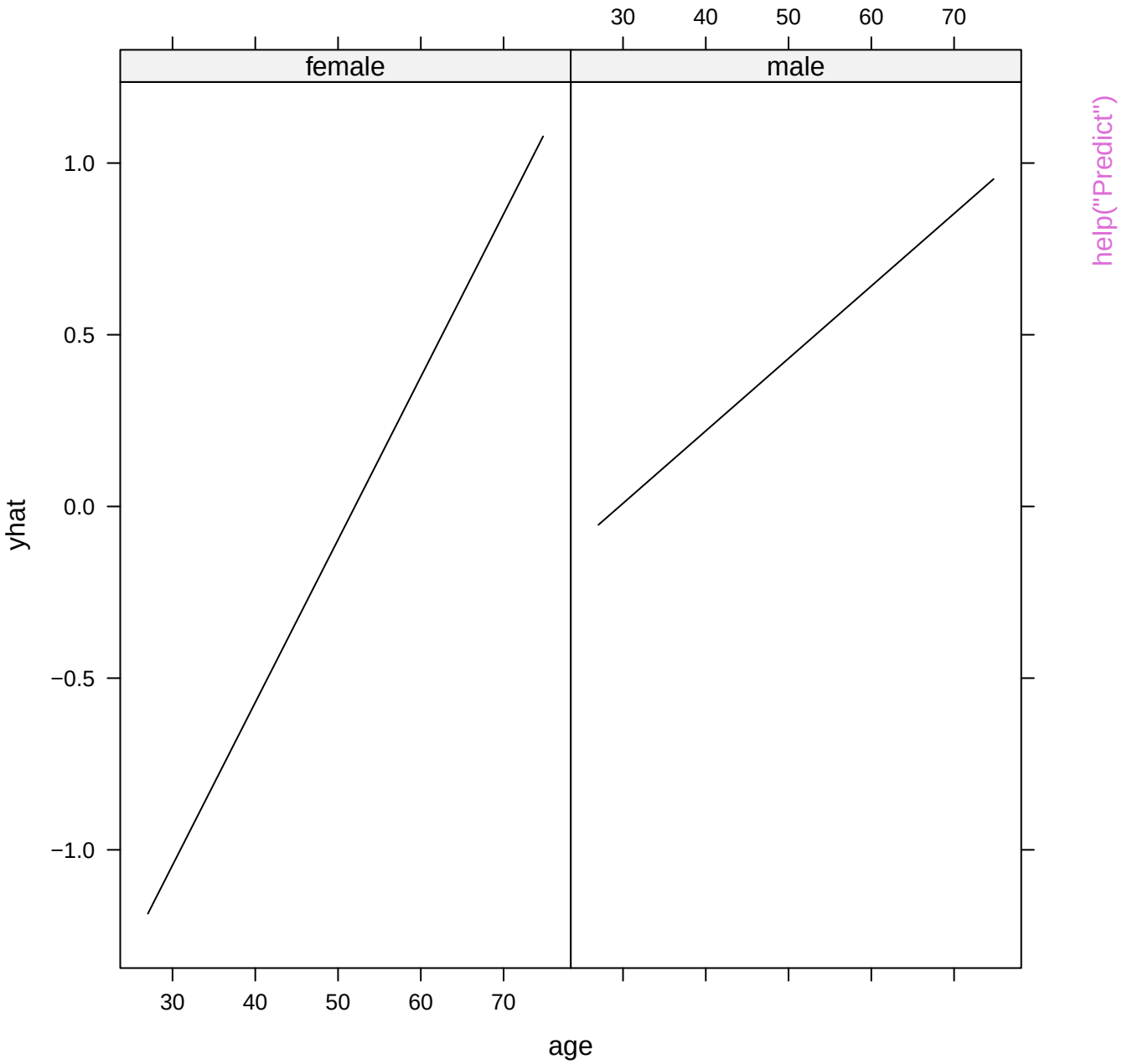
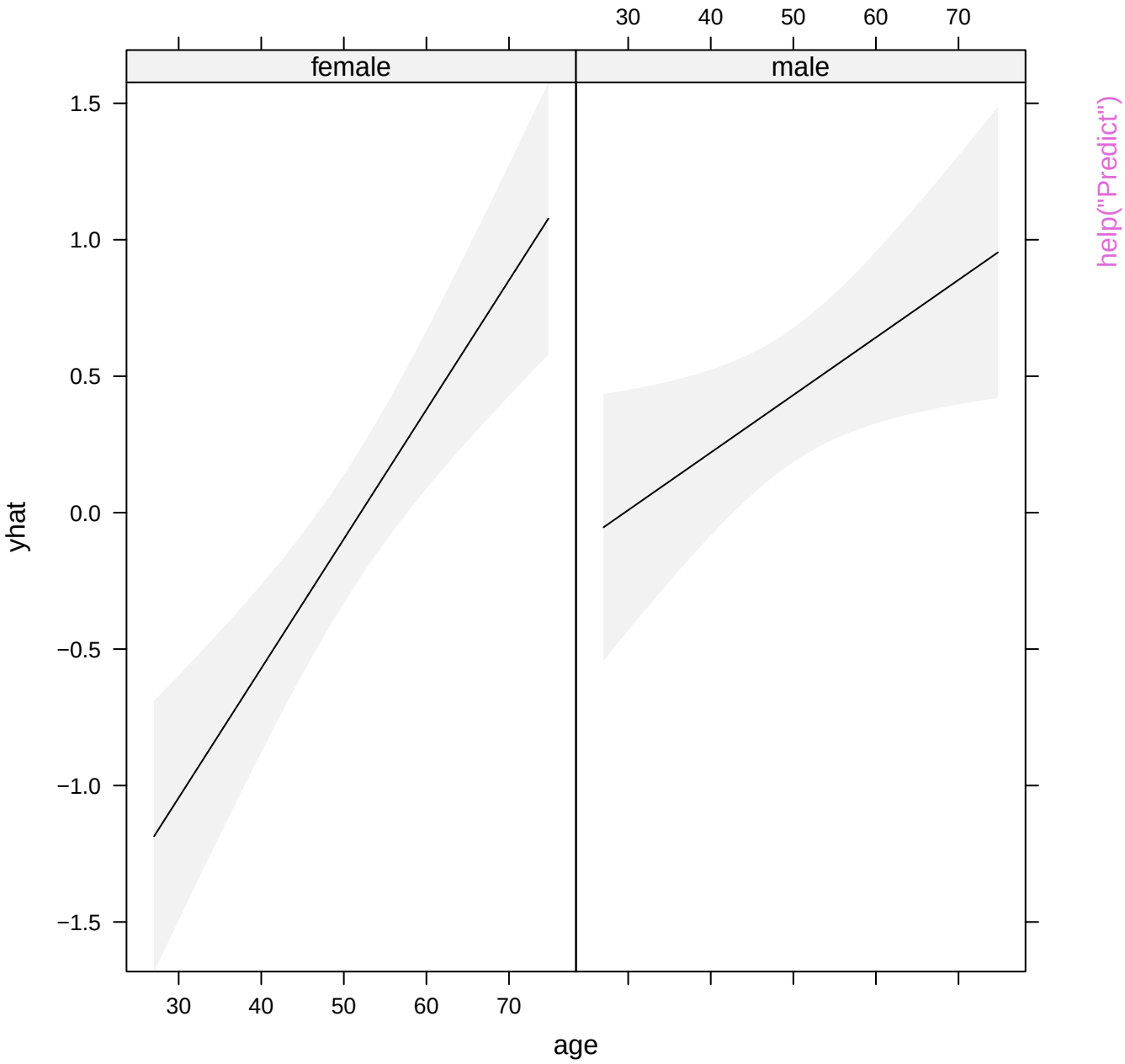
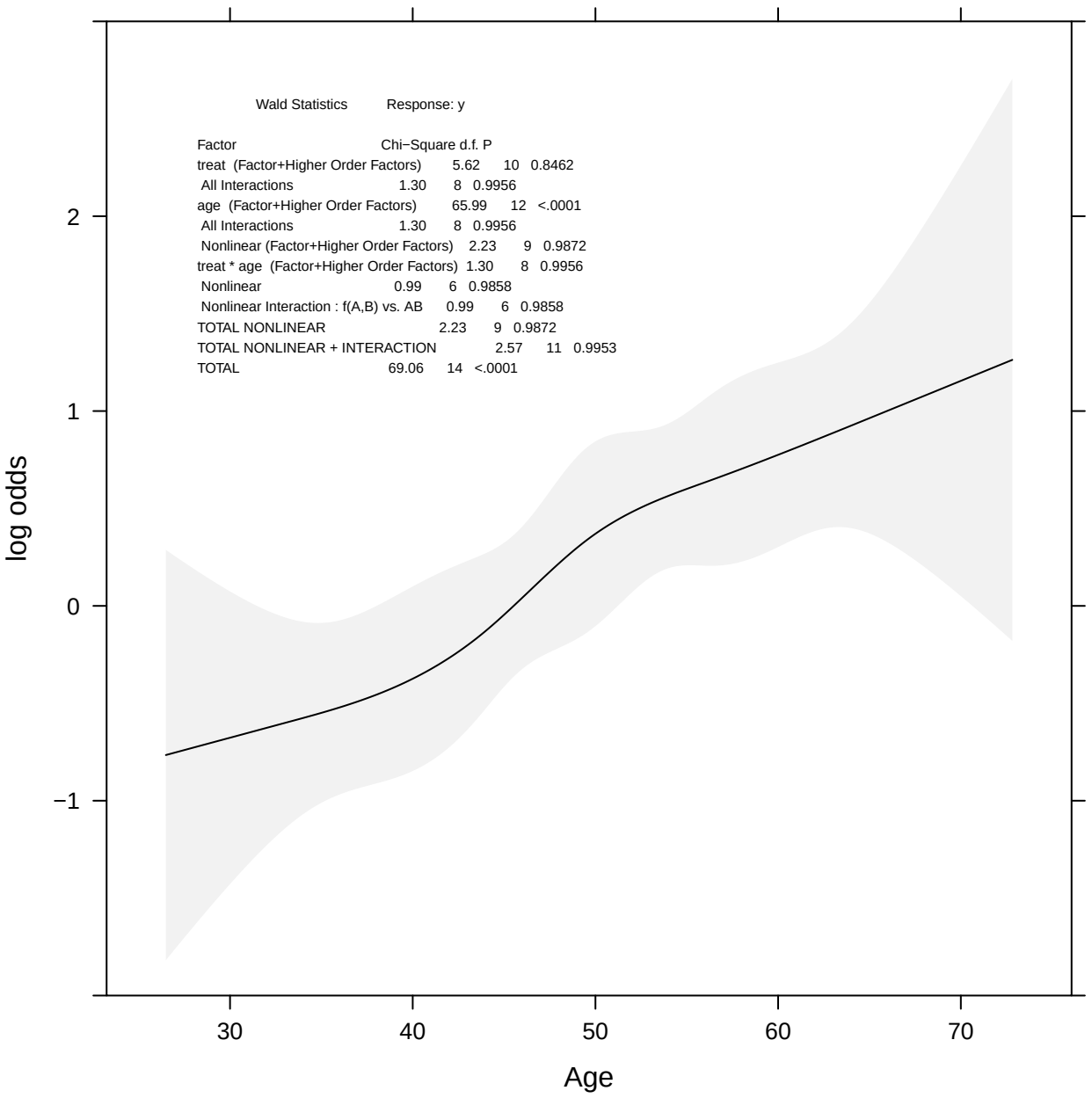
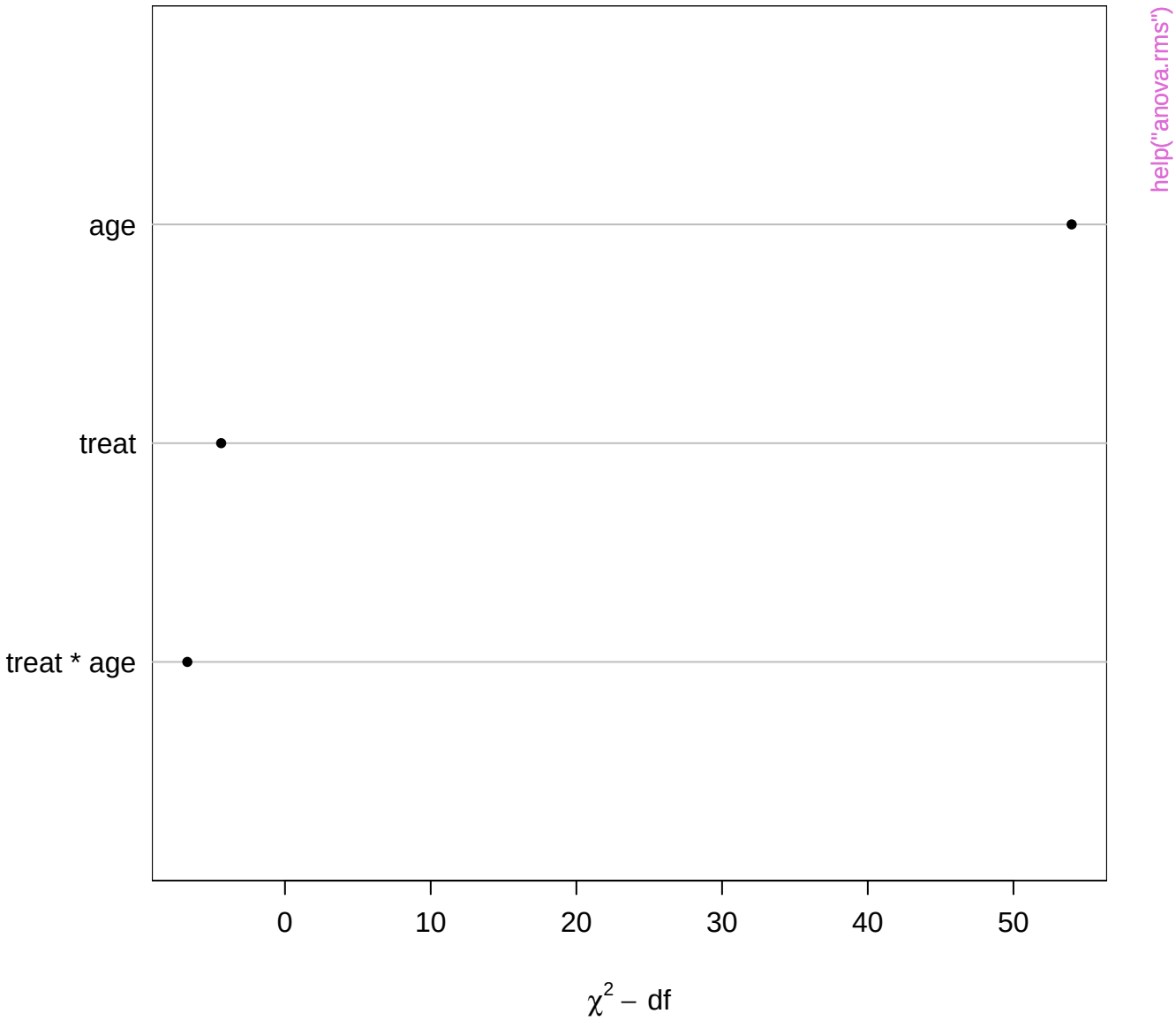
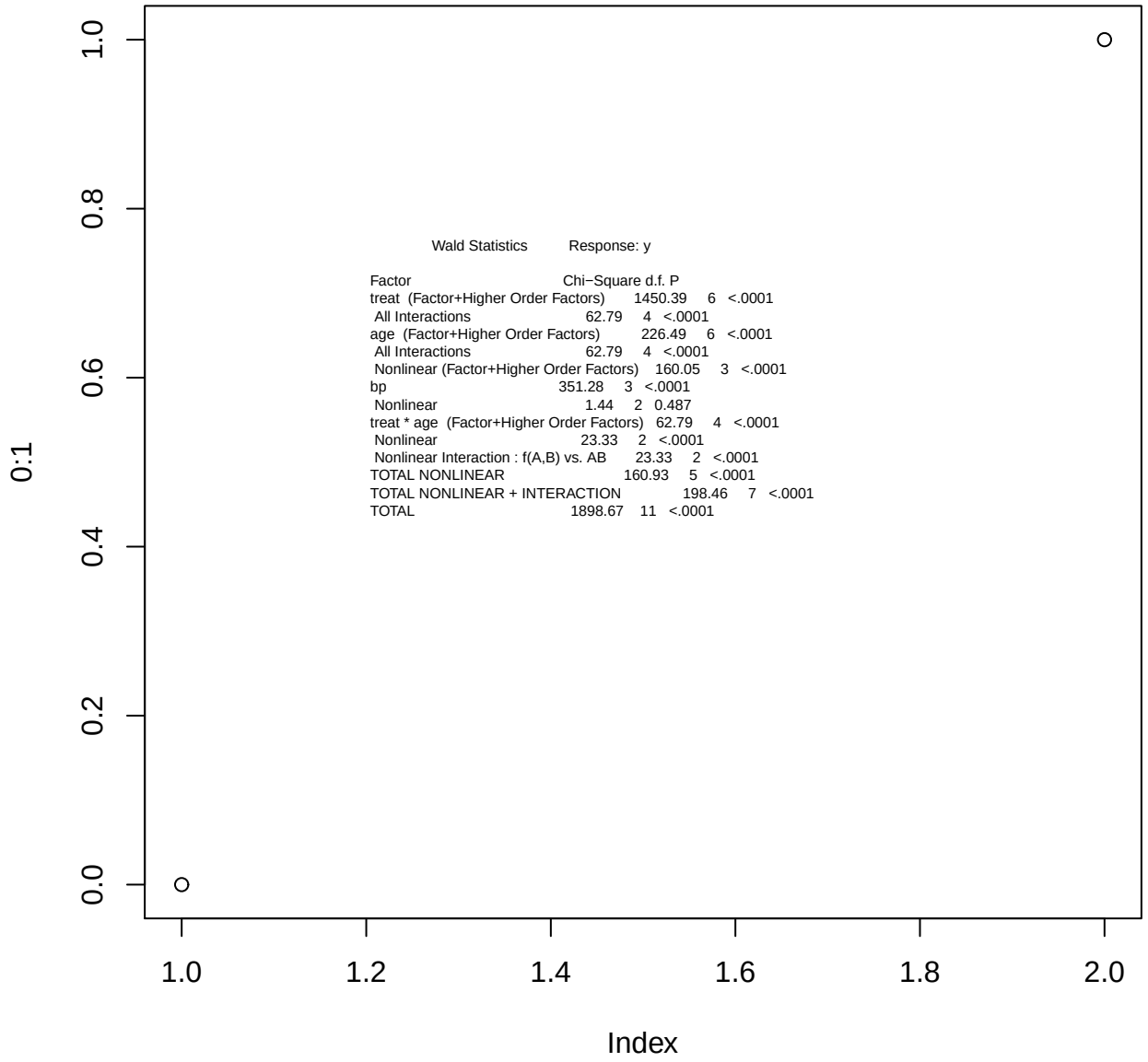

30
40
50
60
70
female
male
1.0
0.5
0.0
−0.5
−1.0
yhat
30
40
50
60
70
age
help("Predict")


female
male
30
40
50
60
70
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
yhat
age
help("Predict")

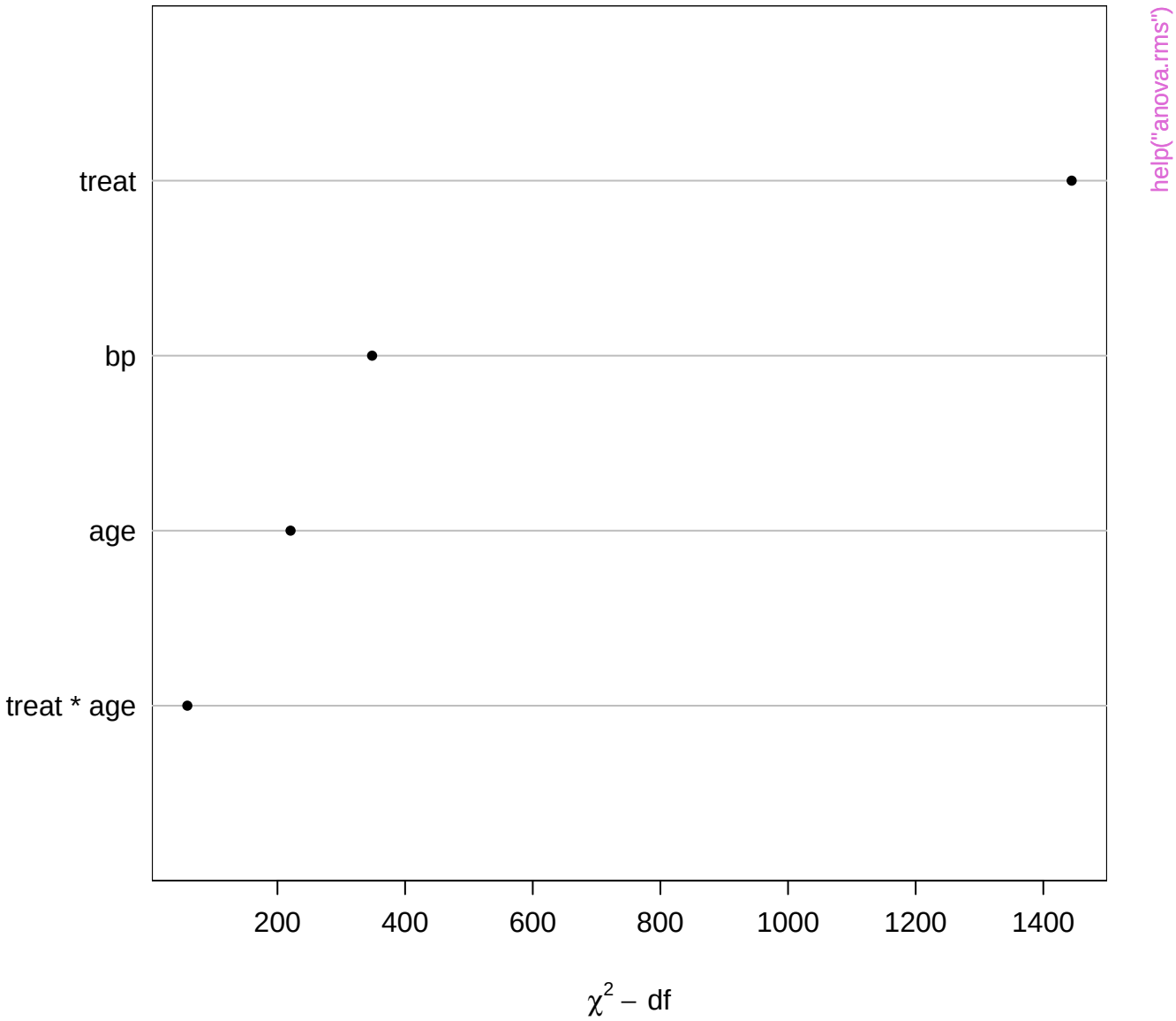


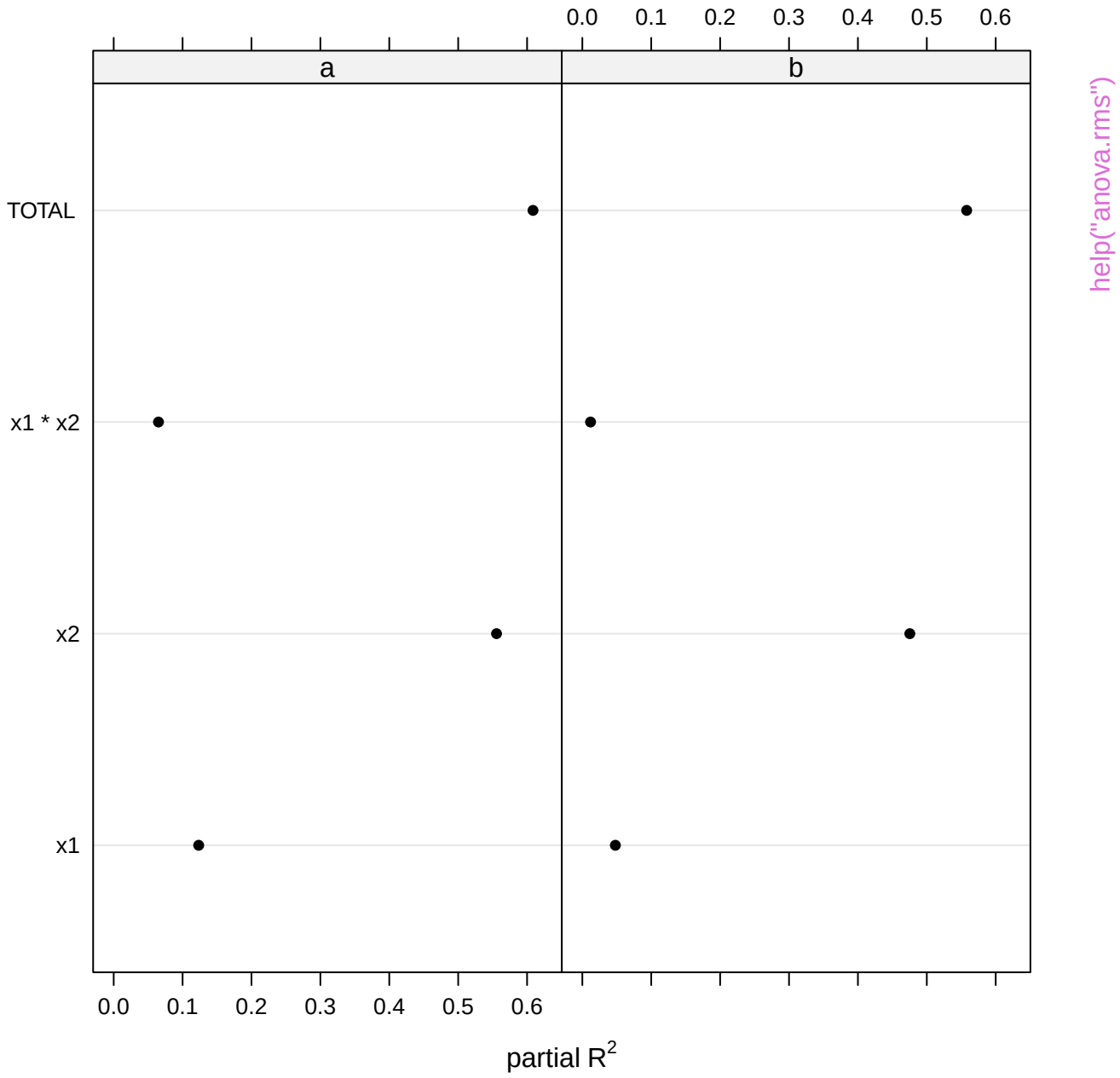
help("anova.rms")


age
treat
treat * age
0
10
20
30
40
50
χ^2 – df
help("anova.rms")

