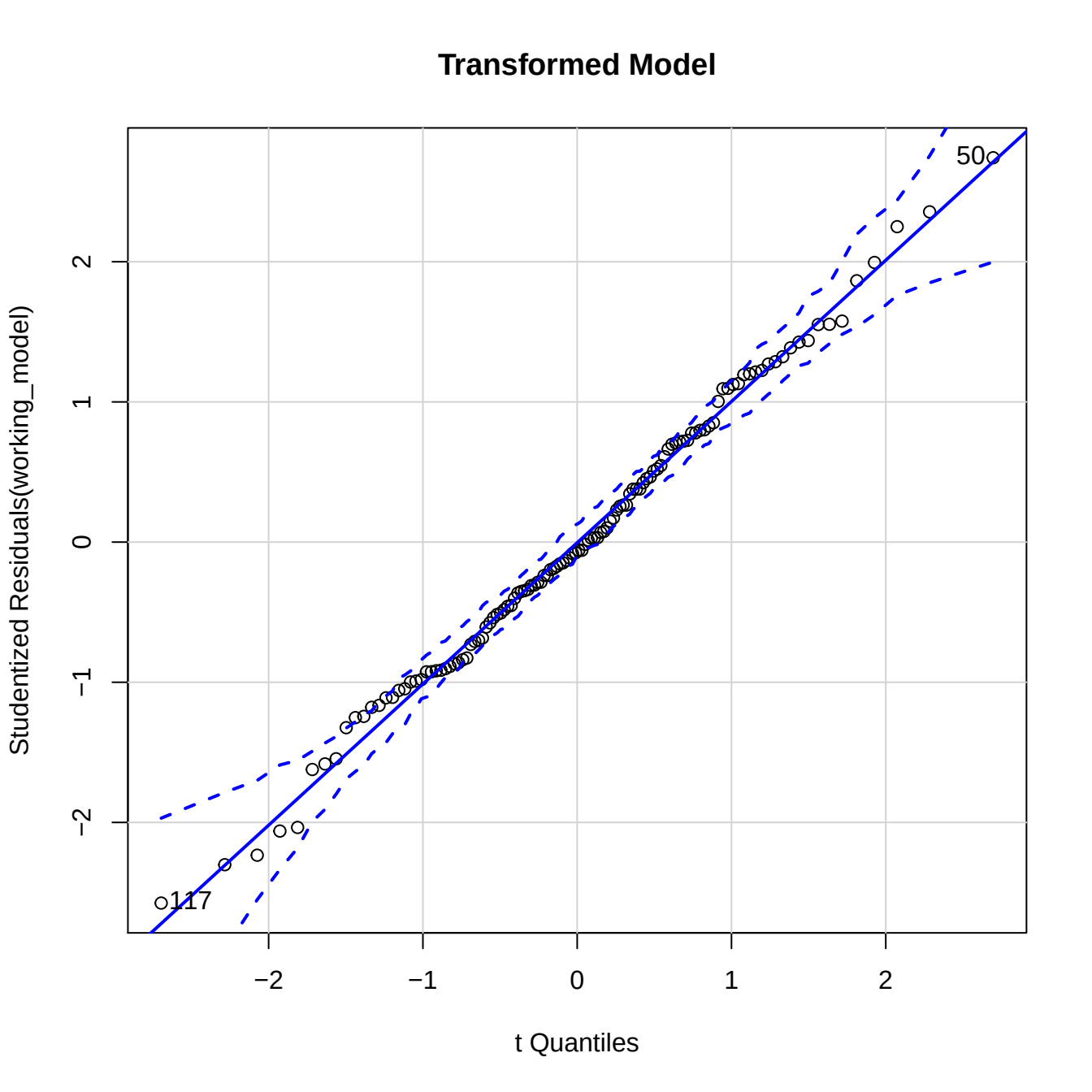



Transformed Model
Residuals vs Fitted
Residuals
Fitted values
lm(grade ~ hangboard_freq + sex + bmi + climbing_sessions + log(max_pull) + ...
50
67
117
4
2
0
−2
2
4
6
8
10
12


Transformed Model
Normal Q−Q
Standardized residuals
Theoretical Quantiles
lm(grade ~ hangboard_freq + sex + bmi + climbing_sessions + log(max_pull) + ...
117
67
50
3
2
1
0
−1
−2
−2
−1
0
1
2

Transformed Model
Scale−Location
50
117
67
1.5
1.0
0.5
0.0
√|Standardized residuals|
2
4
6
8
10
12
Fitted values
lm(grade ~ hangboard_freq + sex + bmi + climbing_sessions + log(max_pull) + ...

Transformed Model
Residuals vs Leverage
Standardized residuals
Leverage
lm(grade ~ hangboard_freq + sex + bmi + climbing_sessions + log(max_pull) + ...
Cook's distance
50
101
117
1
0.5
0.5
3
2
1
0
−1
−2
−3
0.0
0.1
0.2
0.3
0.4


Transformed Model
Studentized Residuals(working_model)
t Quantiles
50
117
−2
−1
0
1
2