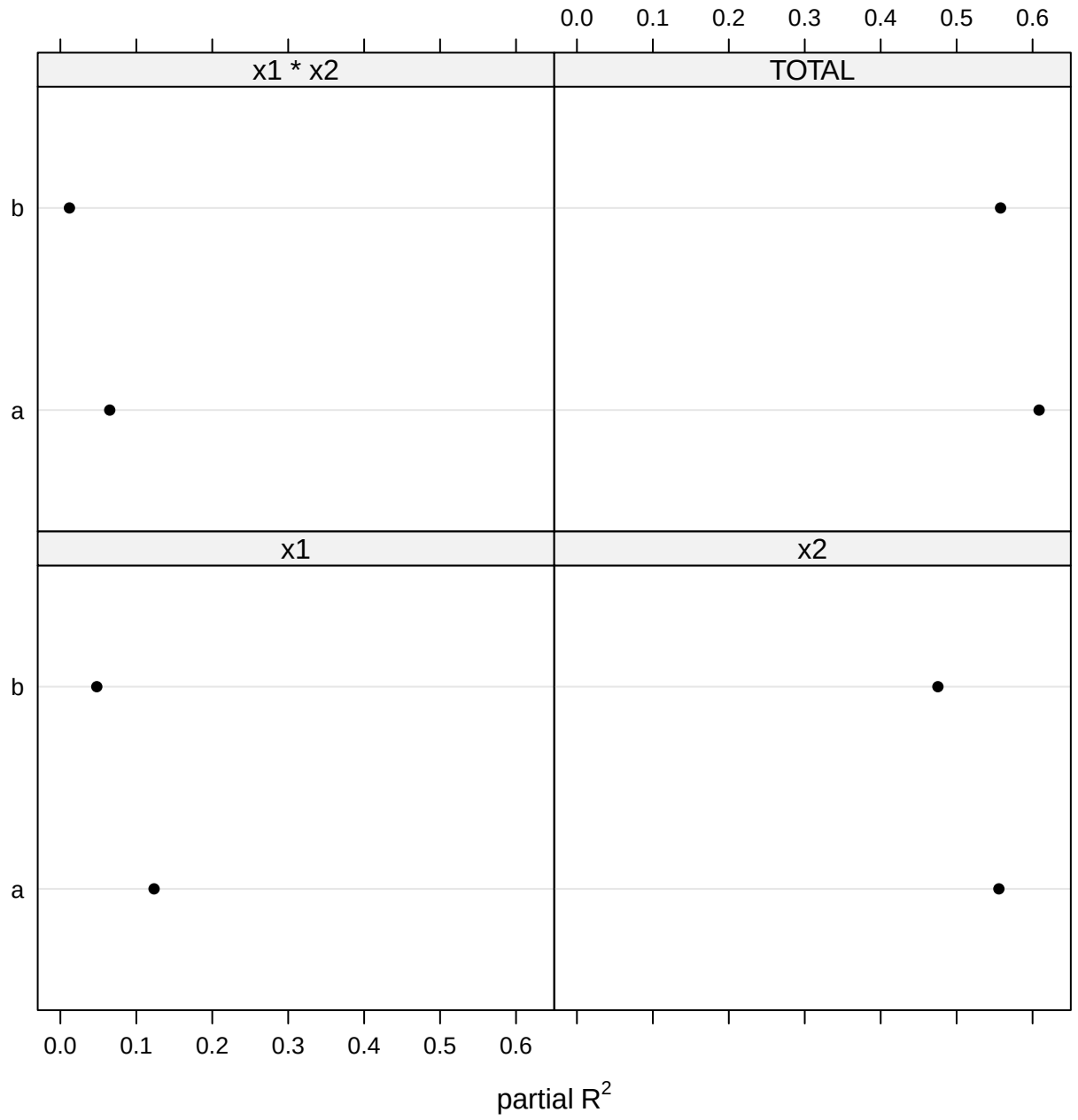


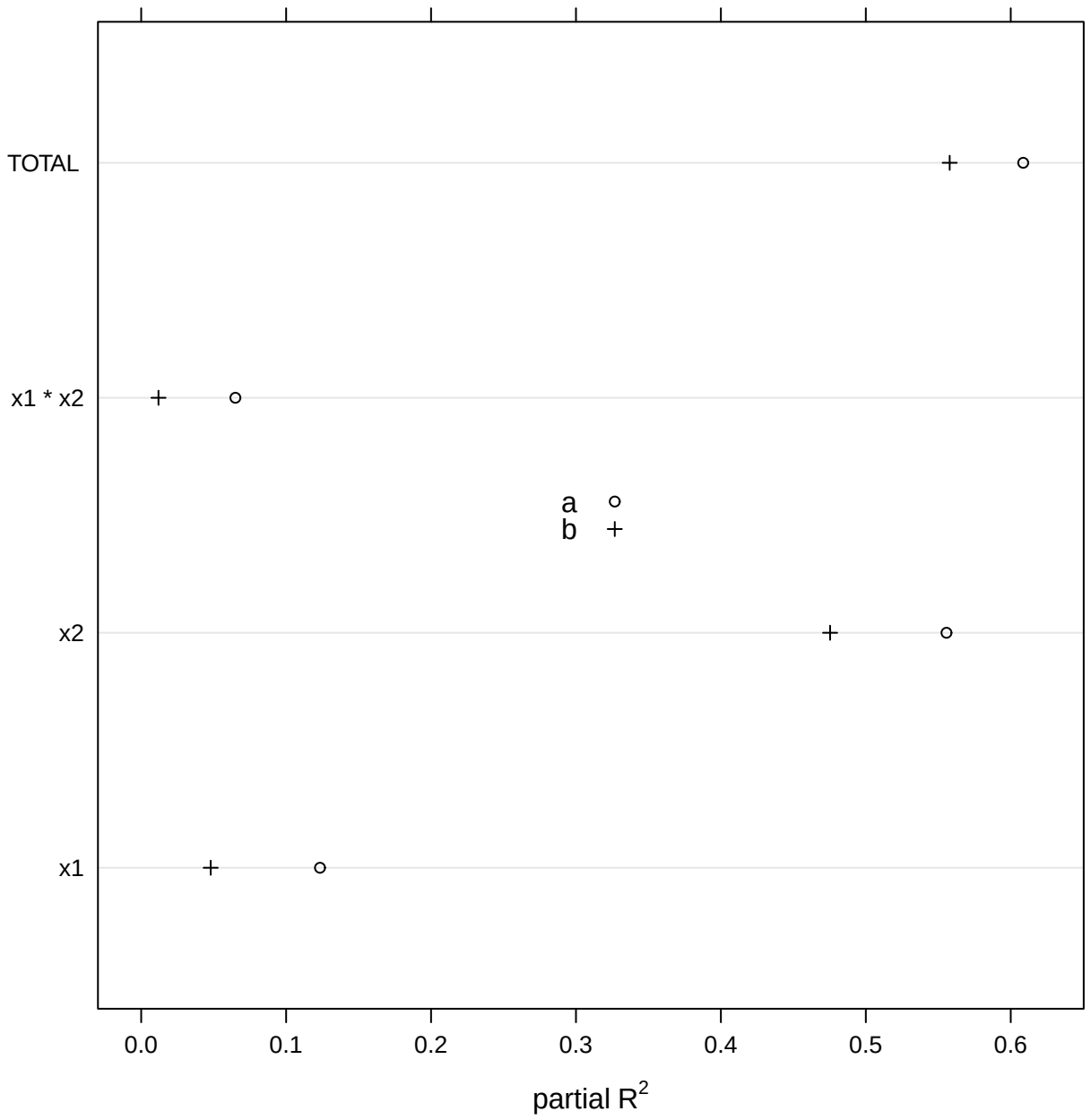
help("anova.rms")


treat
bp
age
treat * age
200
400
600
800
1000
1200
1400
χ² – df
help("anova.rms")

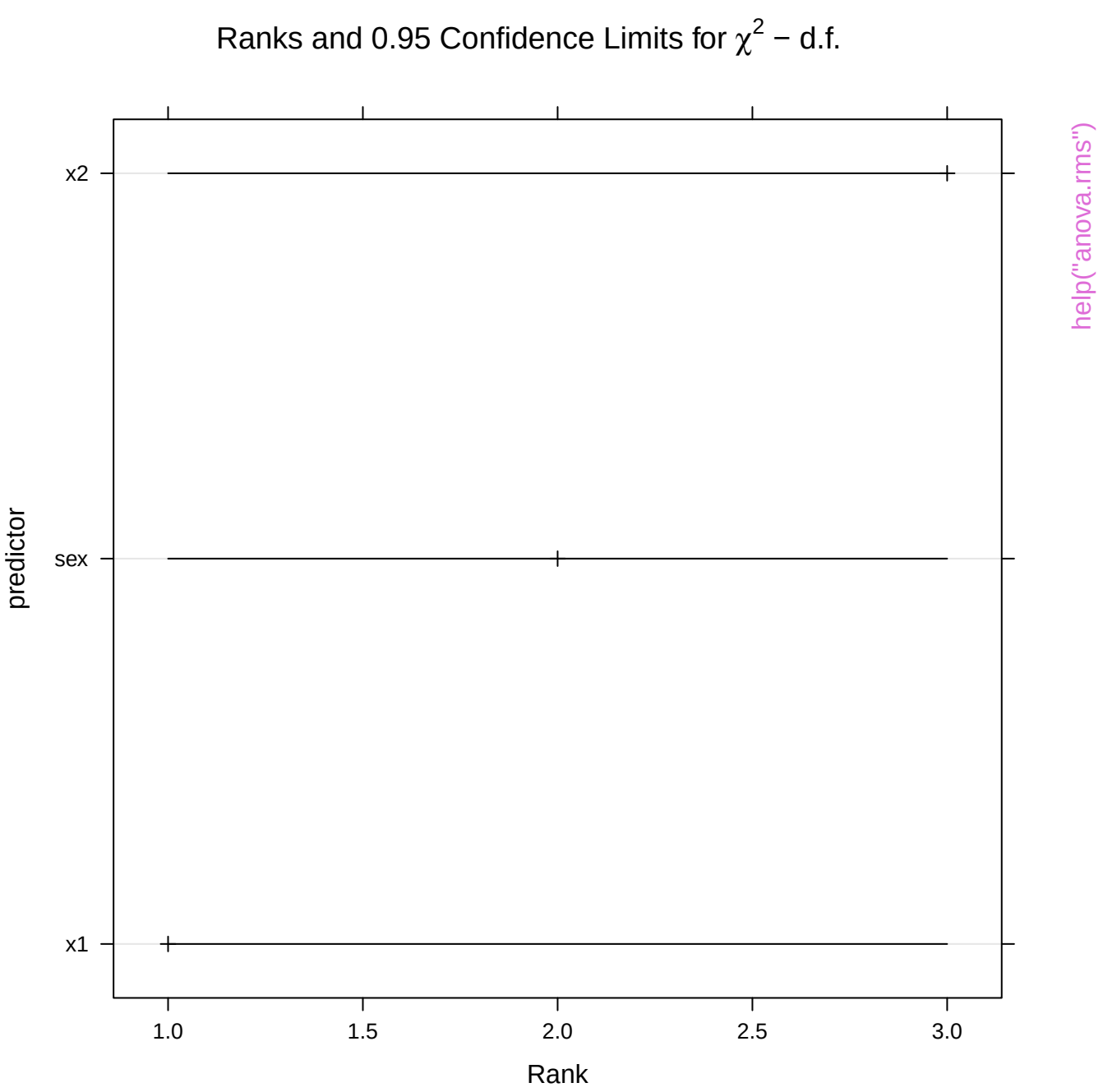


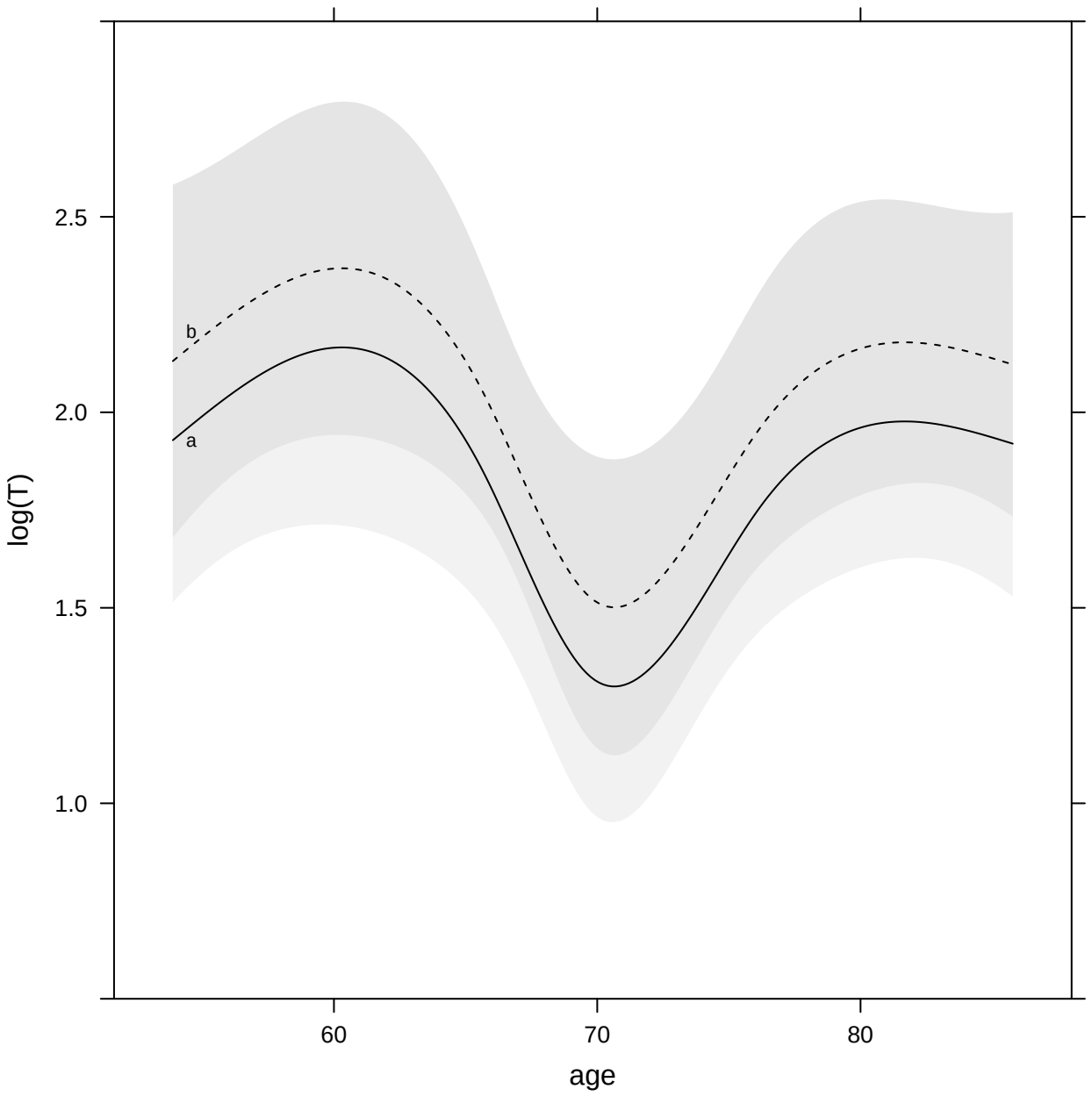
help("anova.rms")



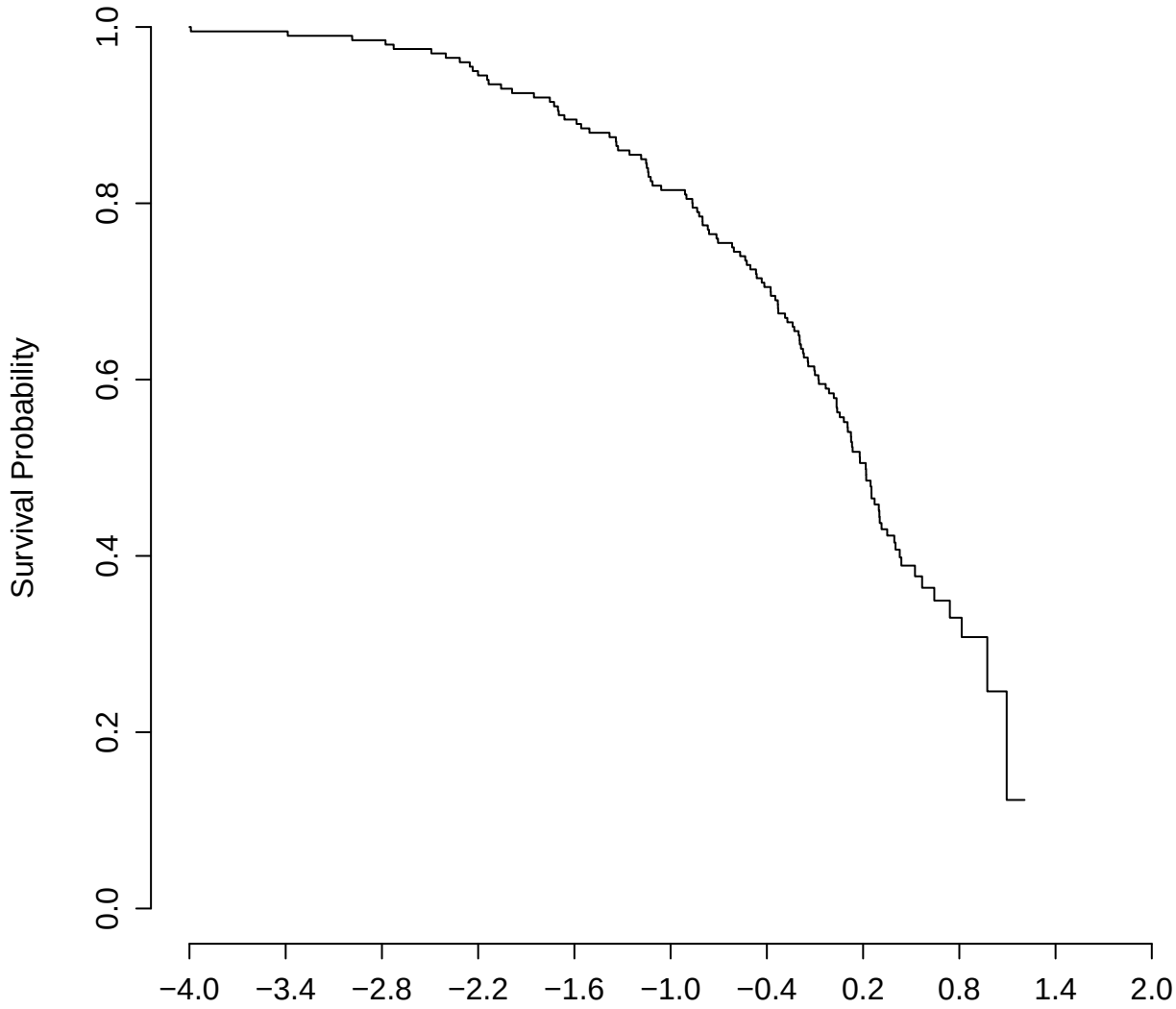


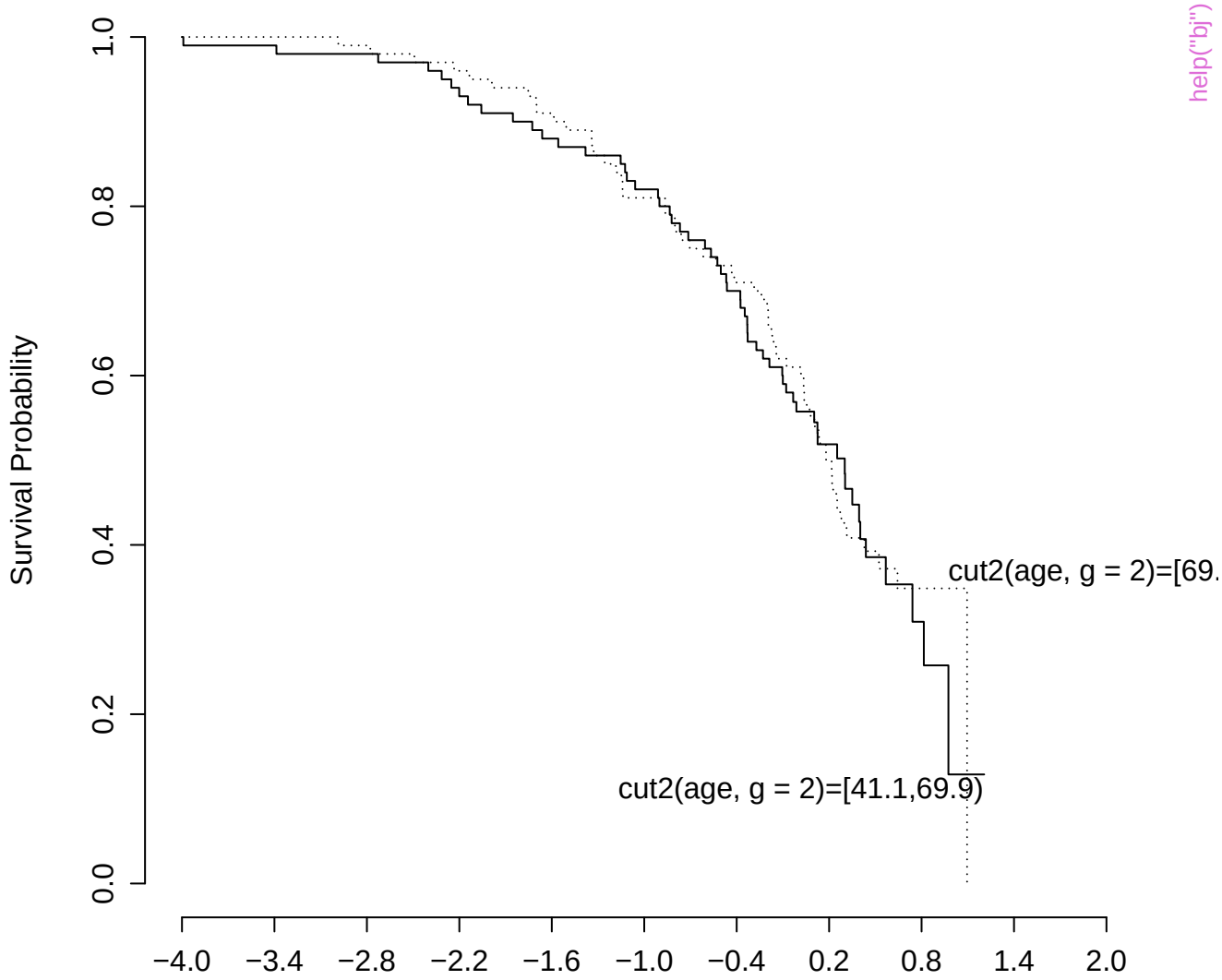
help("anova.rms")

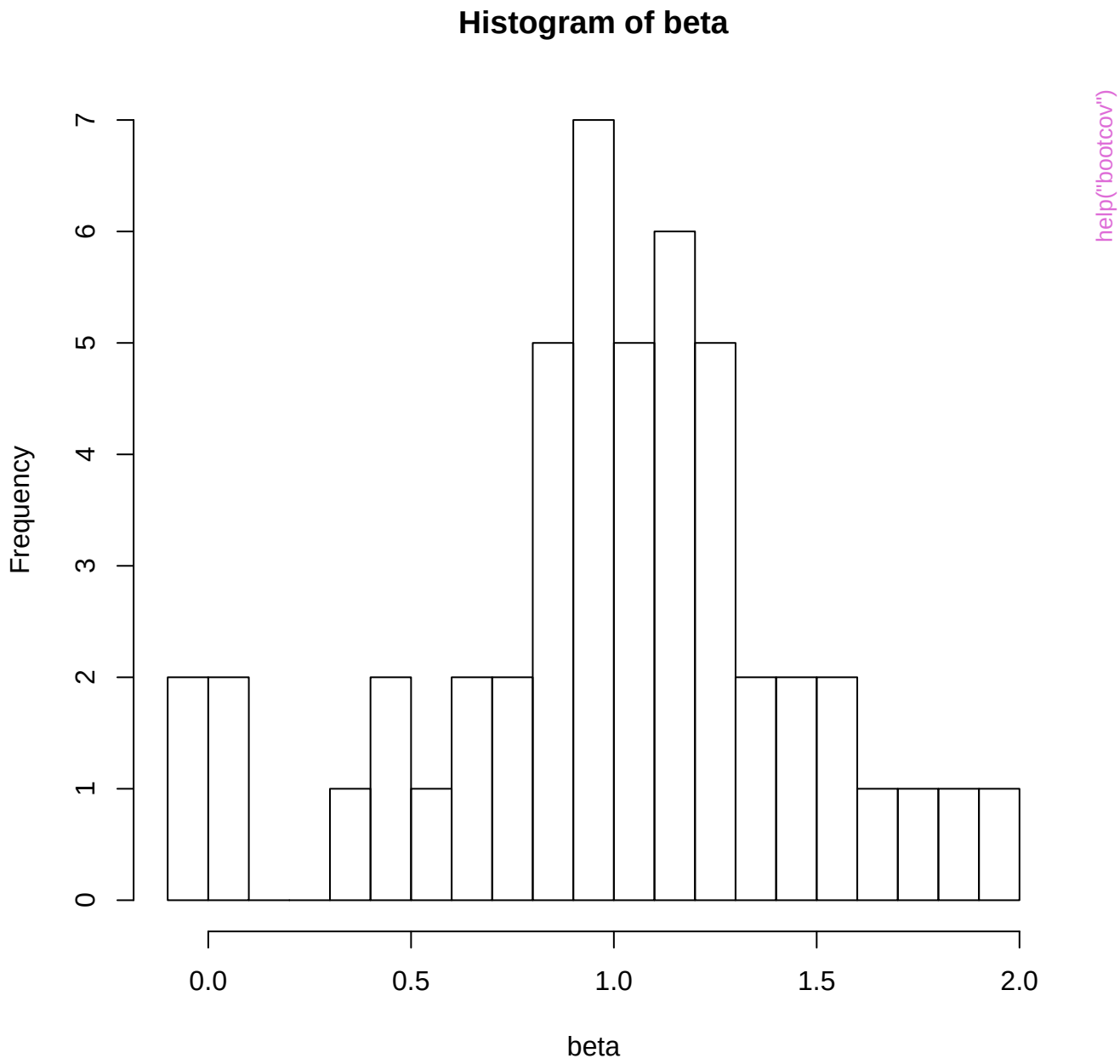

Ranks and 0.95 Confidence Limits for χ^2 − d.f.
predictor
x2
sex
x1
1.0
1.5
2.0
2.5
3.0
Rank
help("anova.rms")



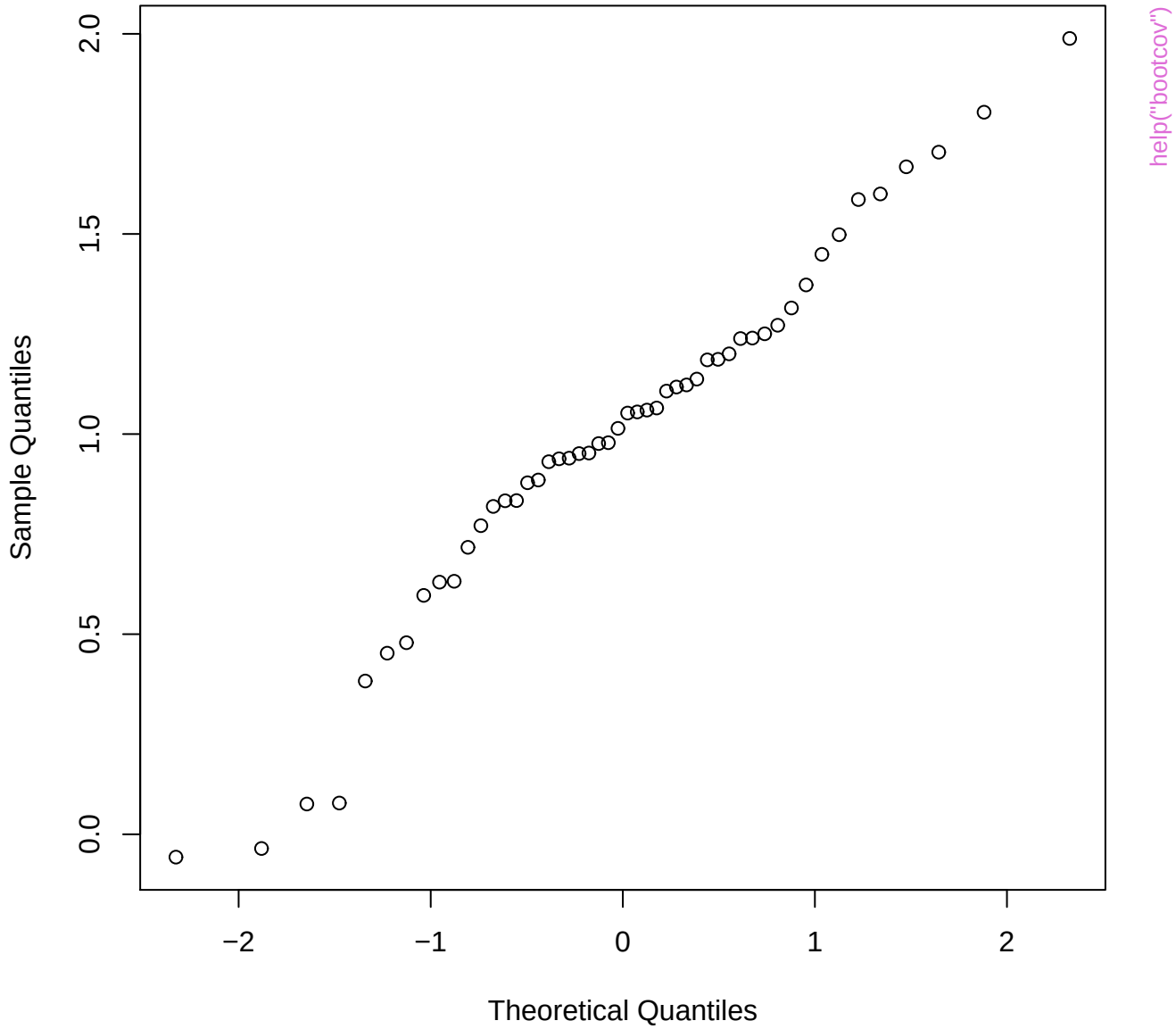
help("plot")

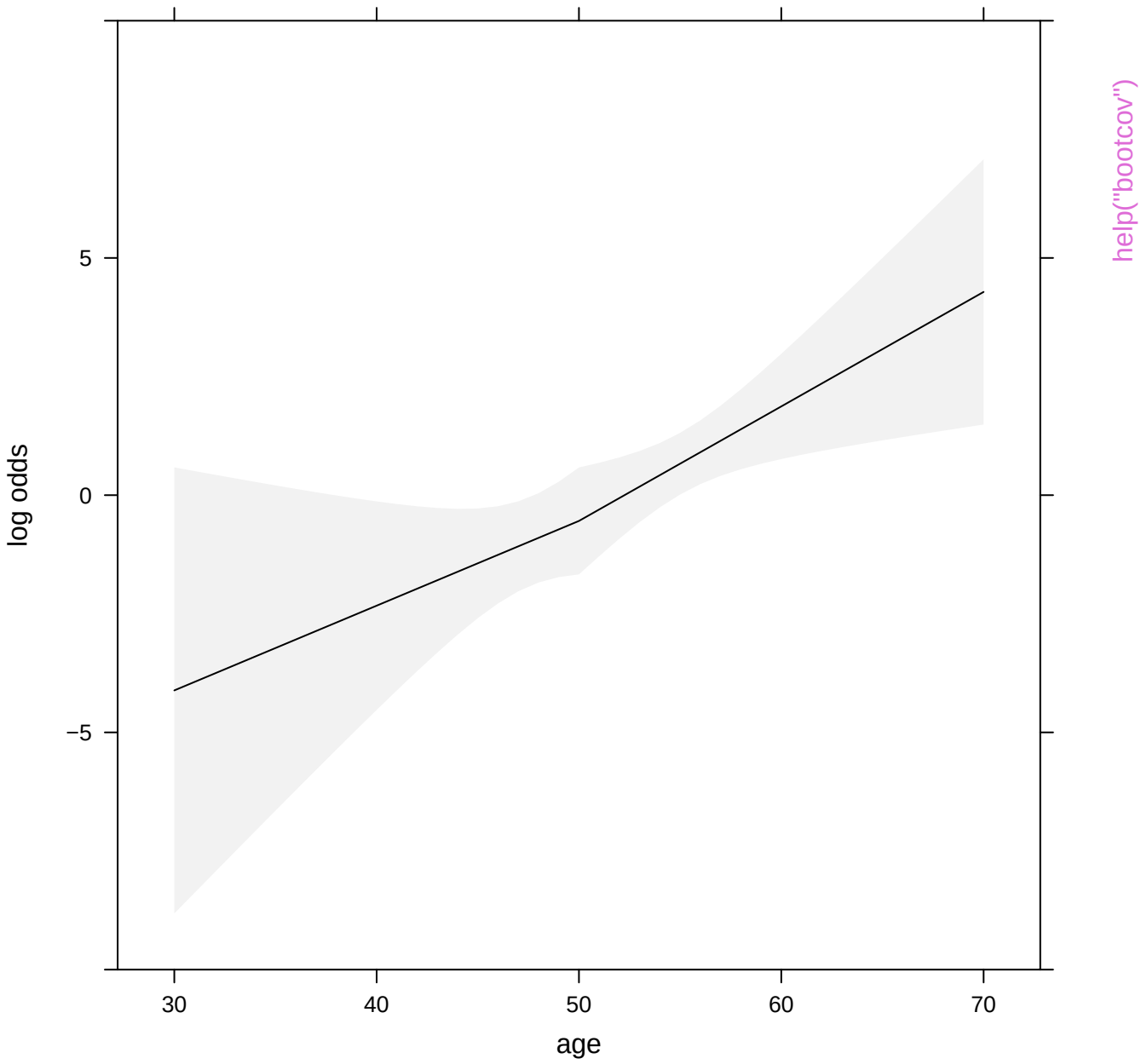

Survival Probability
0.0
0.2
0.4
0.6
0.8
1.0
−4.0
−3.4
−2.8
−2.2
−1.6
−1.0
−0.4
0.2
0.8
1.4
2.0
help("bj")

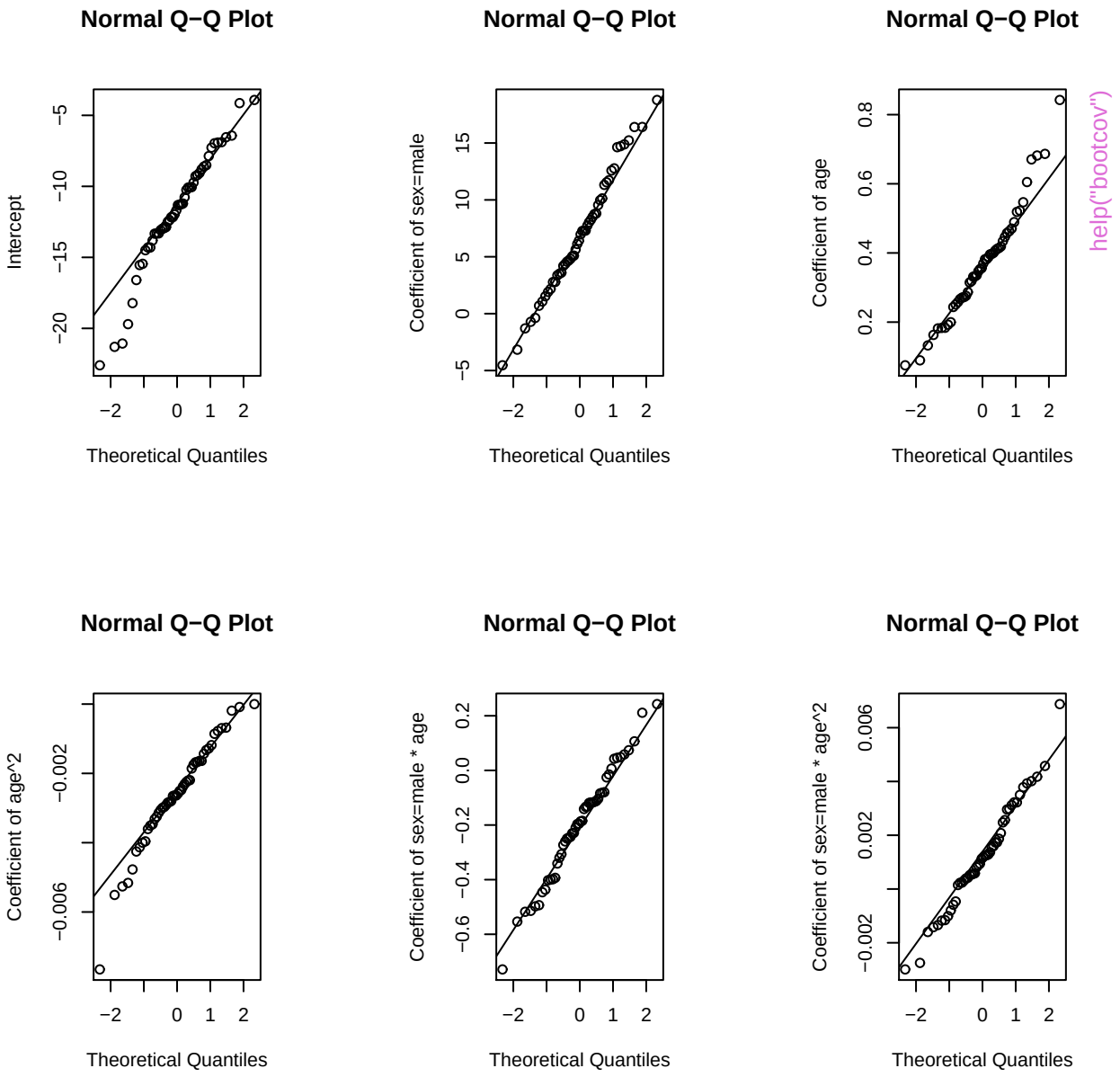

Survival Probability
0.0
0.2
0.4
0.6
0.8
1.0
−4.0
−3.4
−2.8
−2.2
−1.6
−1.0
−0.4
0.2
0.8
1.4
2.0
cut2(age, g = 2)=[69.
cut2(age, g = 2)=[41.1,69.9)
help("bj")

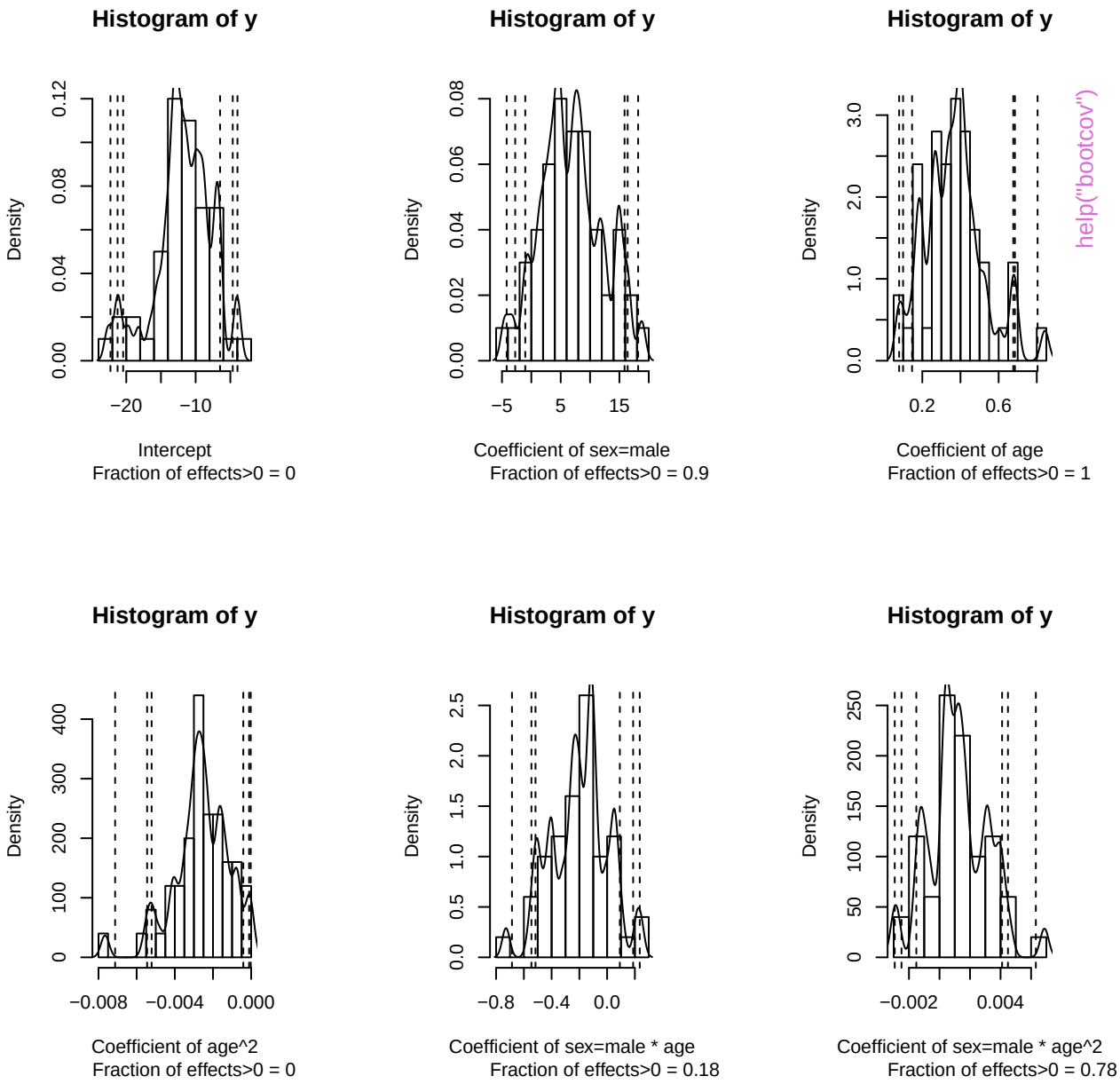


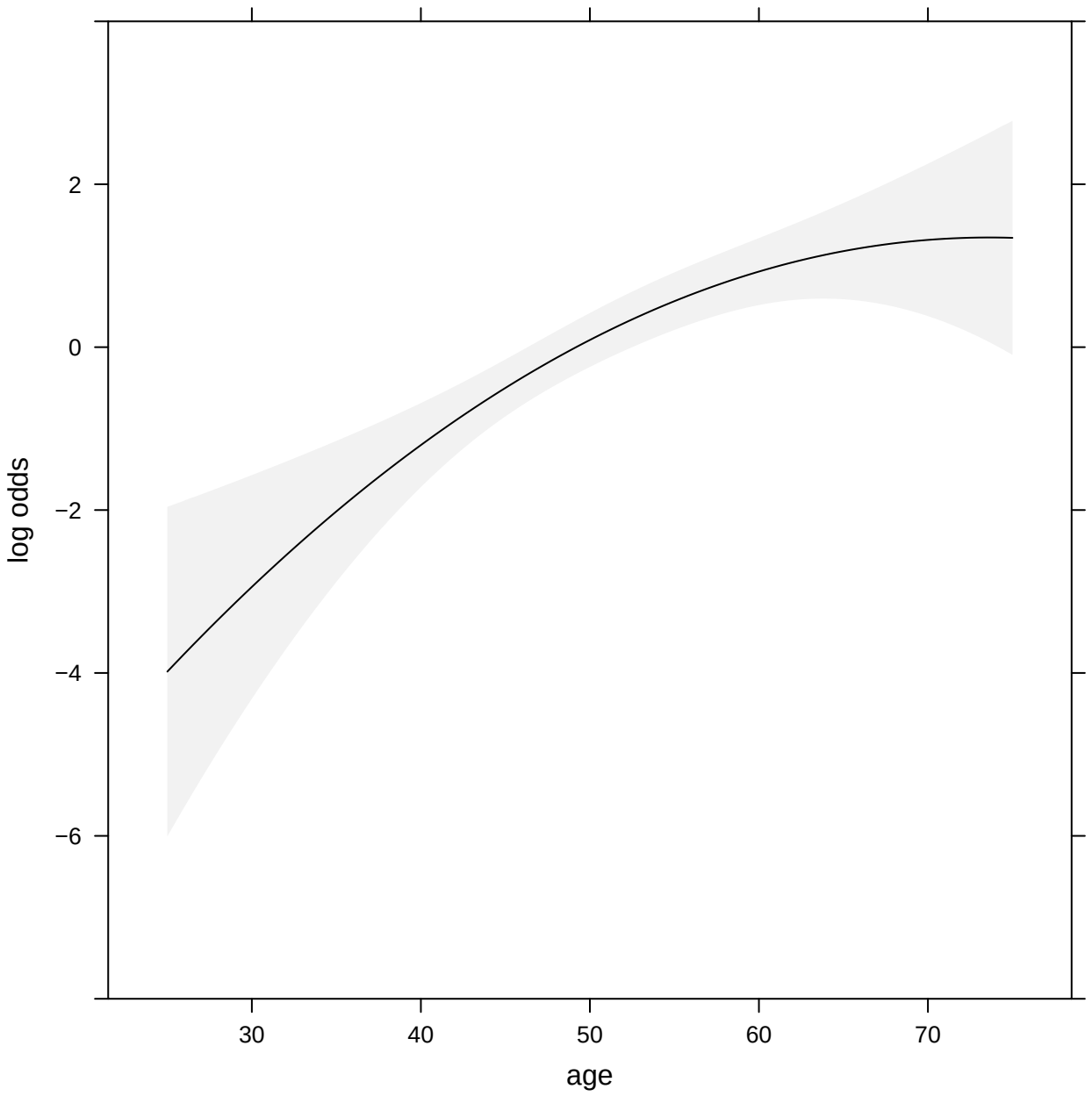
help("bootcov")

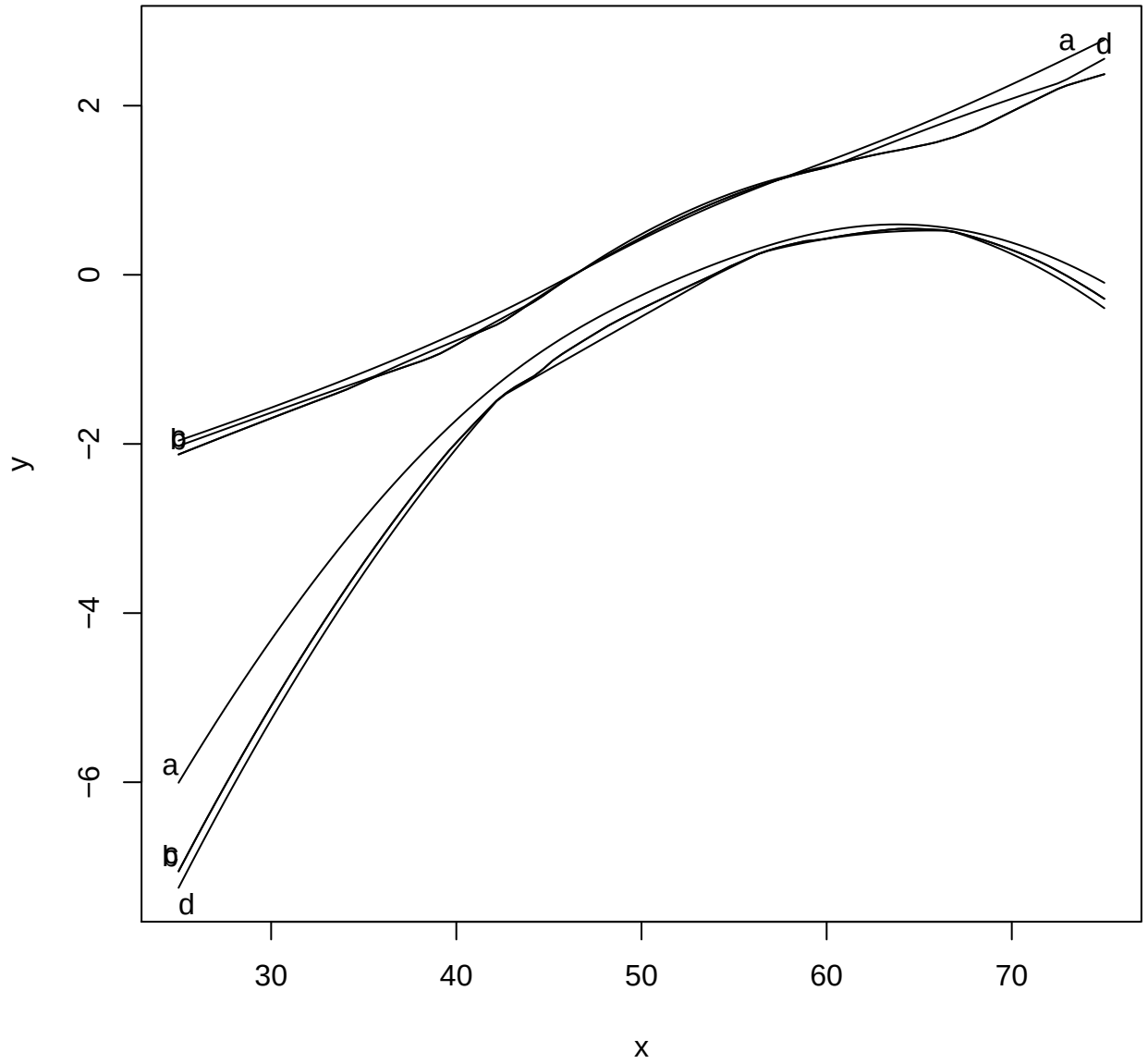

Normal Q−Q Plot
Sample Quantiles
Theoretical Quantiles
0.0
0.5
1.0
1.5
2.0
−2
−1
0
1
2
help("bootcov")


log odds
5
0
−5
30
40
50
60
70
age
help("bootcov")

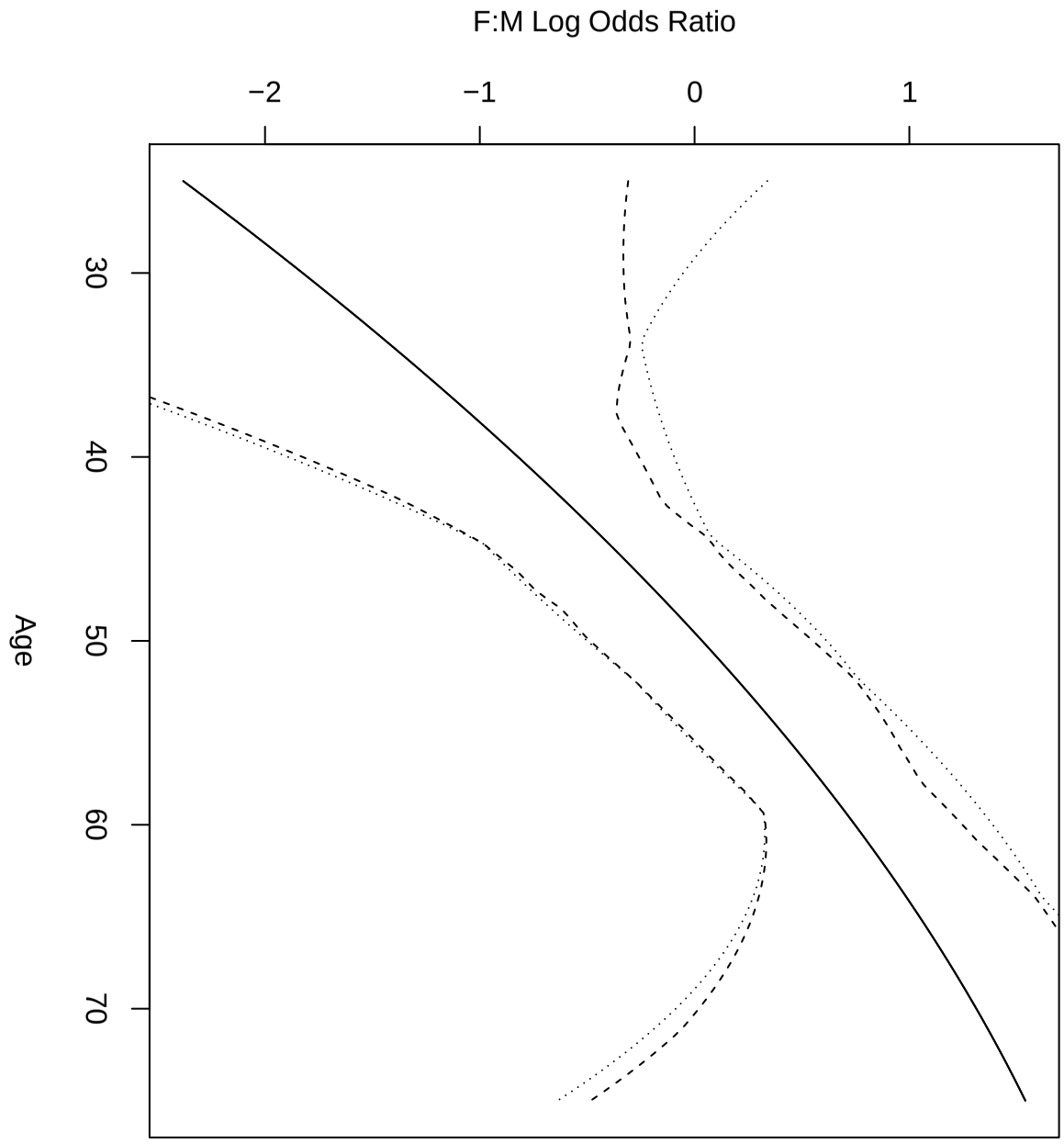

Normal Q−Q Plot
Intercept
−5
−10
−15
−20
−2
0
1
2
Theoretical Quantiles
Normal Q−Q Plot
Coefficient of sex=male
15
10
5
0
−5
−2
0
1
2
Theoretical Quantiles
Normal Q−Q Plot
Coefficient of age
0.8
0.6
0.4
0.2
−2
0
1
2
Theoretical Quantiles
help("bootcov")
Normal Q−Q Plot
Coefficient of age^2
−0.002
−0.006
−2
0
1
2
Theoretical Quantiles
Normal Q−Q Plot
Coefficient of sex=male * age
0.2
0.0
−0.2
−0.4
−0.6
−2
0
1
2
Theoretical Quantiles
Normal Q−Q Plot
Coefficient of sex=male * age^2
0.006
0.002
−0.002
−2
0
1
2
Theoretical Quantiles


Histogram of y
Density
0.00
0.04
0.08
0.12
−20
−10
Intercept
Fraction of effects>0 = 0
Histogram of y
Density
0.00
0.02
0.04
0.06
0.08
−5
5
15
Coefficient of sex=male
Fraction of effects>0 = 0.9
Histogram of y
Density
0.0
1.0
2.0
3.0
0.2
0.6
Coefficient of age
Fraction of effects>0 = 1
help("bootcov")
Histogram of y
Density
0
100
200
300
400
−0.008
−0.004
0.000
Coefficient of age^2
Fraction of effects>0 = 0
Histogram of y
Density
0.0
0.5
1.0
1.5
2.0
2.5
−0.8
−0.4
0.0
Coefficient of sex=male * age
Fraction of effects>0 = 0.18
Histogram of y
Density
0
50
100
150
200
250
−0.002
0.004
Coefficient of sex=male * age^2
Fraction of effects>0 = 0.78

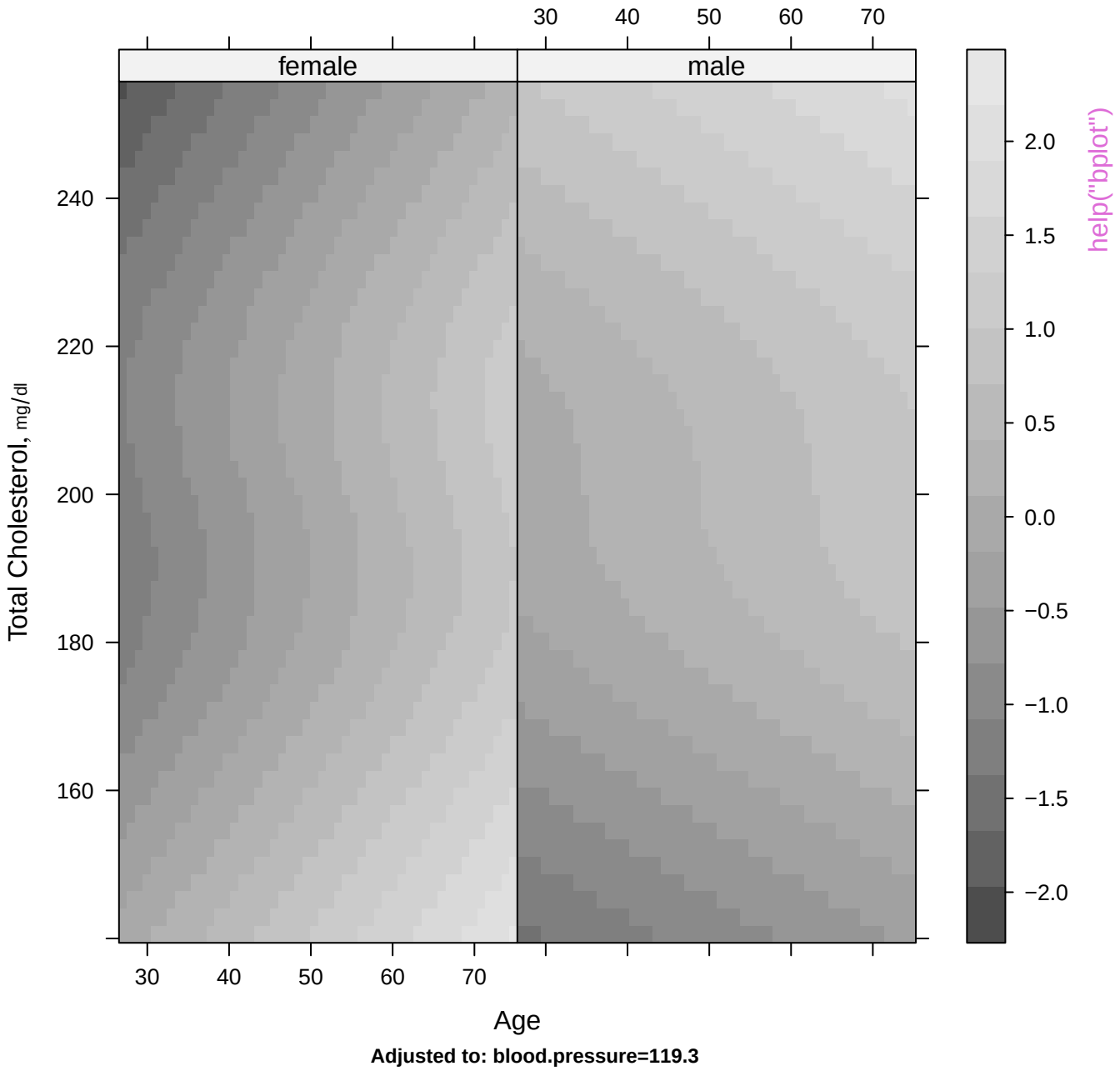

log odds
2
0
−2
−4
−6
30
40
50
60
70
age
help("bootcov")



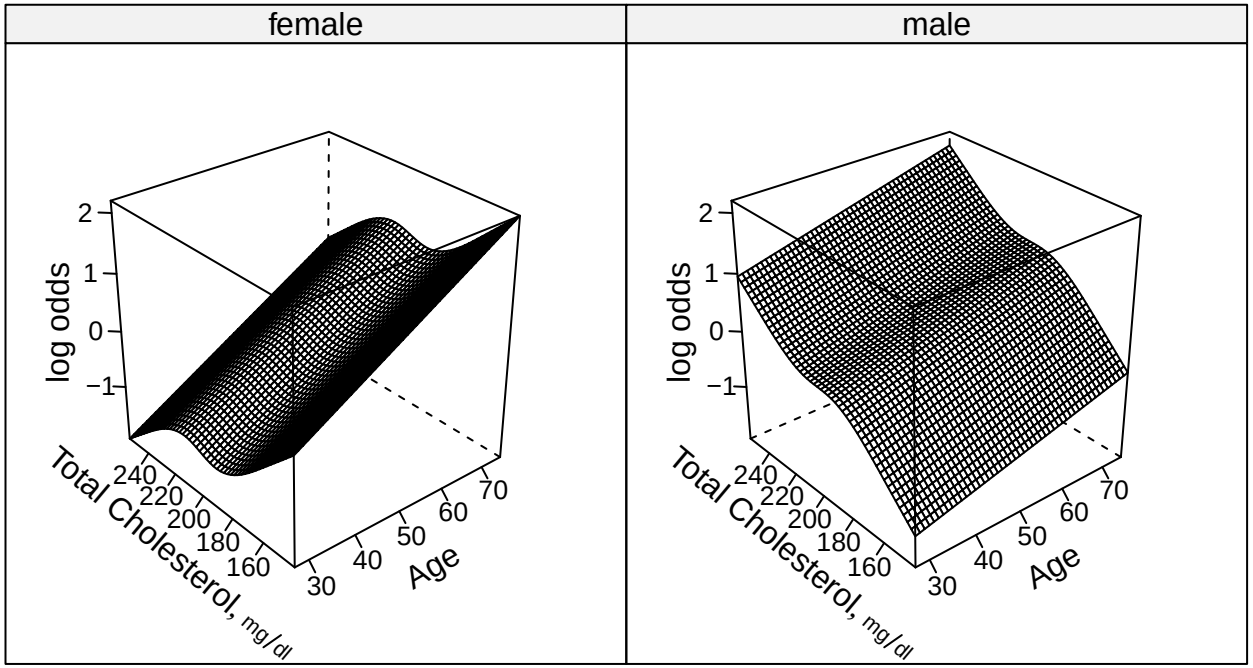
help("bootcov")



help("bootcov")

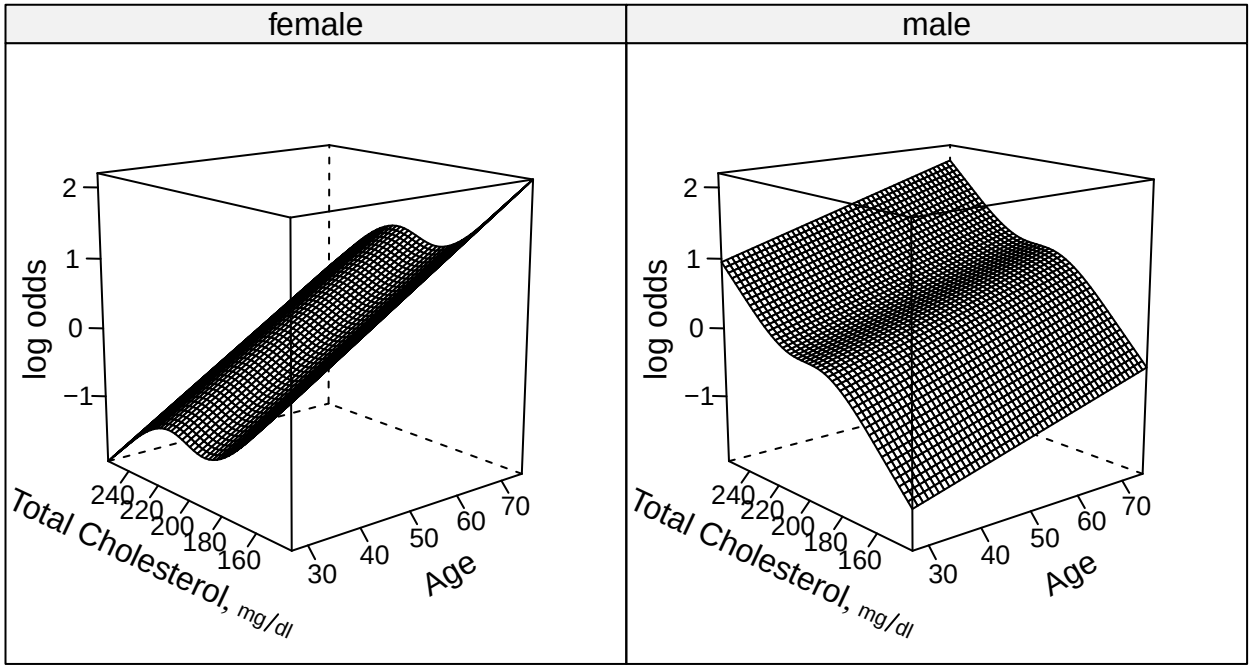

female
male
30
40
50
60
70
240
220
200
180
160
Total Cholesterol, mg/dl
Age
2.0
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
−2.0
help("bplot")
Adjusted to: blood.pressure=119.3

help("bplot")

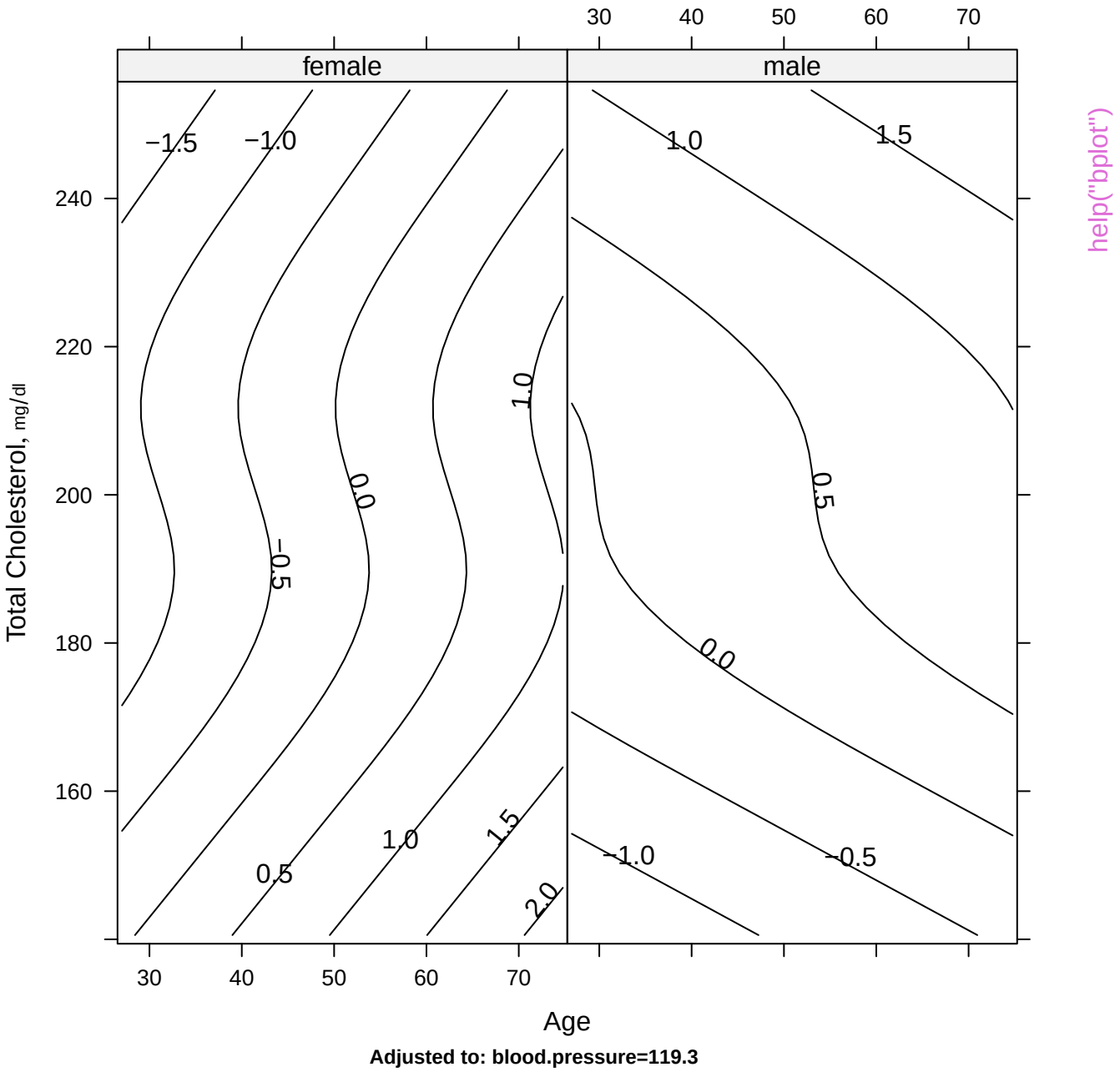


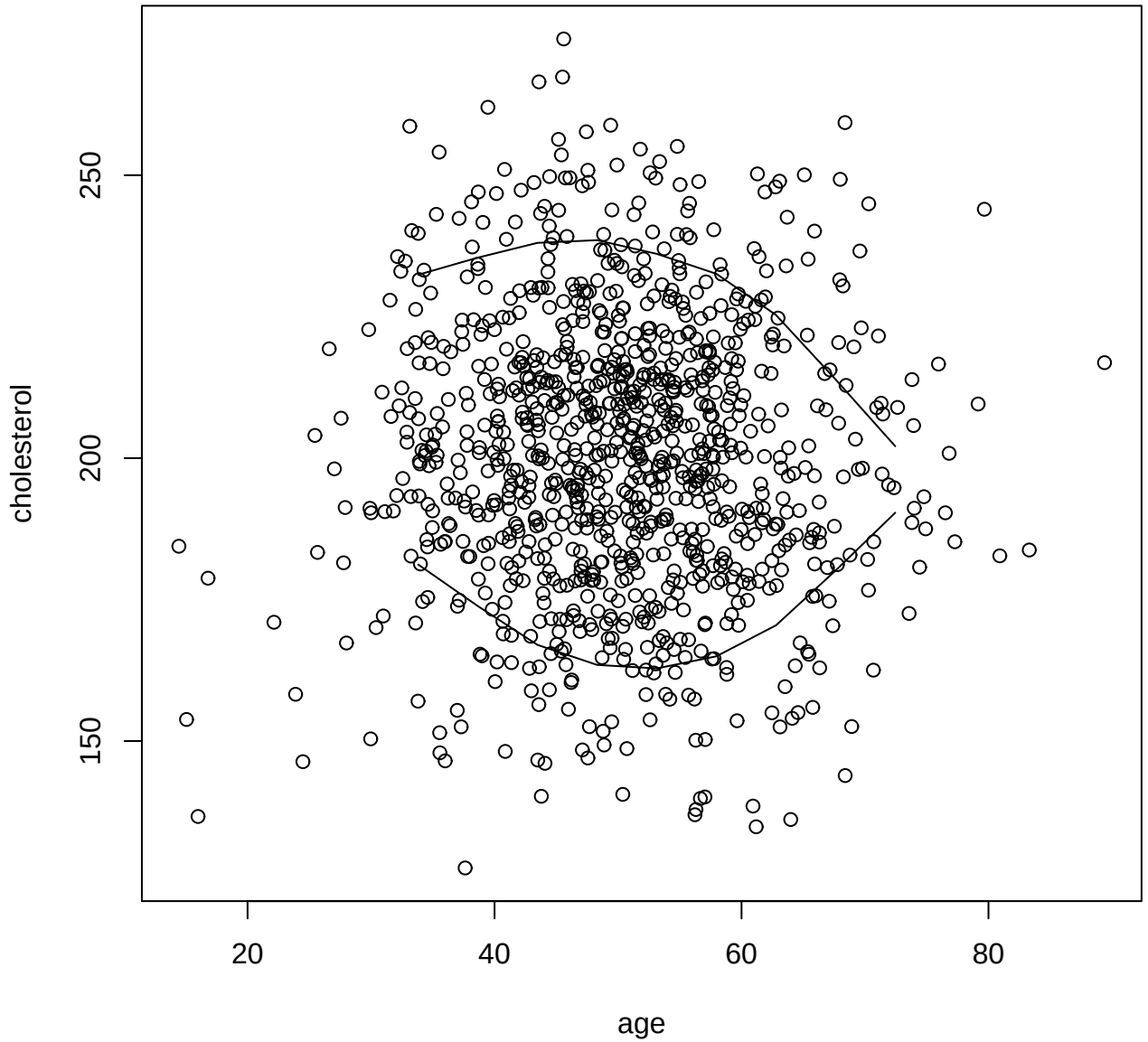
Adjusted to: blood.pressure=119.3

help("bplot")

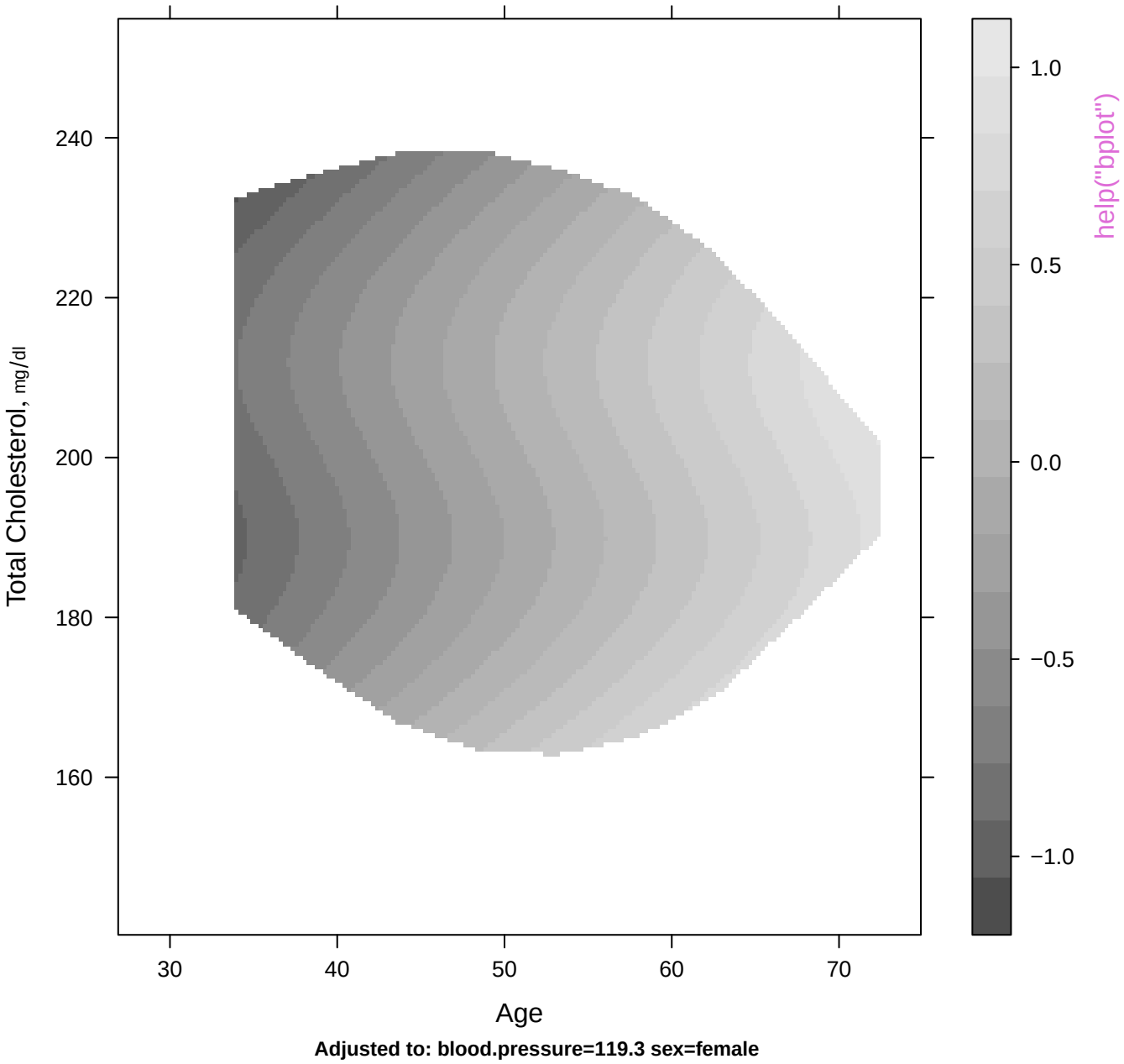


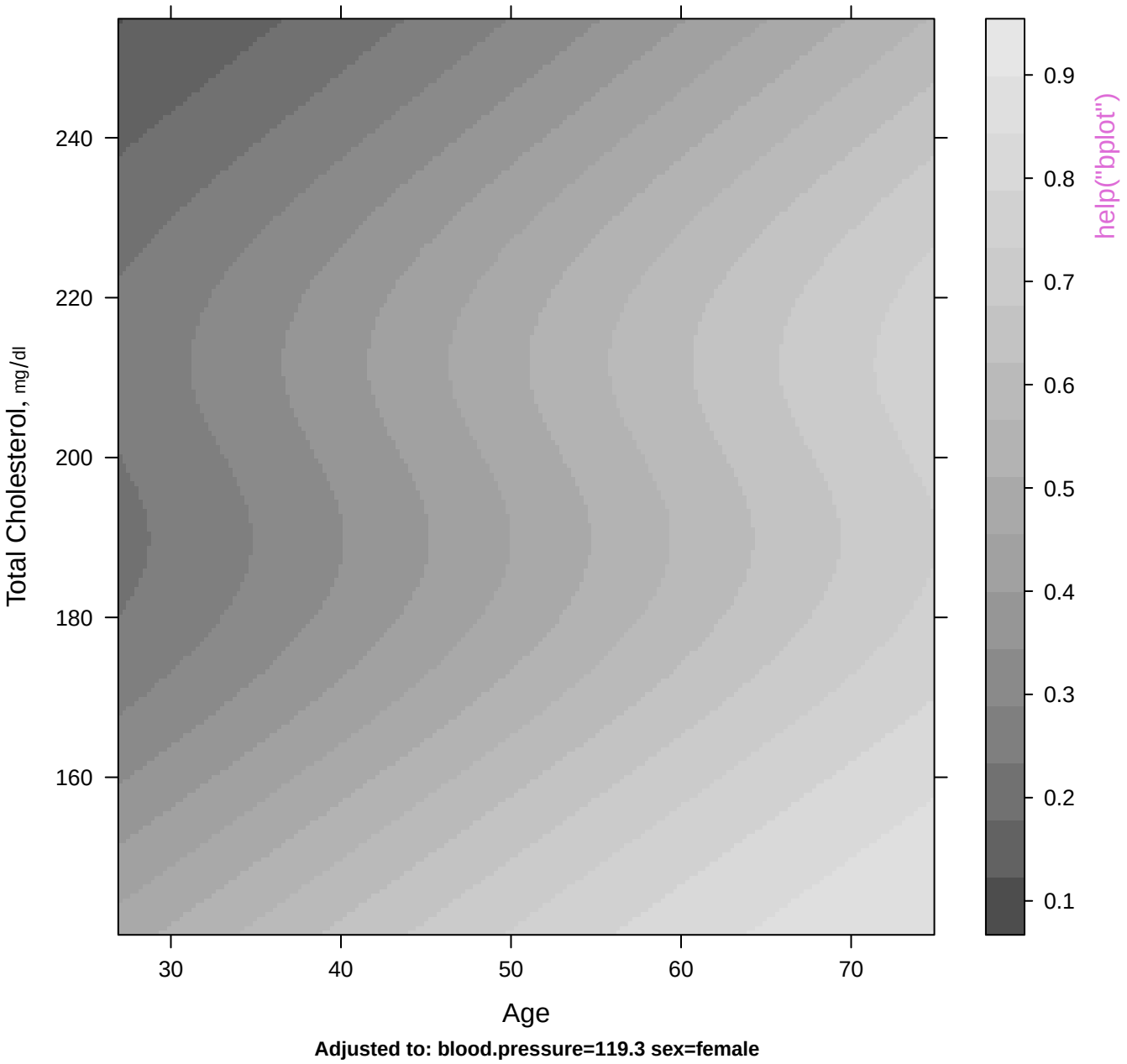
Adjusted to: blood.pressure=119.3

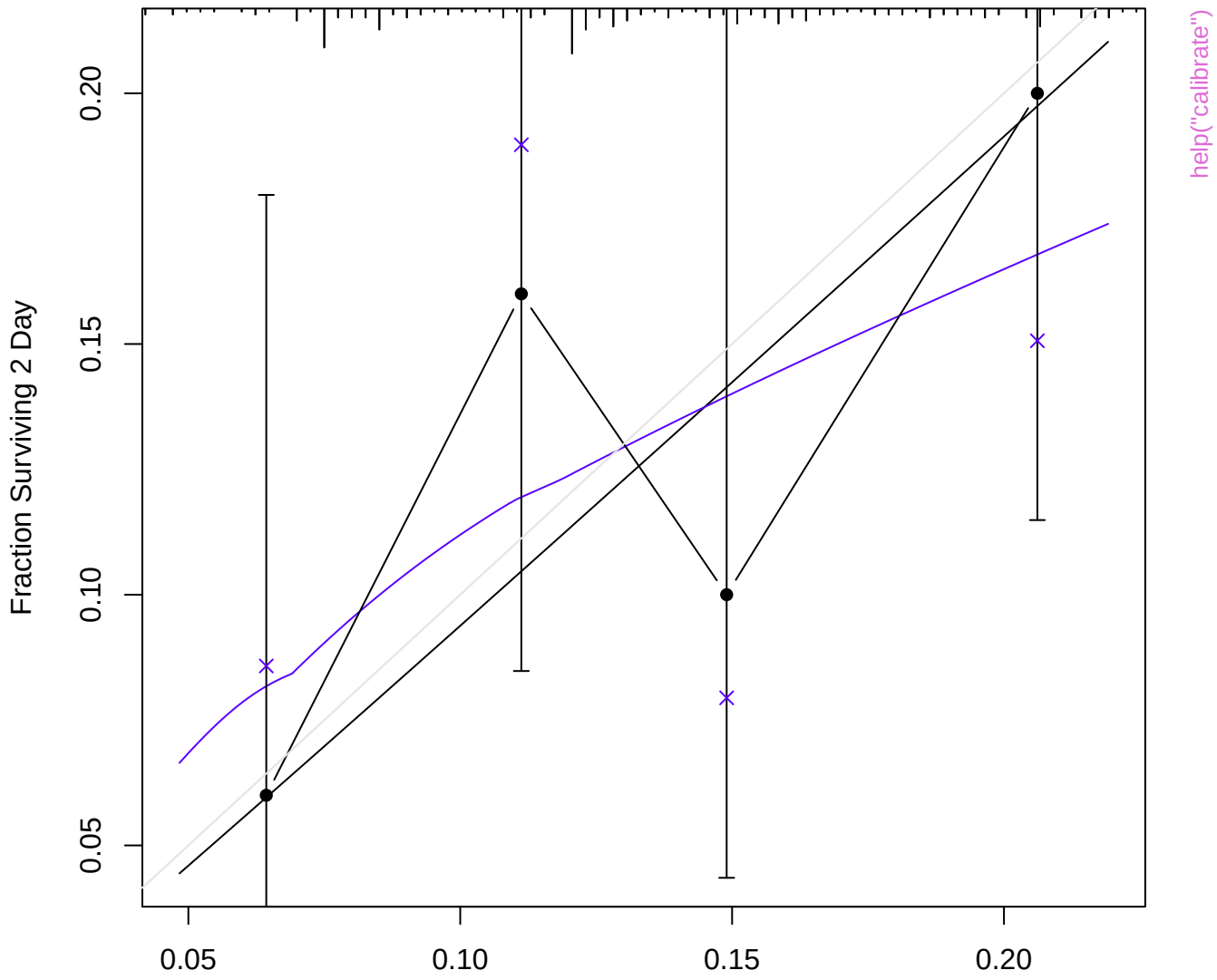

female
male
30
40
50
60
70
240
220
200
180
160
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0
Total Cholesterol, mg/dl
Age
Adjusted to: blood.pressure=119.3
help("bplot")

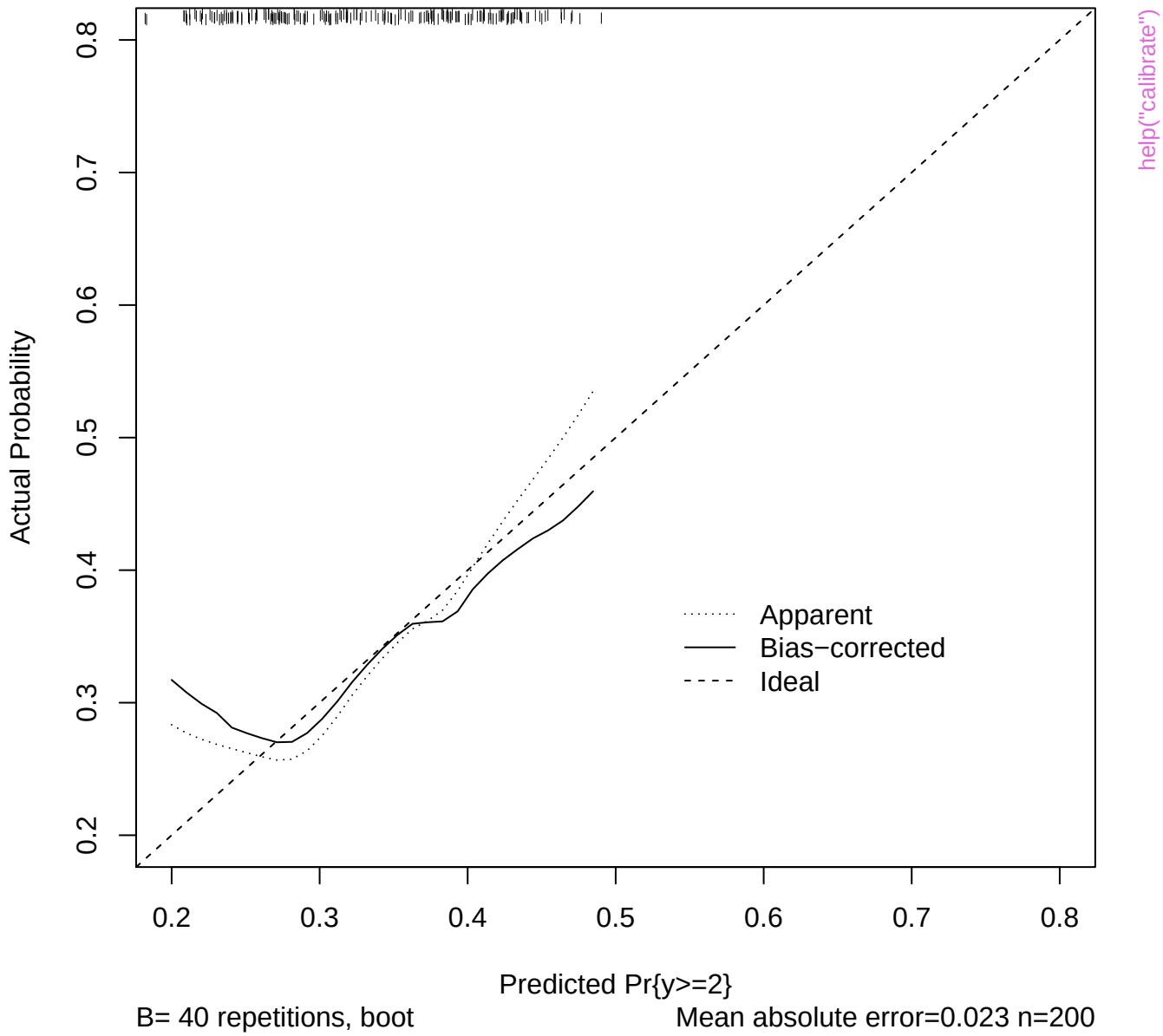


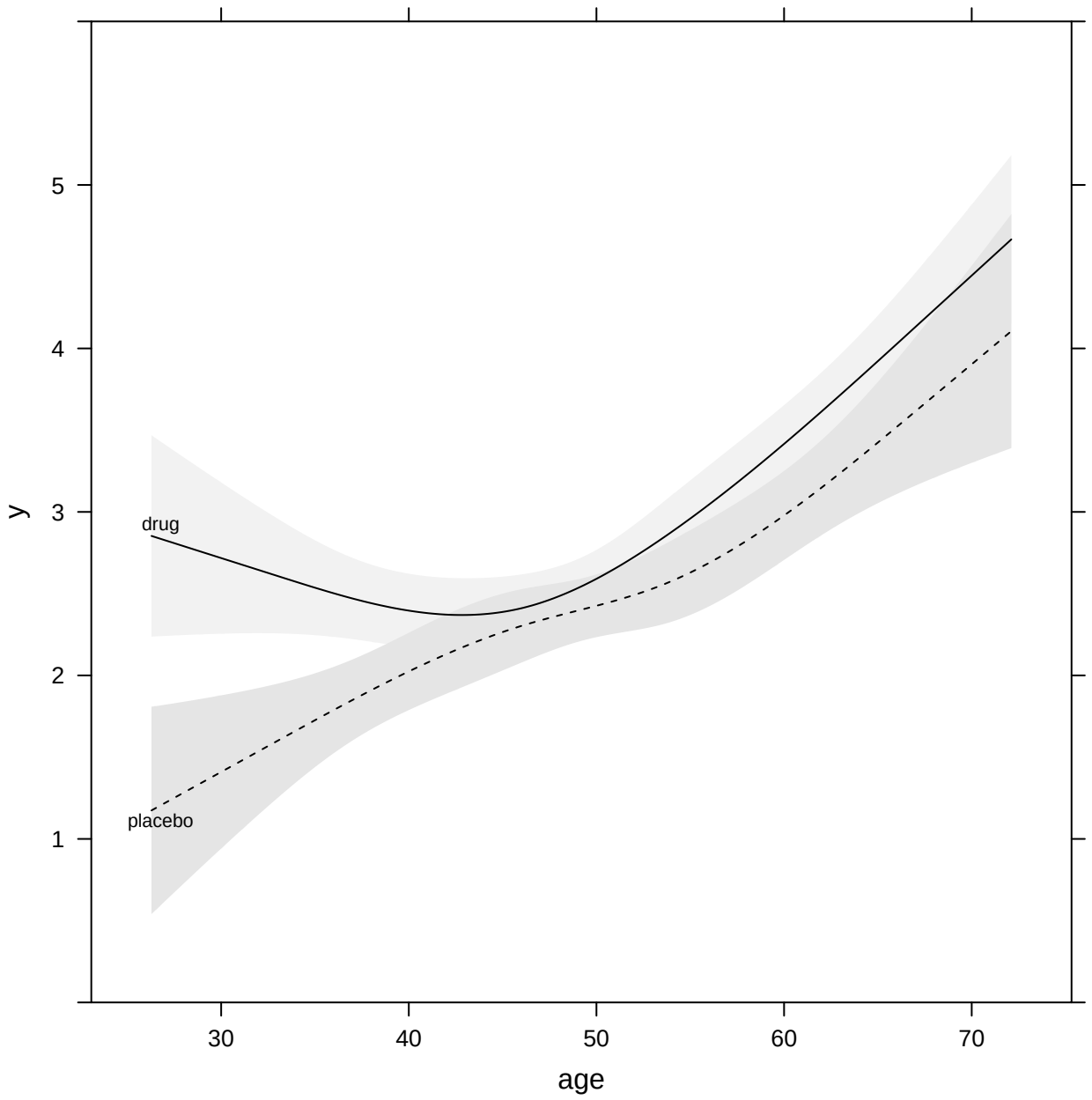
help("bplot")


Total Cholesterol, mg/dl
240
220
200
180
160
30
40
50
60
70
Age
Adjusted to: blood.pressure=119.3 sex=female
1.0
0.5
0.0
−0.5
−1.0
help("bplot")

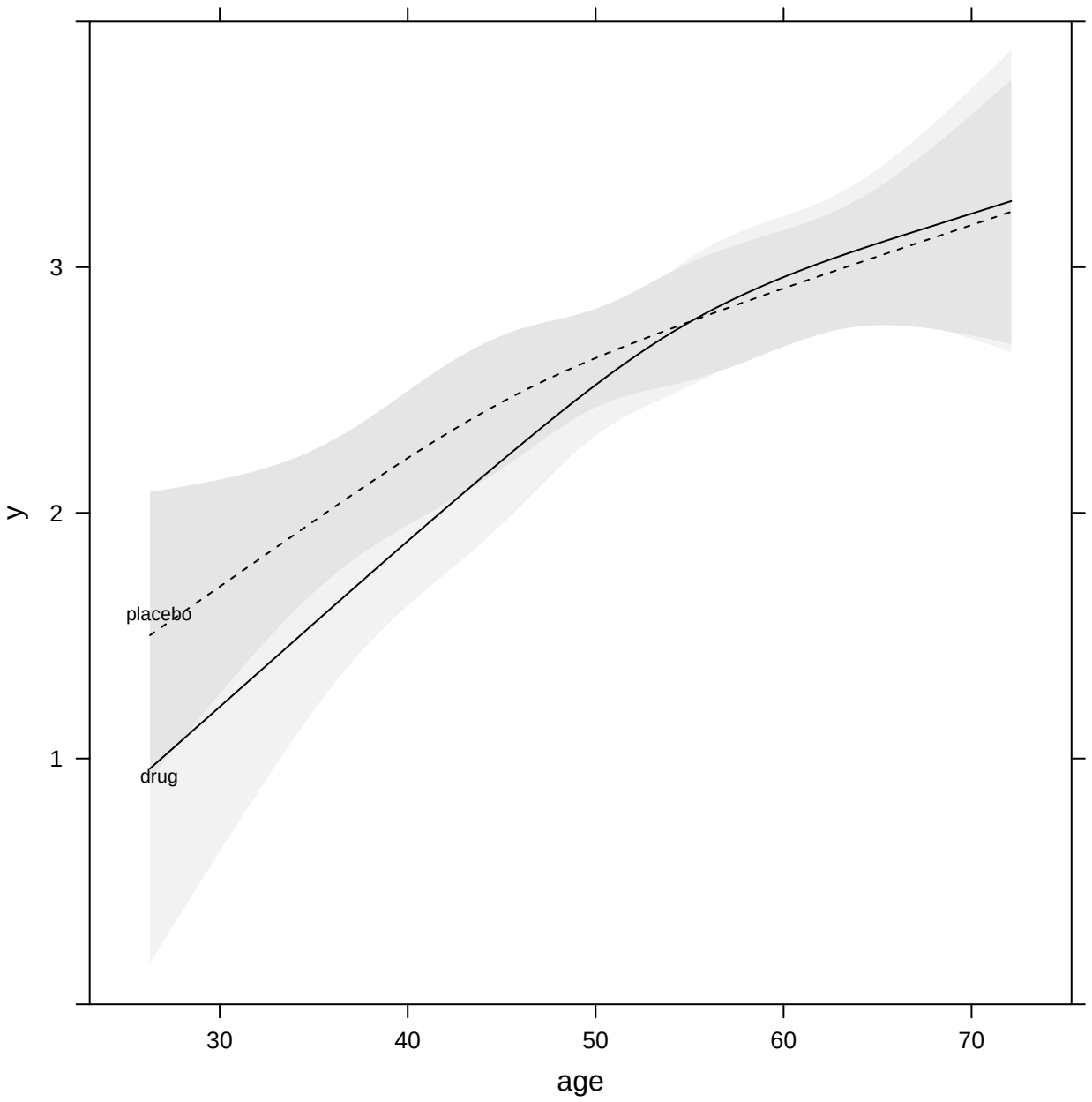

Total Cholesterol, mg/dl
240
220
200
180
160
30
40
50
60
70
Age
help("bplot")
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
Adjusted to: blood.pressure=119.3 sex=female


help("calibrate")
Fraction Surviving 2 Day
0.05
0.10
0.15
0.20
0.05
0.10
0.15
0.20
Predicted 2 Day Survival
Black: observed Gray: ideal
Blue : optimism corrected
B=20 based on observed−predicted
Mean |error|=0.018 0.9 Quantile=0.039

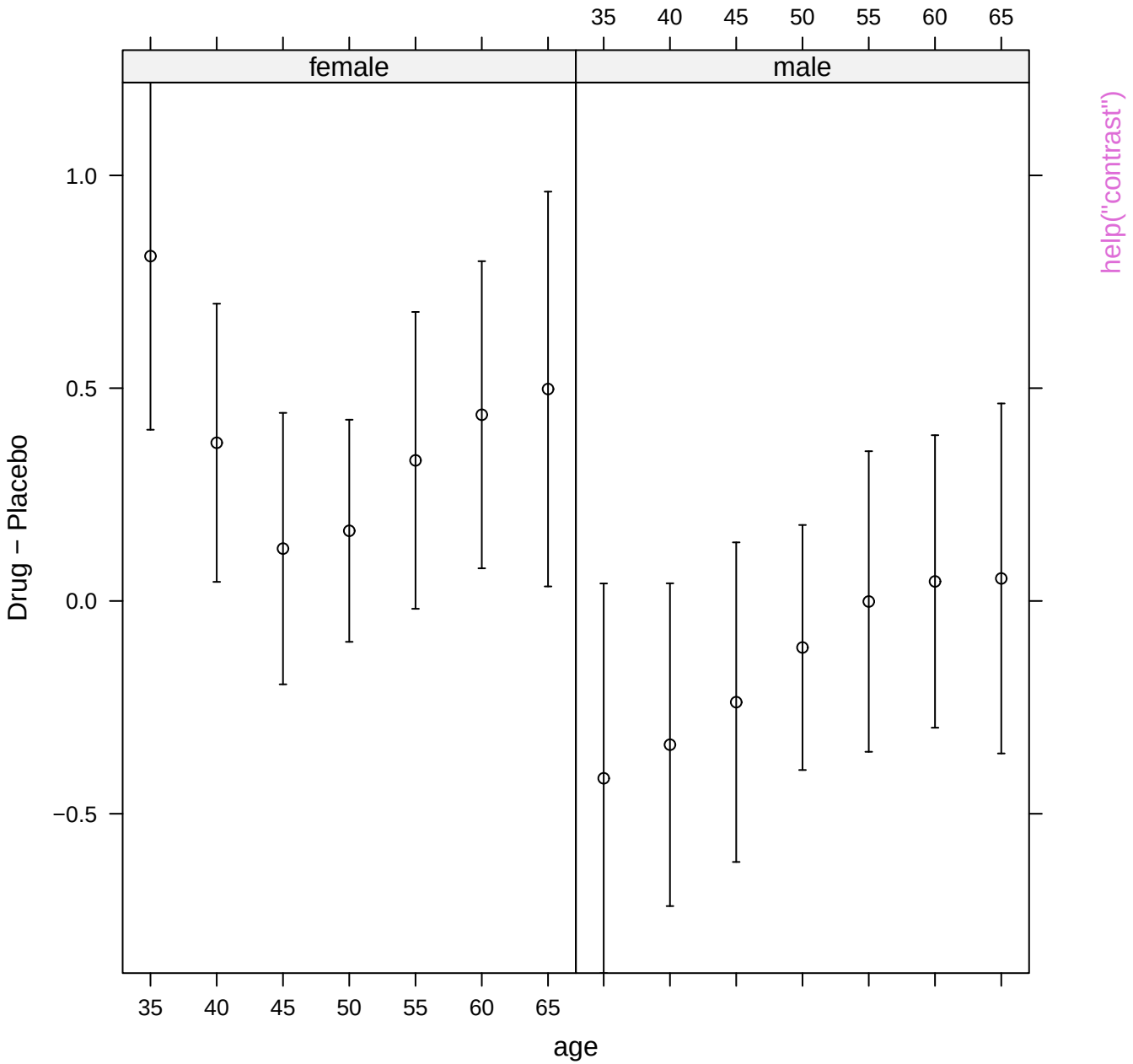

help("calibrate")
Actual Probability
0.2
0.3
0.4
0.5
0.6
0.7
0.8
Apparent
Bias−corrected
Ideal
Predicted Pr{y>=2}
B= 40 repetitions, boot
Mean absolute error=0.023 n=200

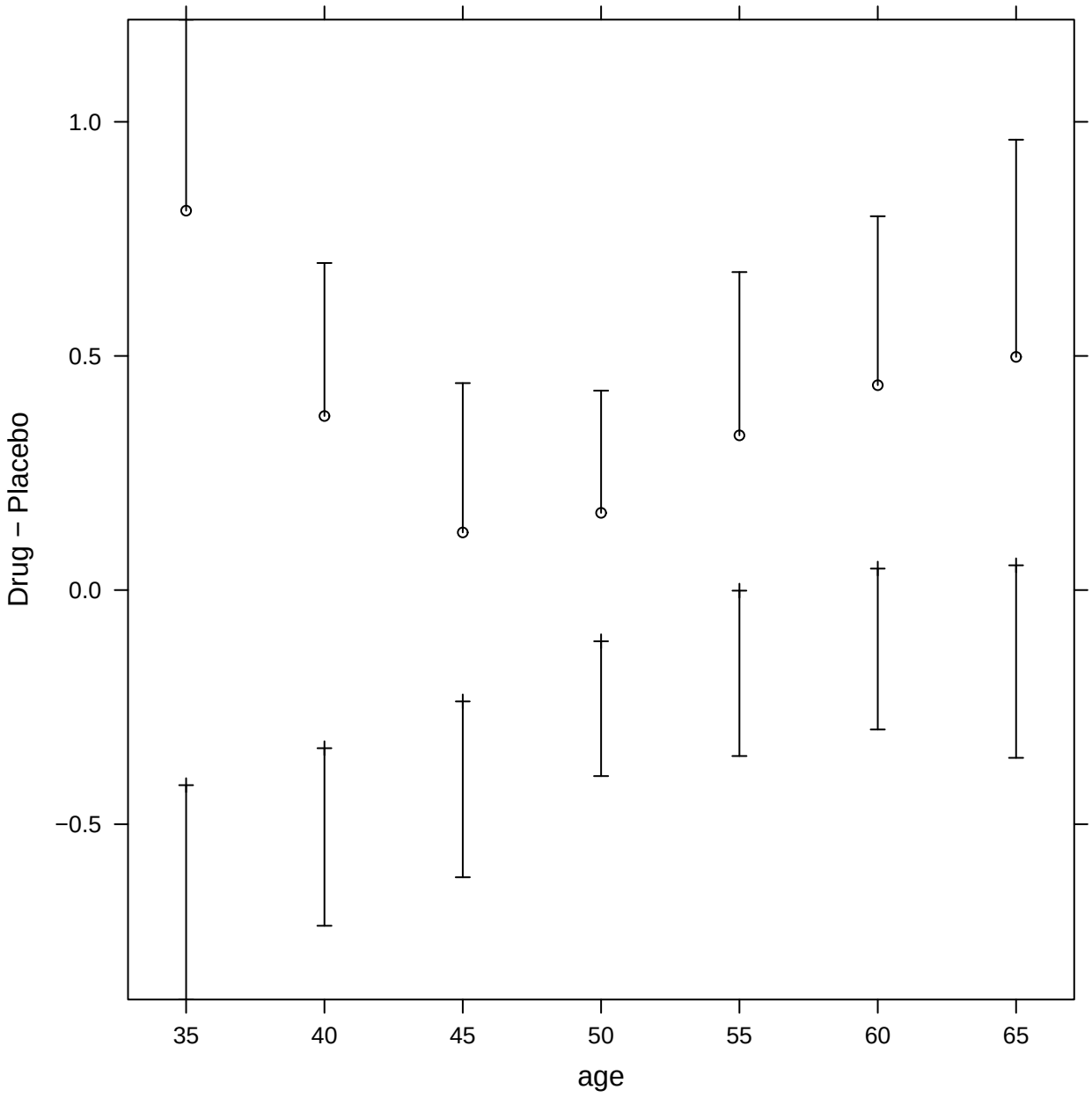


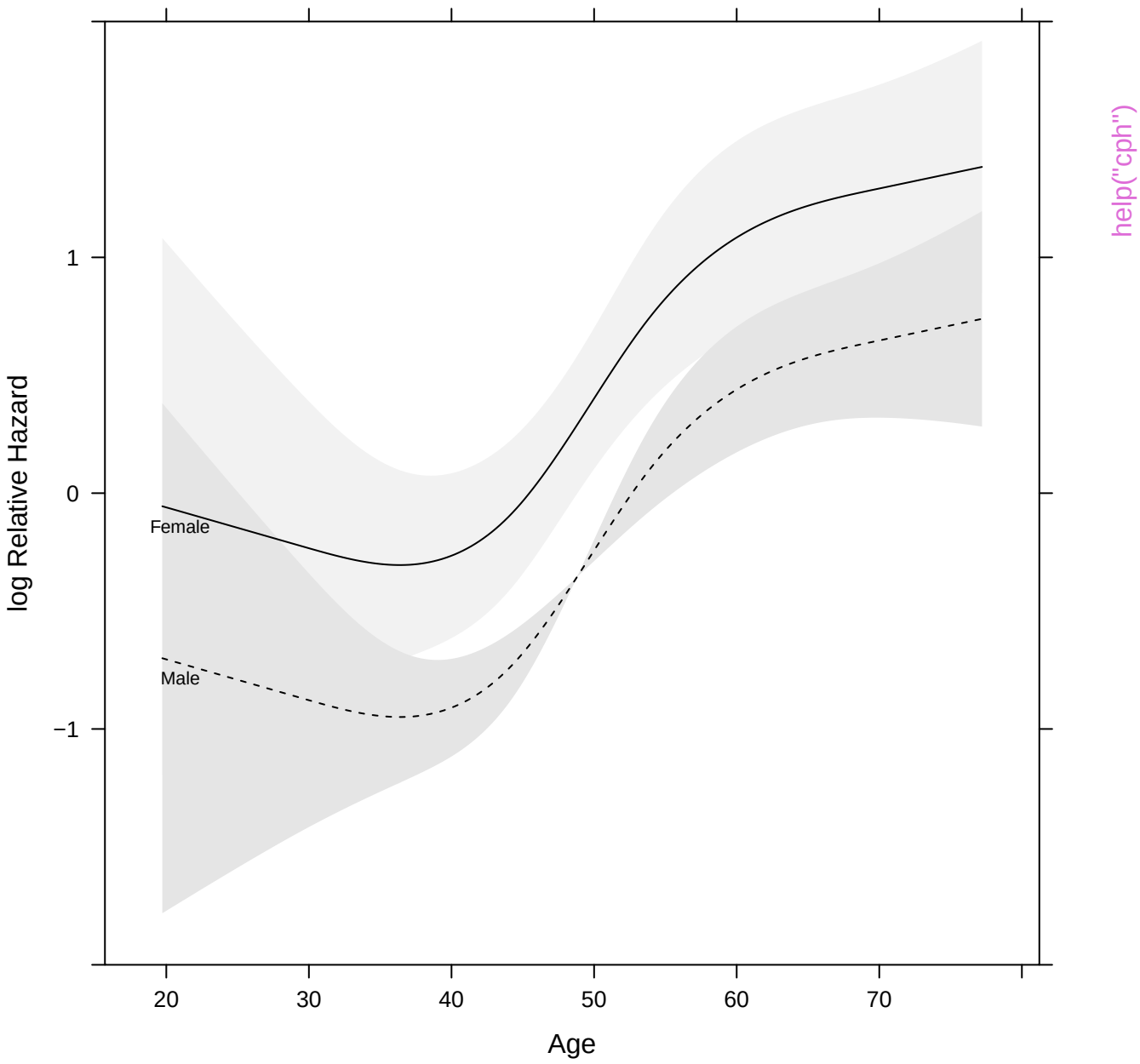
help("contrast")

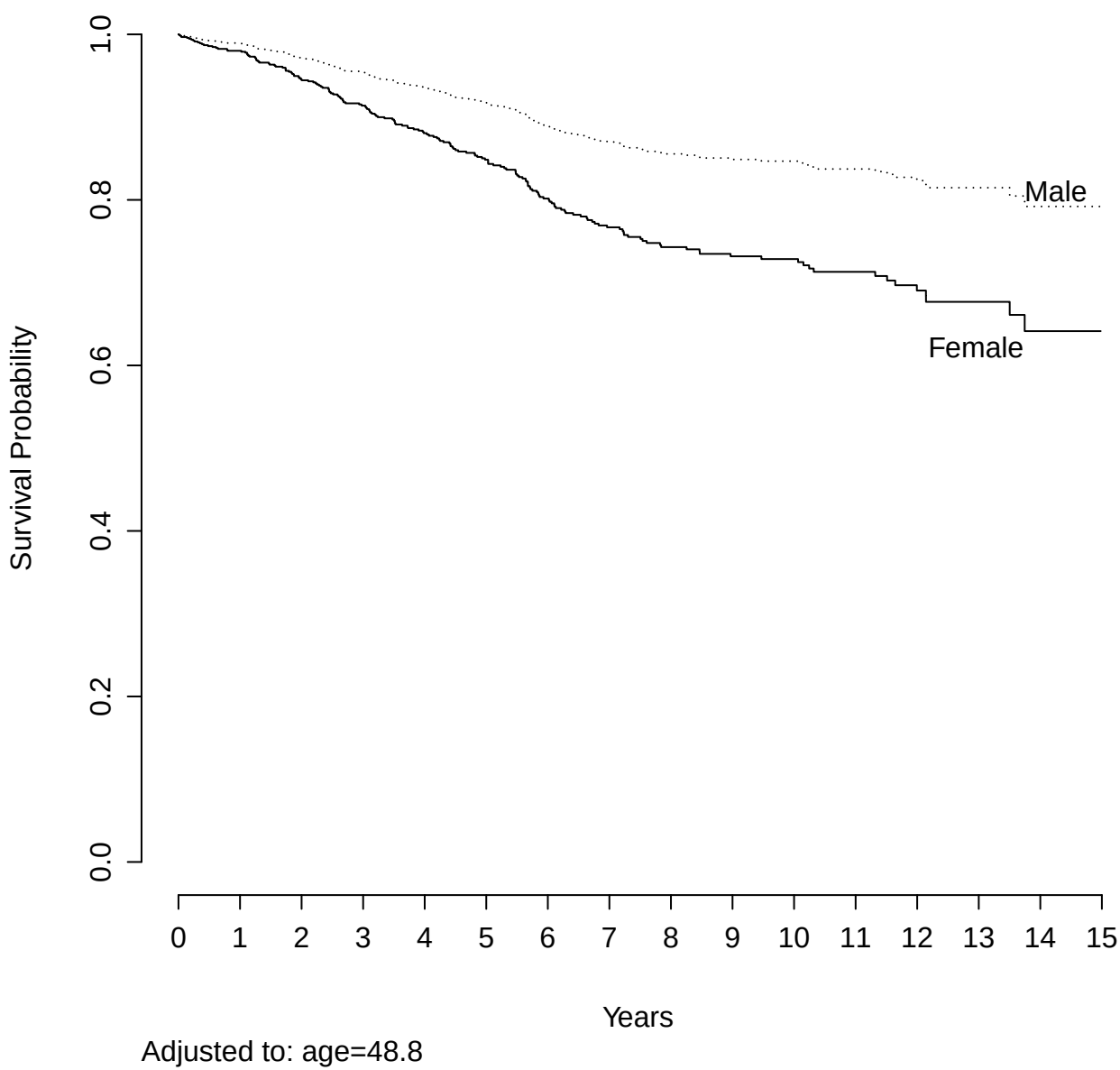


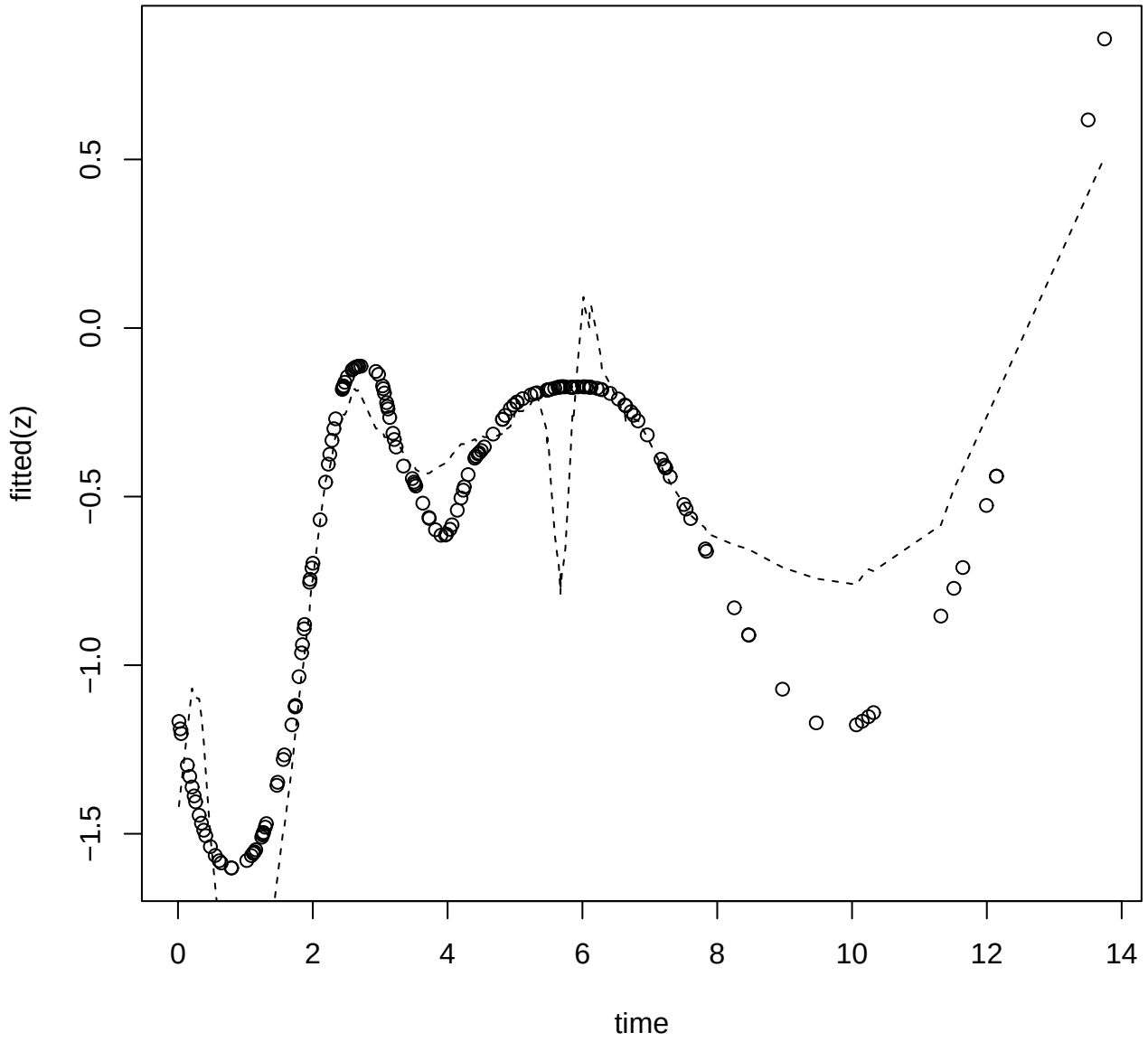
help("contrast")


female
male
35
40
45
50
55
60
65
1.0
0.5
0.0
−0.5
Drug – Placebo
age
help("contrast")

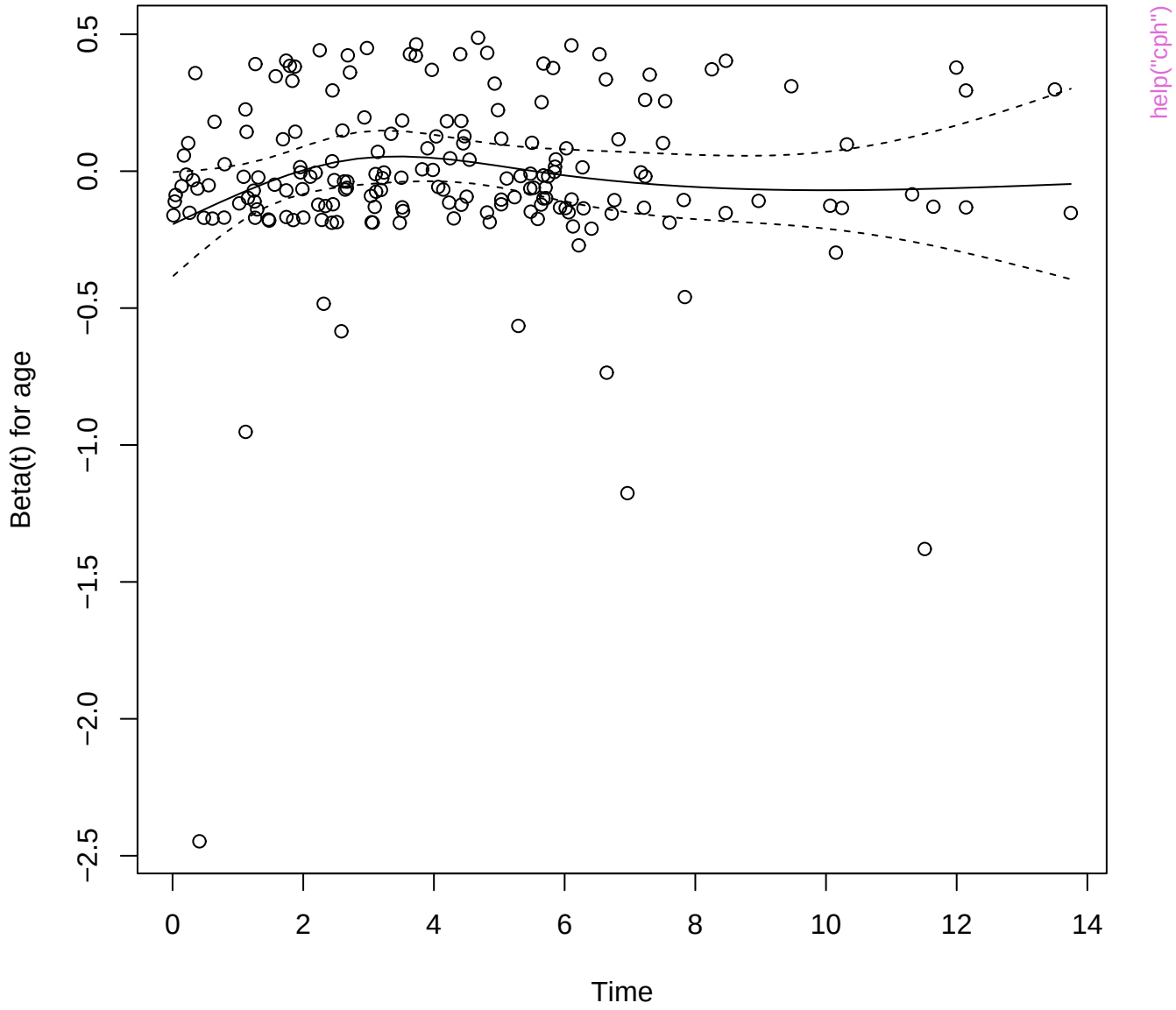

Drug – Placebo
1.0
0.5
0.0
−0.5
35
40
45
50
55
60
65
age
help("contrast")

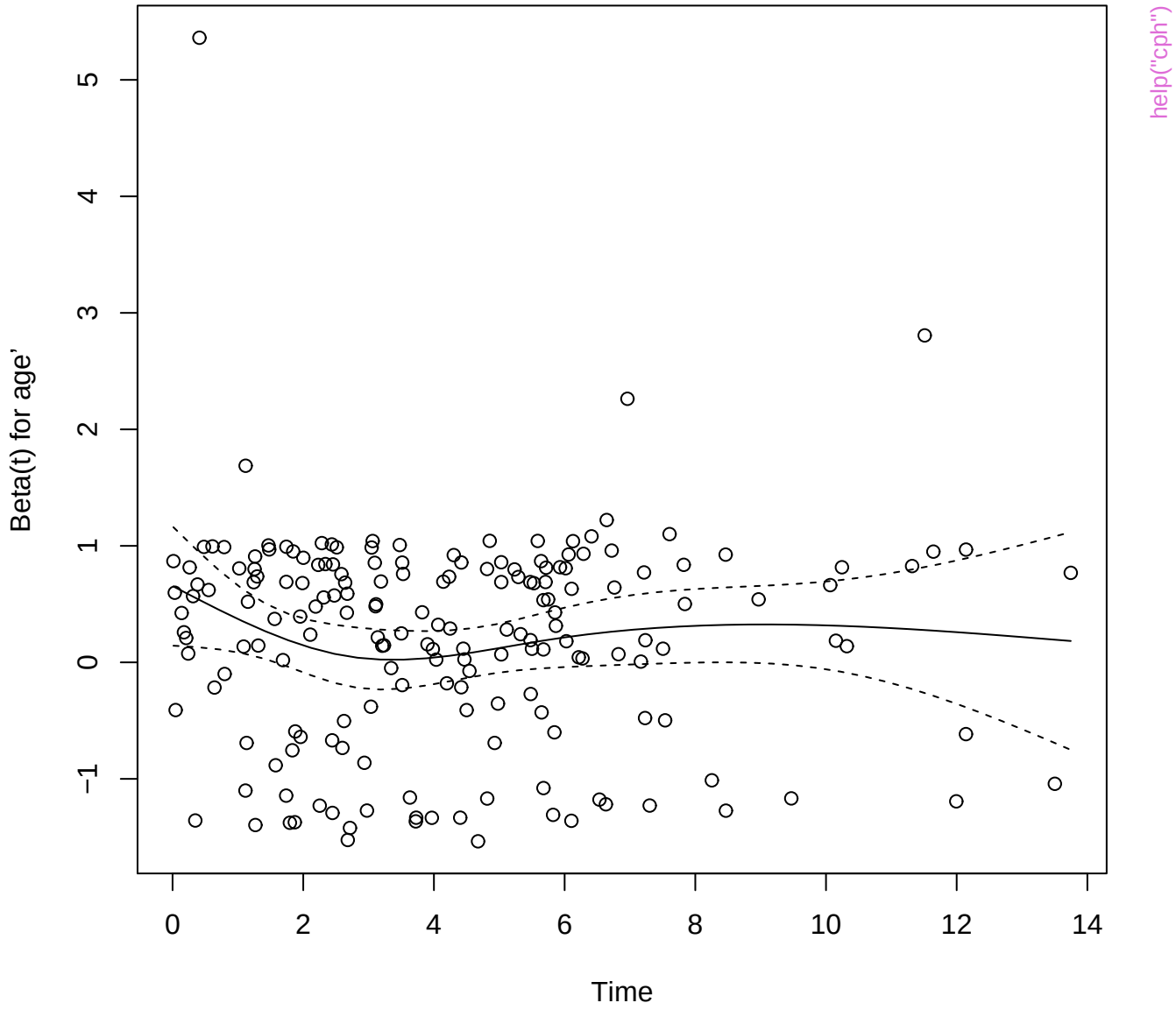

log Relative Hazard
1
0
−1
Female
Male
20
30
40
50
60
70
Age
help("cph")

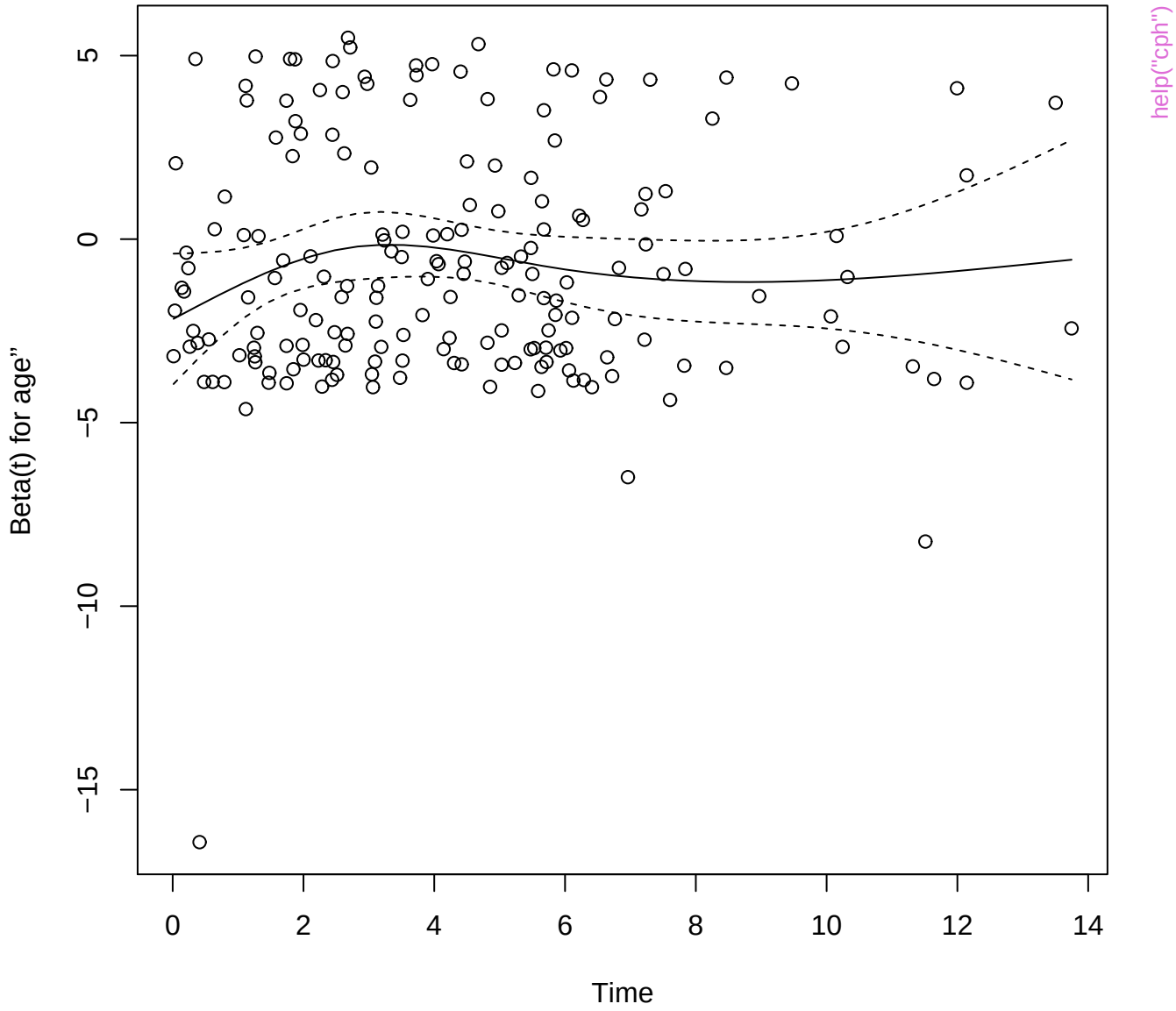

help("cph")
Survival Probability
1.0
0.8
0.6
0.4
0.2
0.0
Male
Female
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Years
Adjusted to: age=48.8

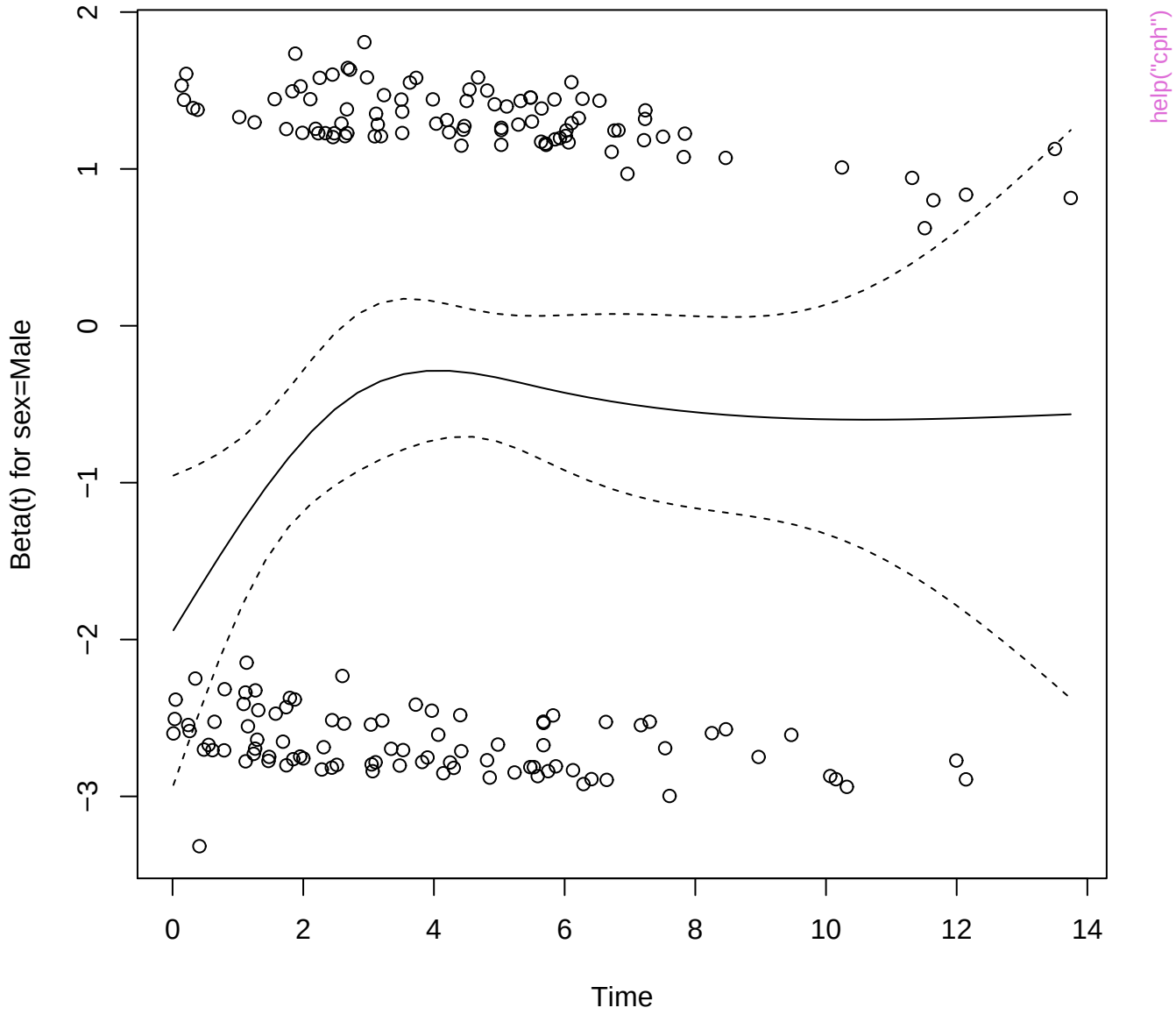


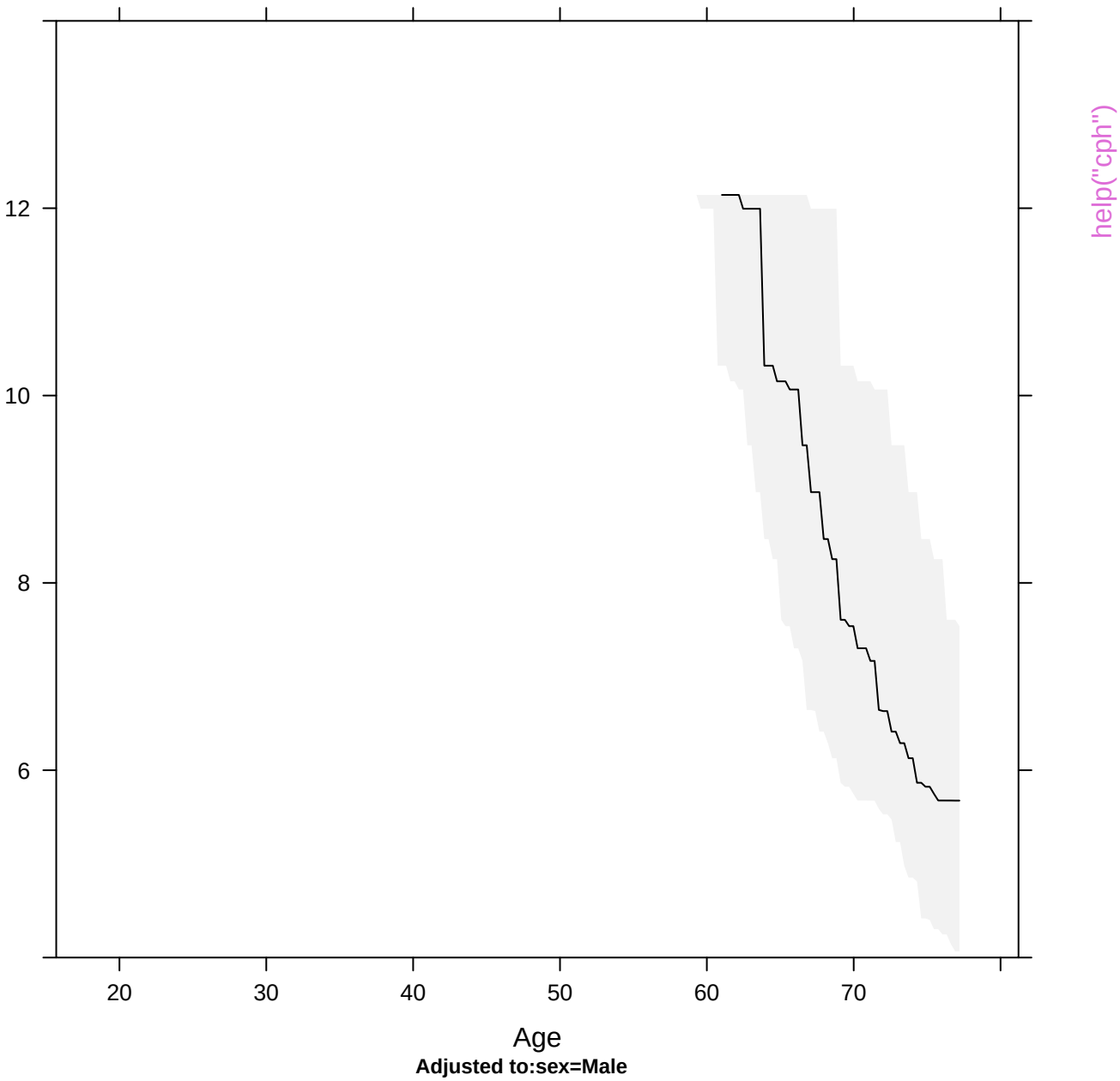
help("cph")

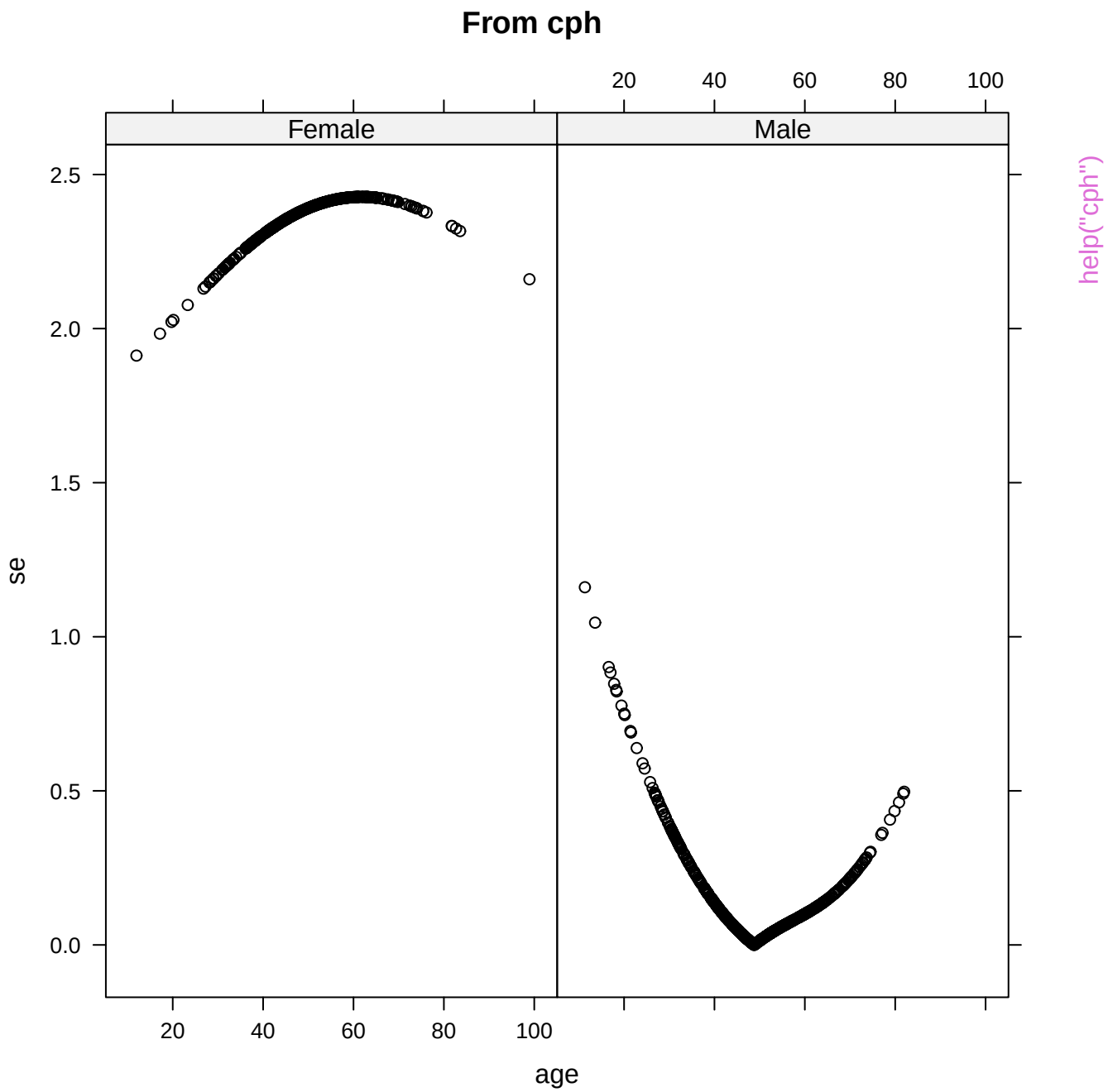

Beta(t) for age
0.5
0.0
−0.5
−1.0
−1.5
−2.0
−2.5
0
2
4
6
8
10
12
14
Time
help("cph")

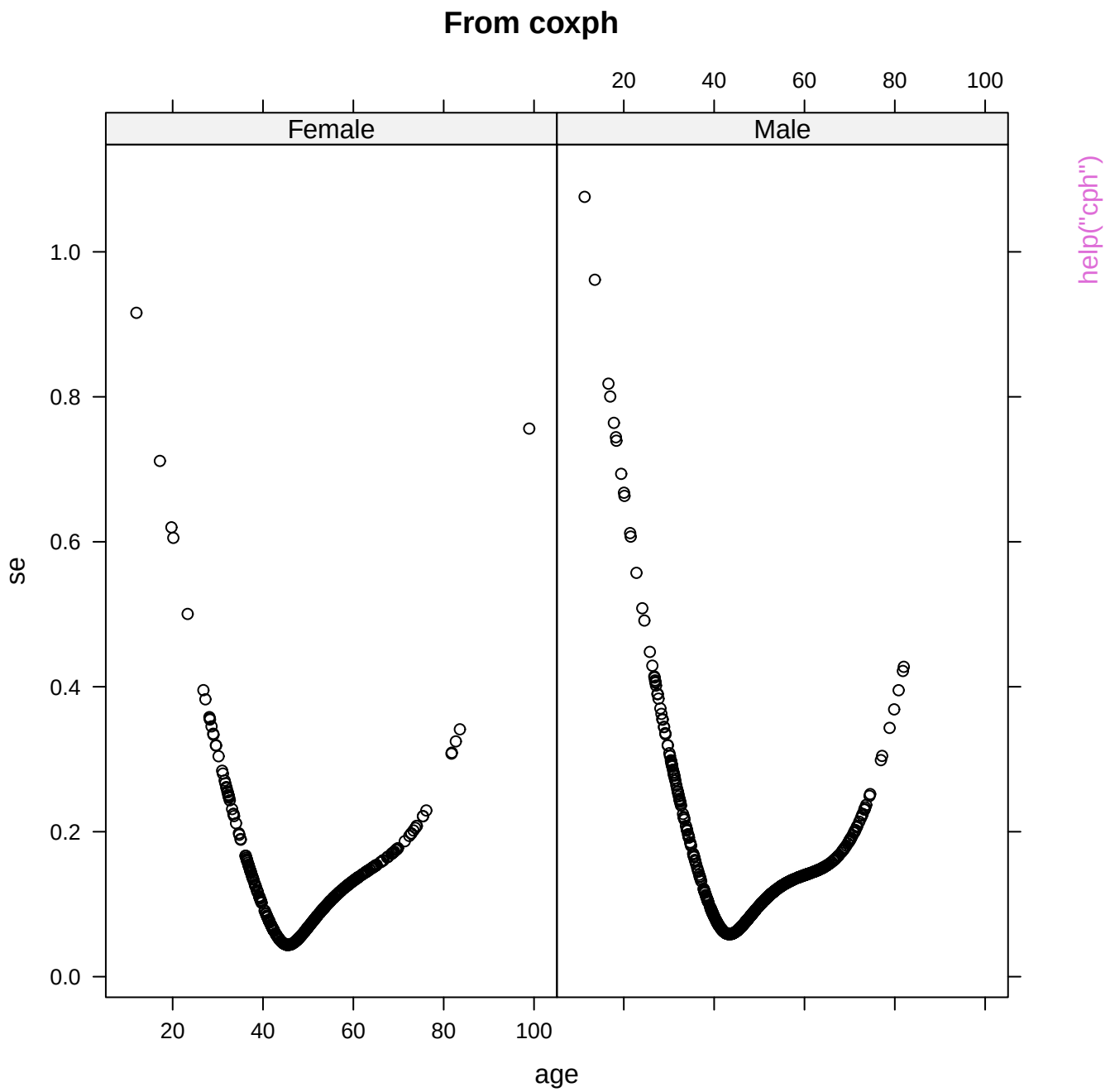

Beta(t) for age'
5
4
3
2
1
0
−1
0
2
4
6
8
10
12
14
Time
help("cph")

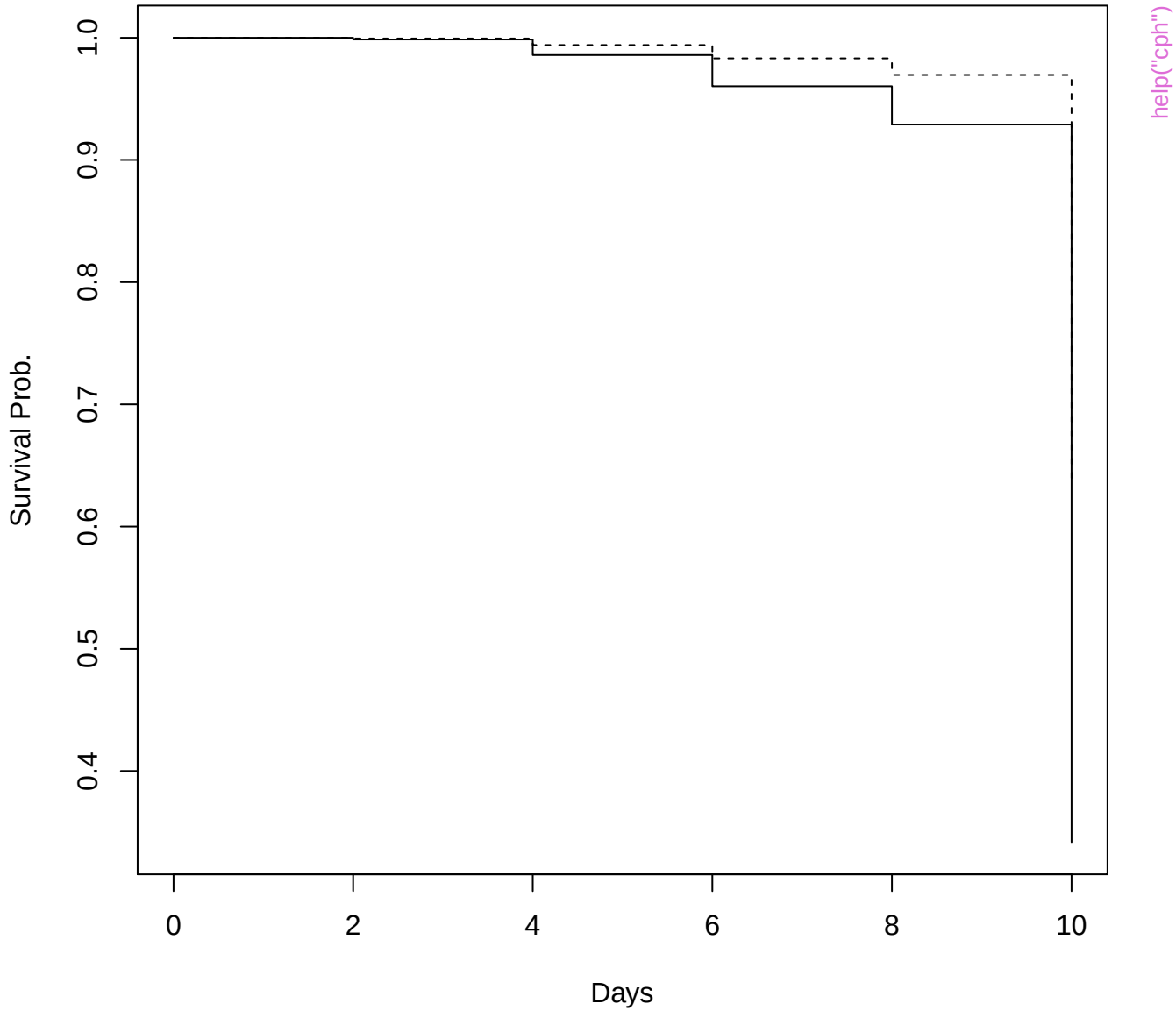

Beta(t) for age"
5
0
−5
−10
−15
0
2
4
6
8
10
12
14
Time
help("cph")

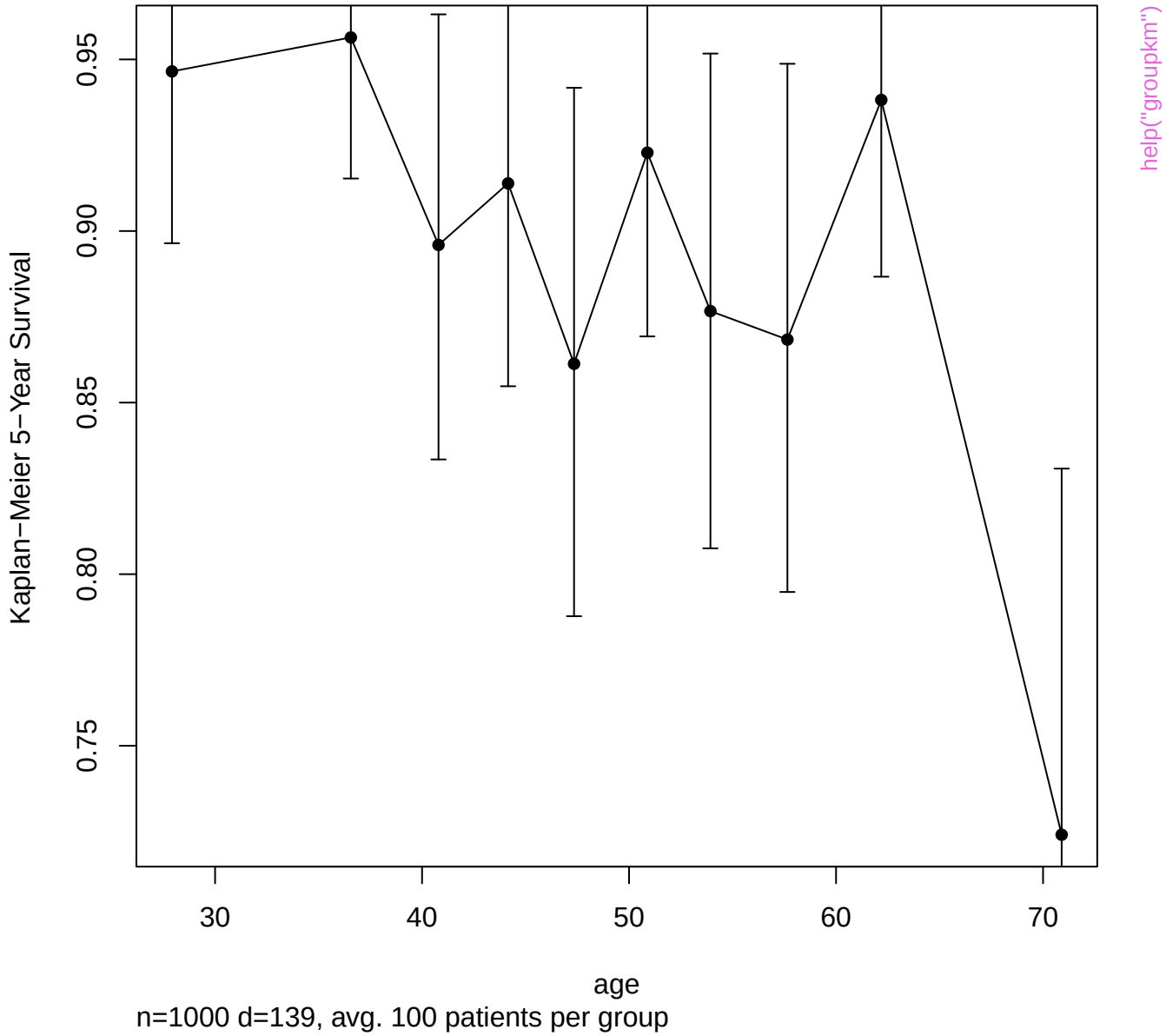

Beta(t) for sex=Male
Time
help("cph")

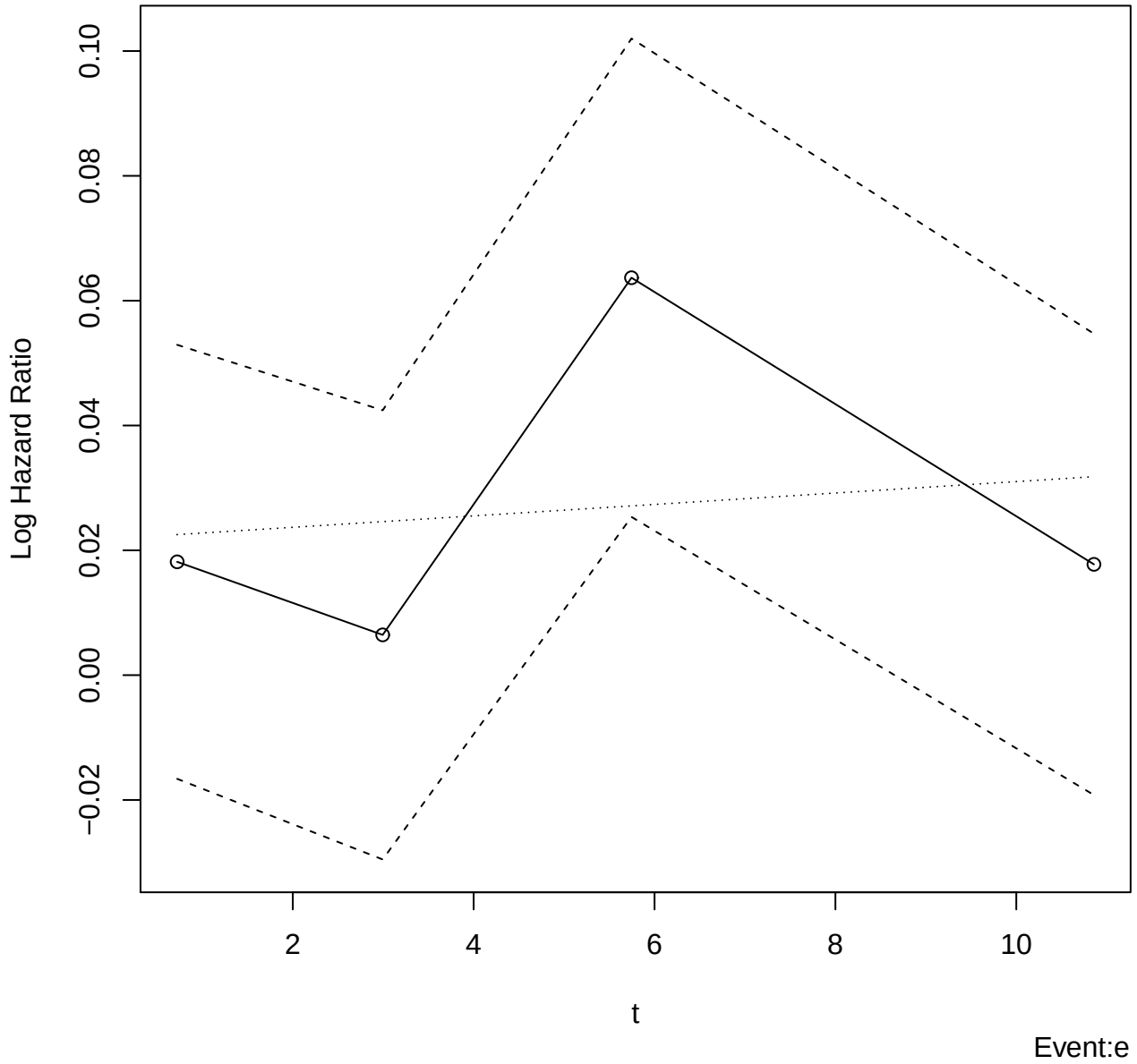

12
10
8
6
20
30
40
50
60
70
Age
Adjusted to:sex=Male
help("cph")

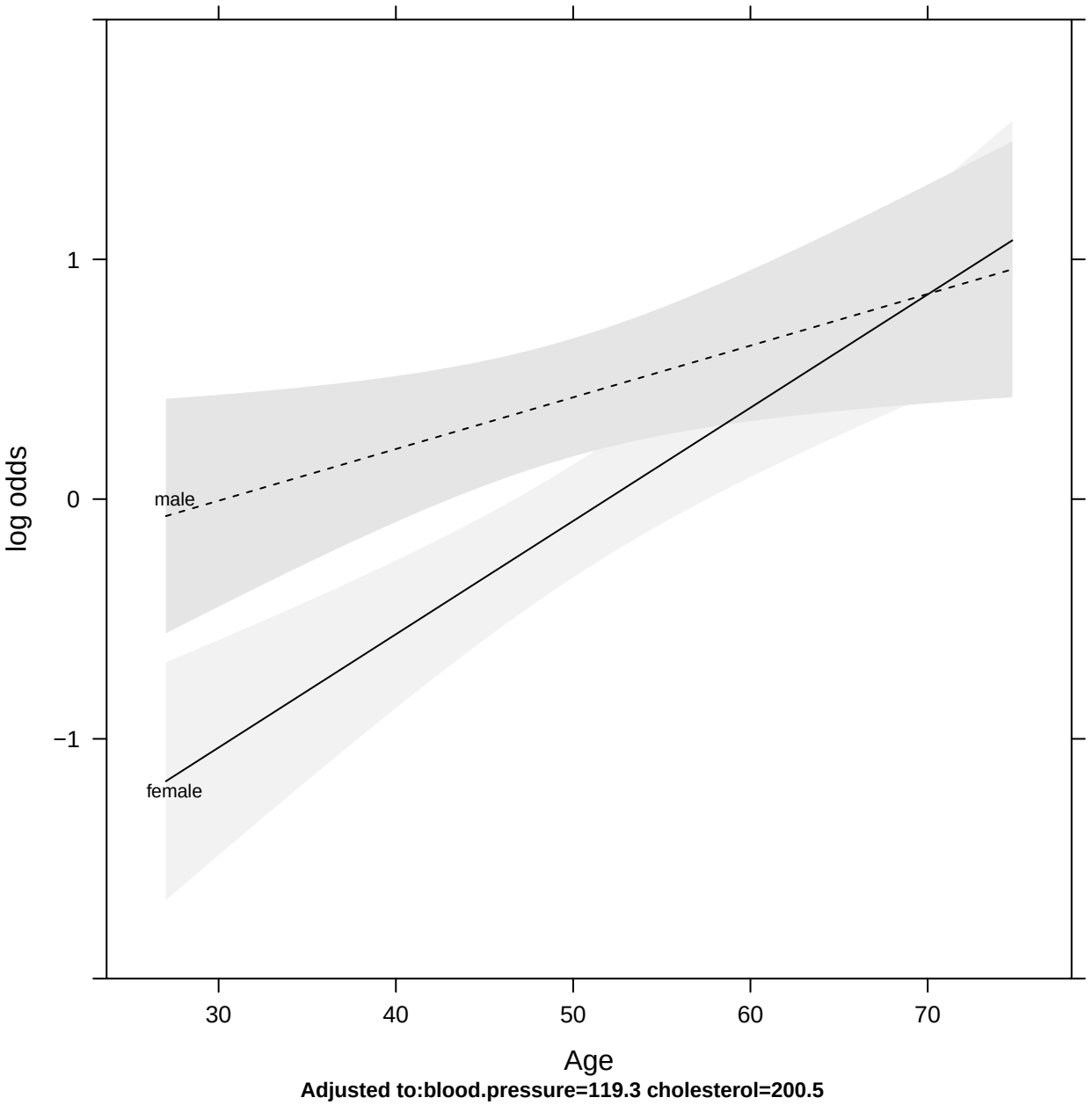

From cph
Female
Male
se
age
help("cph")

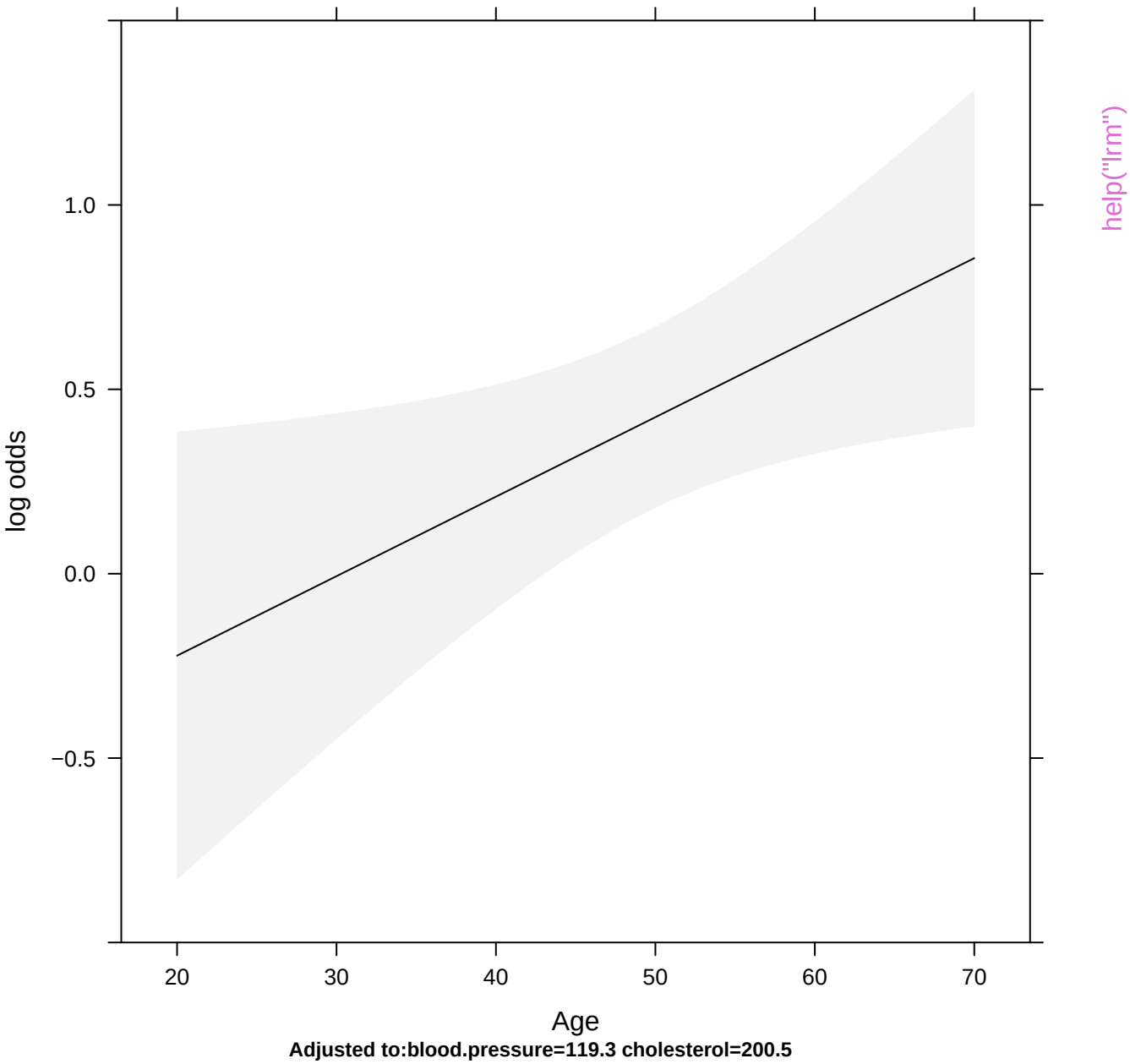

From coxph
Female
Male
se
age
help("cph")

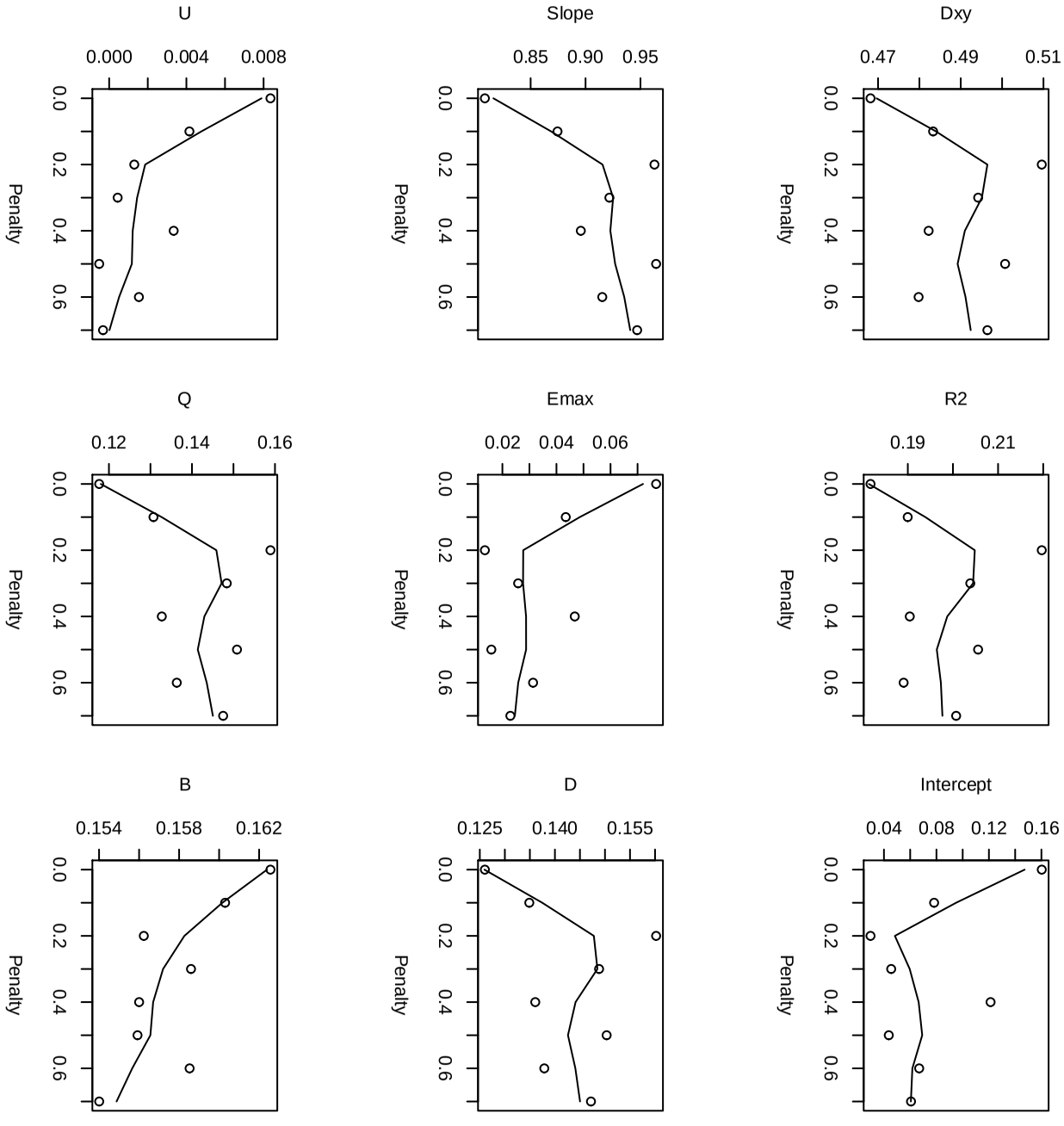

Survival Prob.
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0
2
4
6
8
10
Days
help("cph")


Kaplan−Meier 5−Year Survival
0.75
0.80
0.85
0.90
0.95
30
40
50
60
70
age
n=1000 d=139, avg. 100 patients per group
help("groupkm")

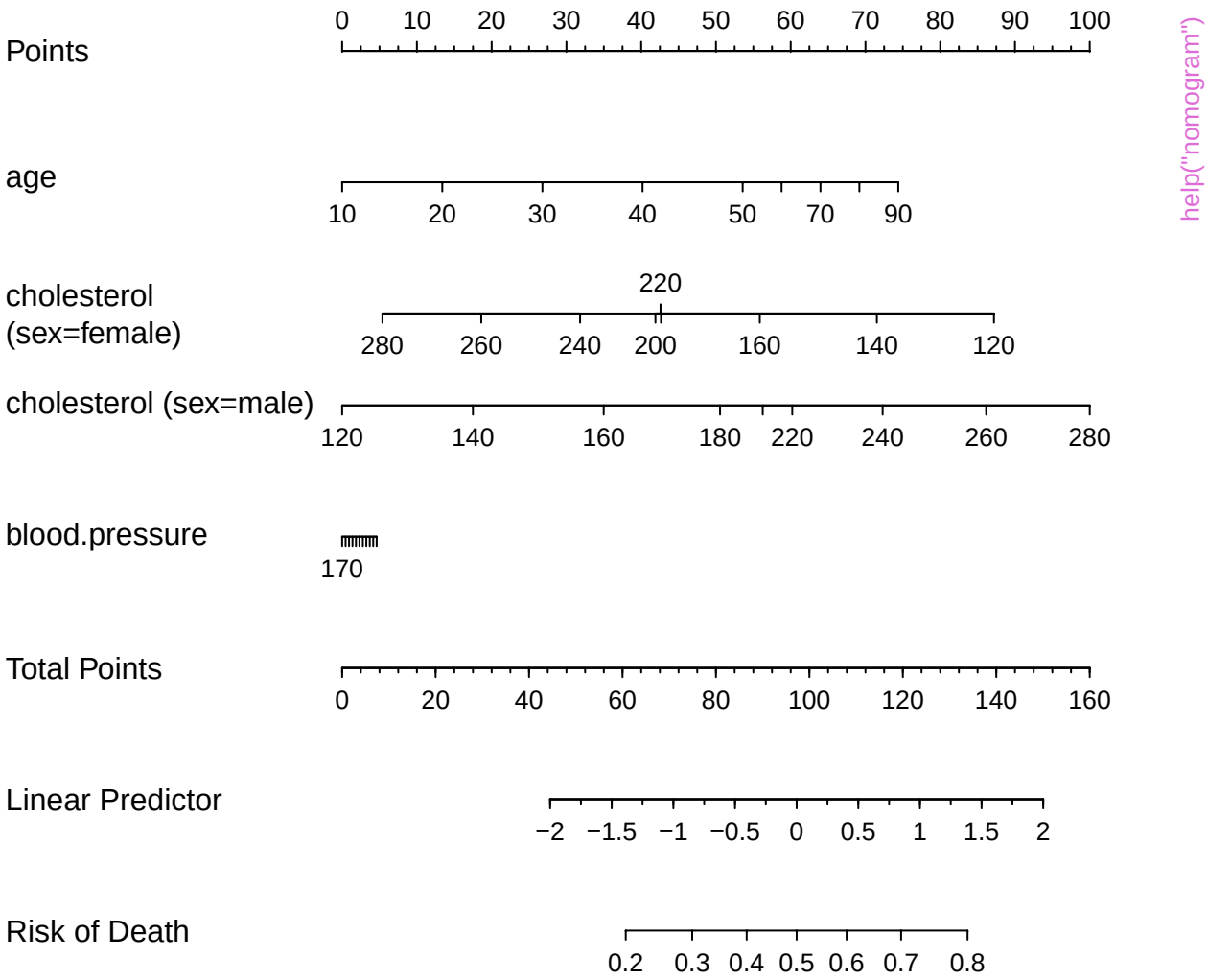

Log Hazard Ratio
0.10
0.08
0.06
0.04
0.02
0.00
−0.02
2
4
6
8
10
t
Event:e
help("hazard.ratio.plot")

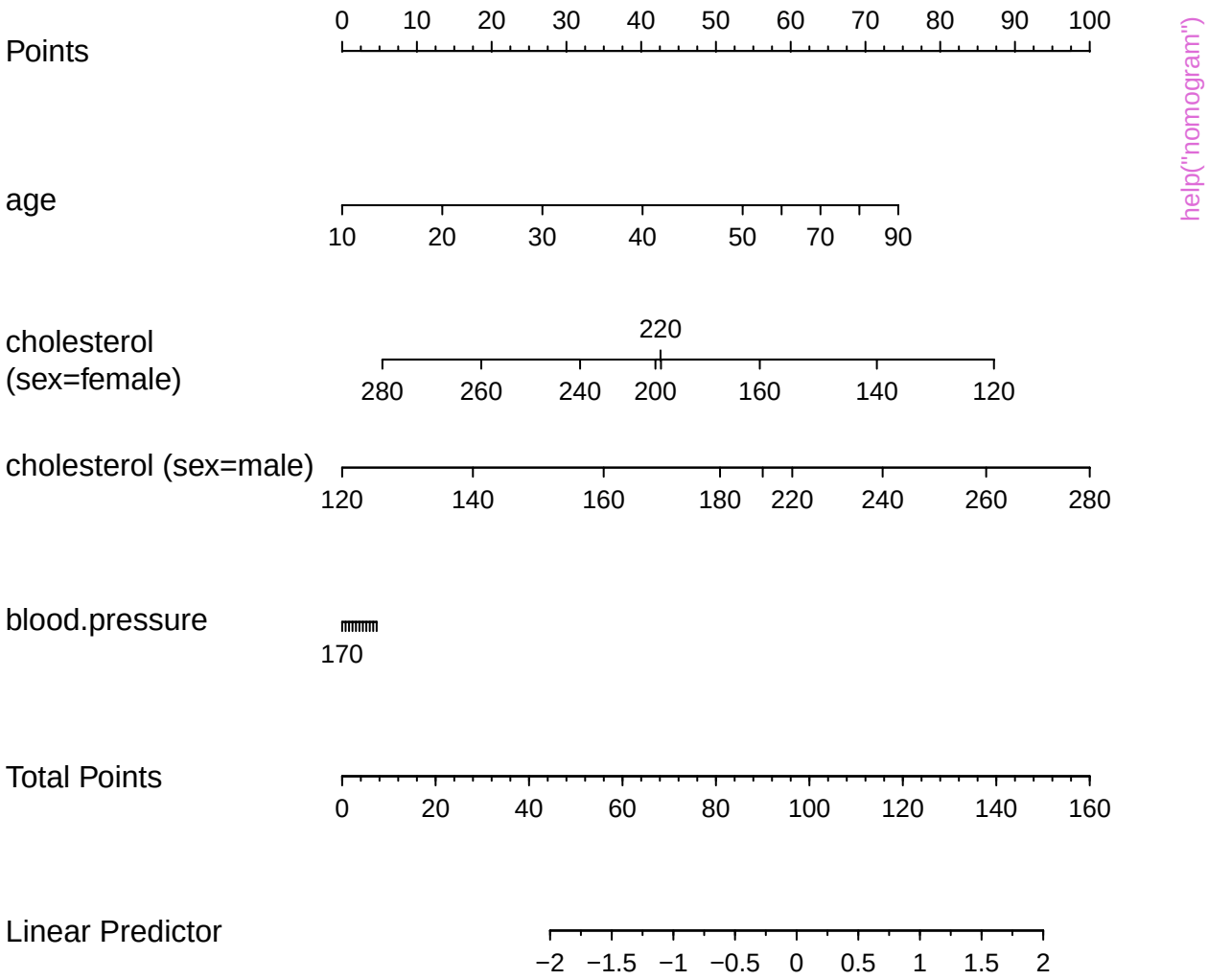

log odds
1
0
−1
male
female
30
40
50
60
70
Age
Adjusted to:blood.pressure=119.3 cholesterol=200.5
help("lrm")

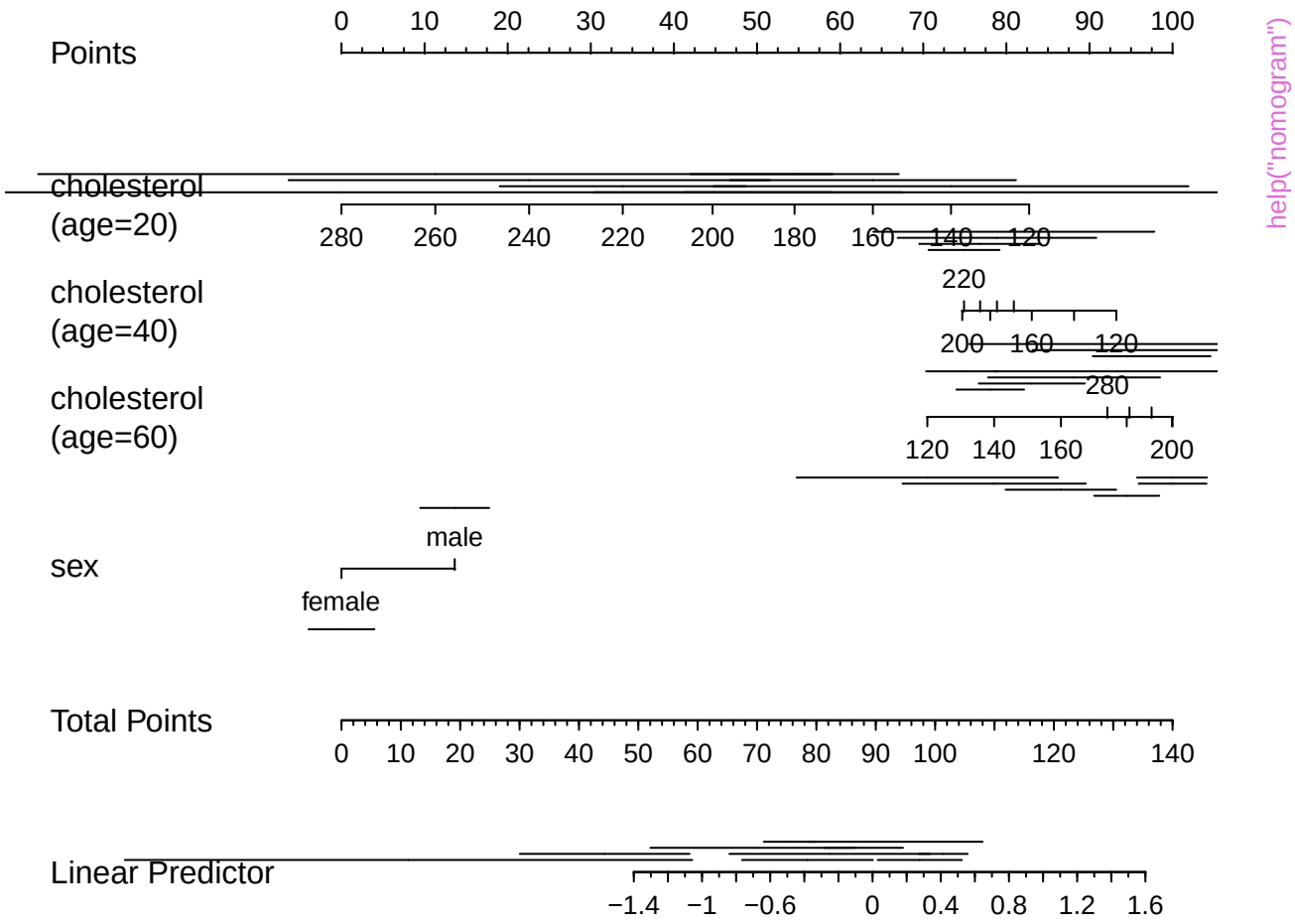

log odds
1.0
0.5
0.0
−0.5
20
30
40
50
60
70
Age
Adjusted to:blood.pressure=119.3 cholesterol=200.5
help("lrm")

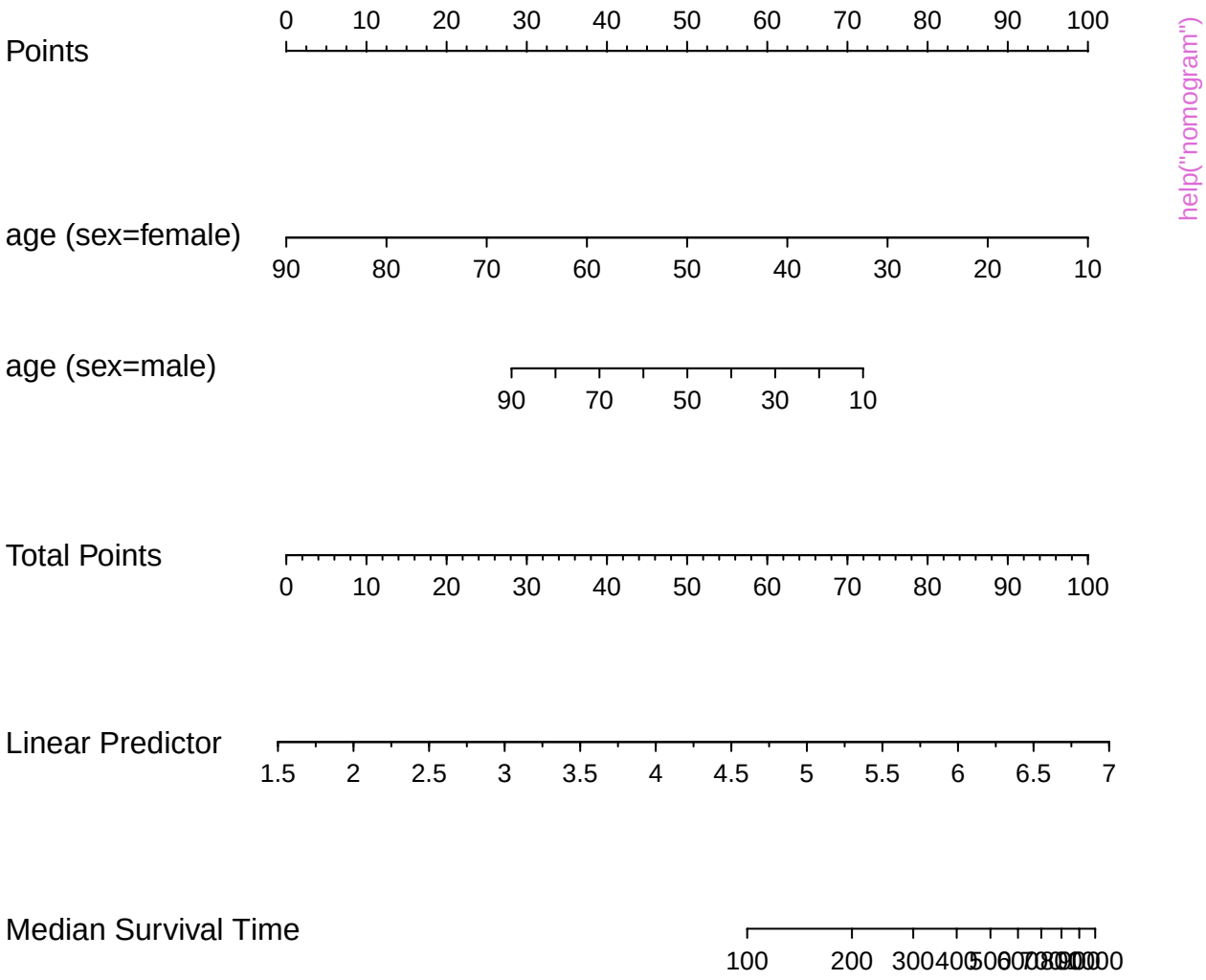

U
0.000
0.004
0.008
Slope
0.85
0.90
0.95
Dxy
0.47
0.49
0.51
Q
0.12
0.14
0.16
Emax
0.02
0.04
0.06
R2
0.19
0.21
B
0.154
0.158
0.162
D
0.125
0.140
0.155
Intercept
0.04
0.08
0.12
0.16
Penalty
0.0
0.2
0.4
0.6

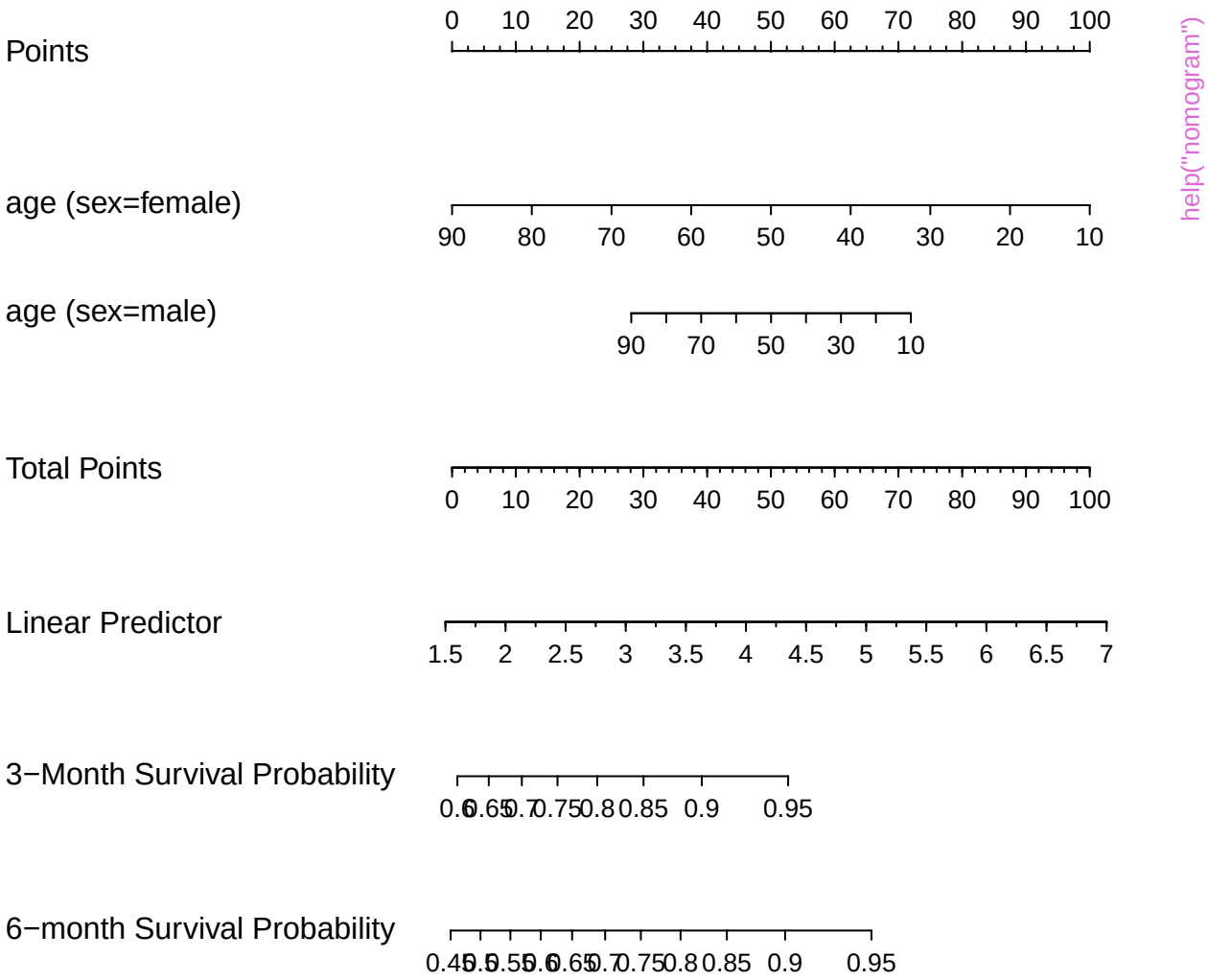
help("lrm")

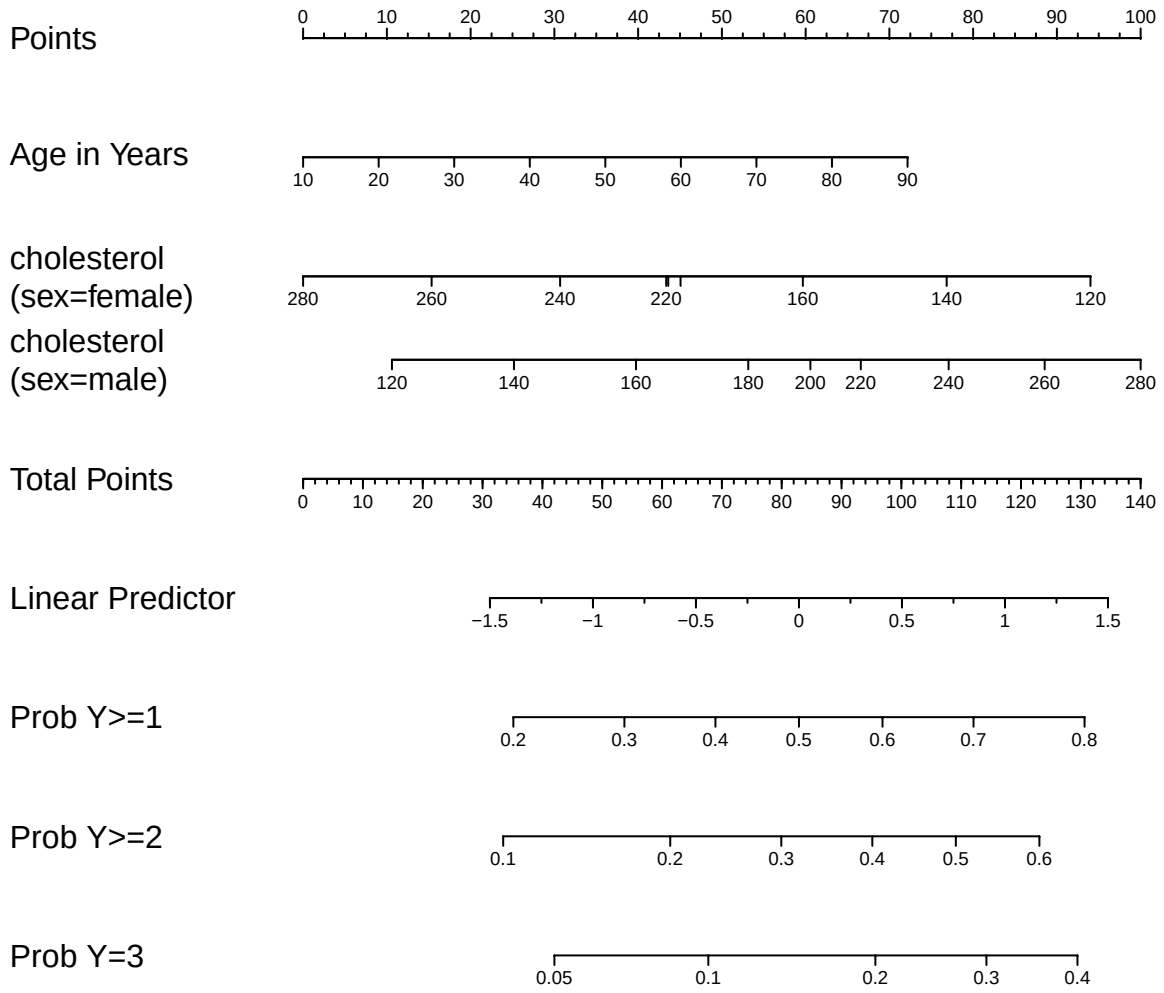

Points
0 10 20 30 40 50 60 70 80 90 100
age
10 20 30 40 50 70 90
cholesterol
(sex=female)
220
280 260 240 200 160 140 120
cholesterol (sex=male)
120 140 160 180 220 240 260 280
blood.pressure
170
Total Points
0 20 40 60 80 100 120 140 160
Linear Predictor
−2 −1.5 −1 −0.5 0 0.5 1 1.5 2
Risk of Death
0.2 0.3 0.4 0.5 0.6 0.7 0.8
help("nomogram")

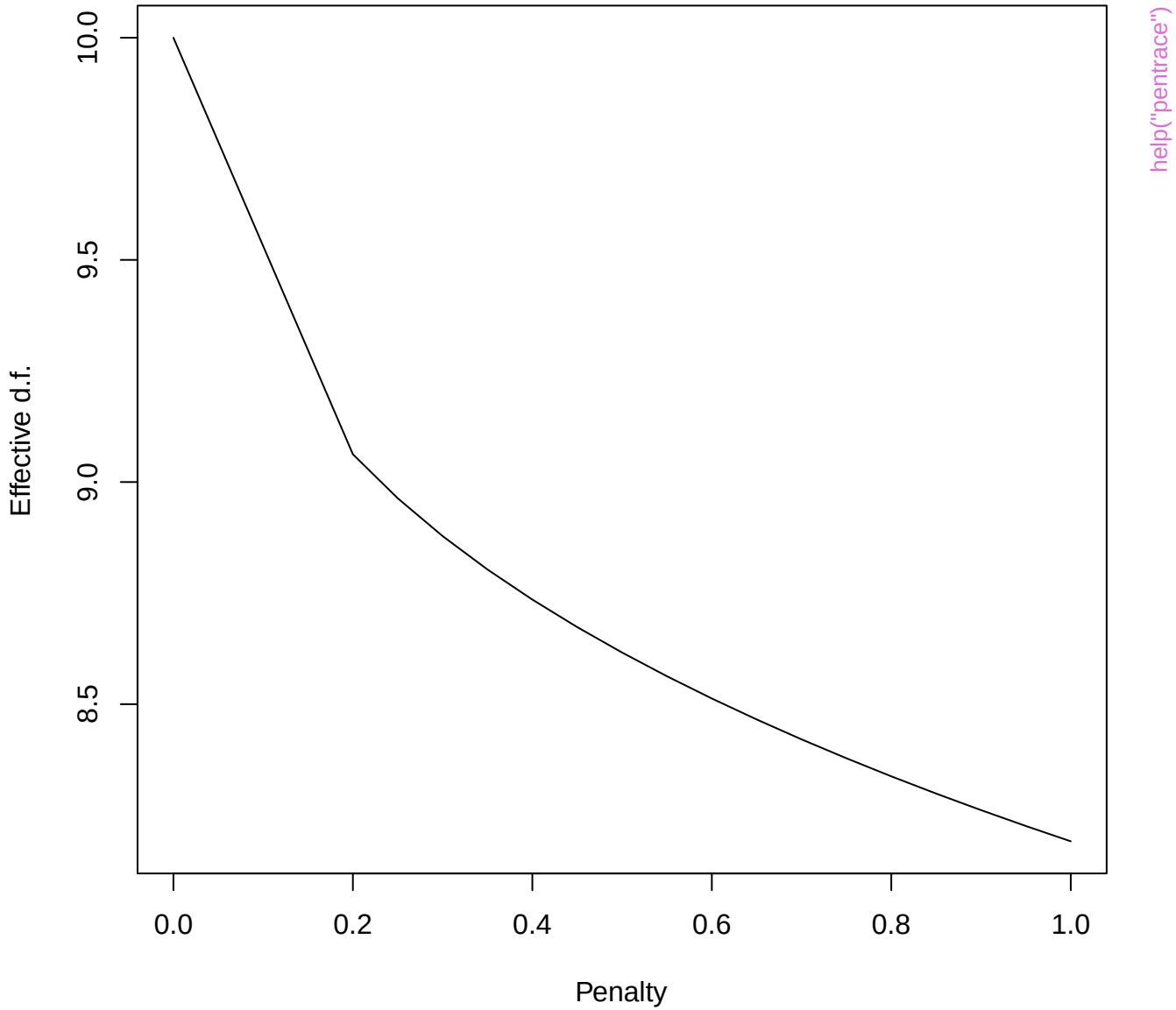

Points
0 10 20 30 40 50 60 70 80 90 100
age
10 20 30 40 50 70 90
cholesterol
(sex=female)
220
280 260 240 200 160 140 120
cholesterol (sex=male)
120 140 160 180 220 240 260 280
blood.pressure
170
Total Points
0 20 40 60 80 100 120 140 160
Linear Predictor
−2 −1.5 −1 −0.5 0 0.5 1 1.5 2
help("nomogram")


Points
0 10 20 30 40 50 60 70 80 90 100
cholesterol (age=20)
280 260 240 220 200 180 160 140 120
cholesterol (age=40)
220
200 160 120
cholesterol (age=60)
280
120 140 160 200
sex
male
female
Total Points
0 10 20 30 40 50 60 70 80 90 100 120 140
Linear Predictor
−1.4 −1 −0.6 0 0.4 0.8 1.2 1.6
help("nomogram")

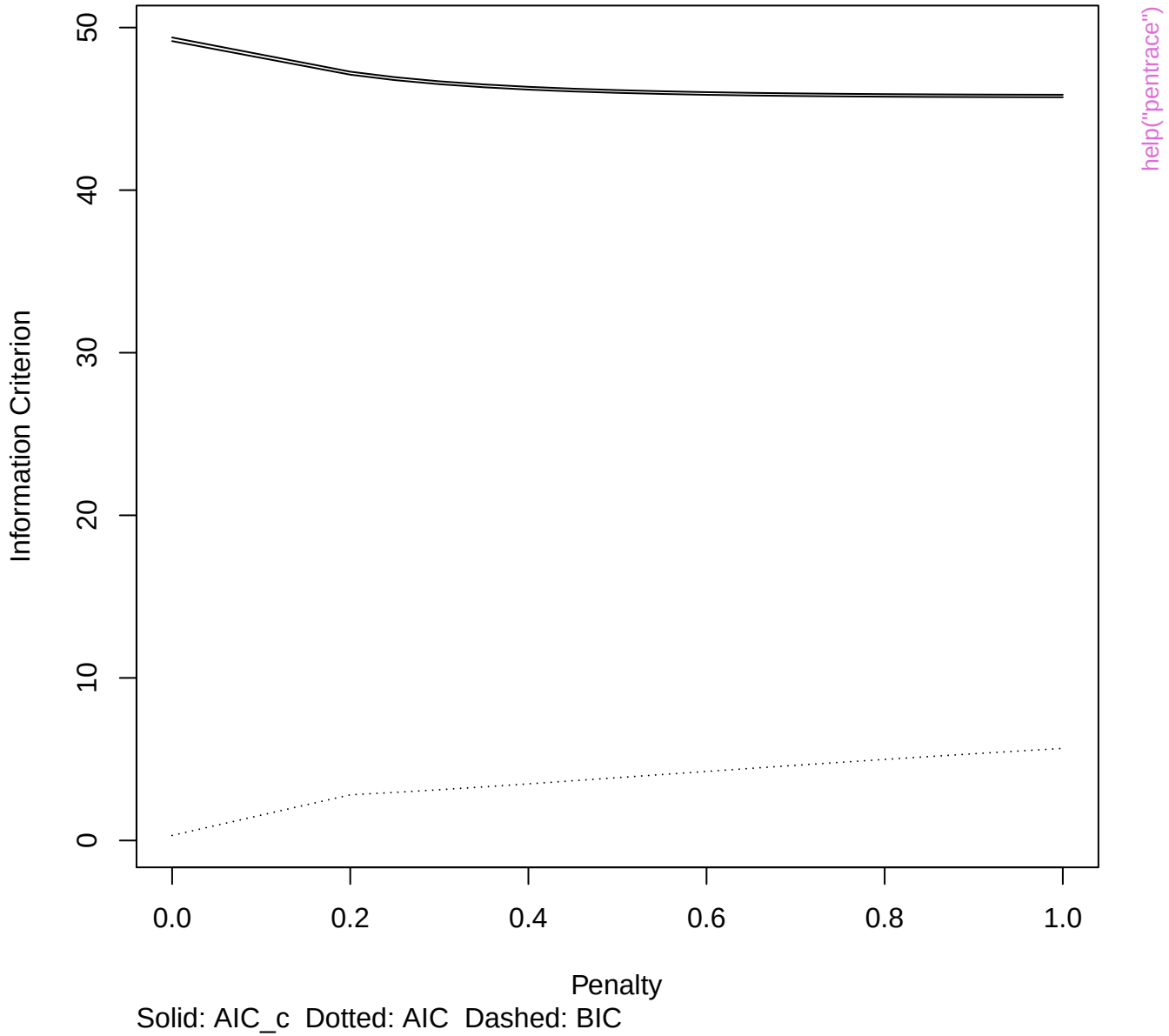

Points
0 10 20 30 40 50 60 70 80 90 100
age (sex=female)
90 80 70 60 50 40 30 20 10
age (sex=male)
90 70 50 30 10
Total Points
0 10 20 30 40 50 60 70 80 90 100
Linear Predictor
1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7
Median Survival Time
100 200 300
help("nomogram")

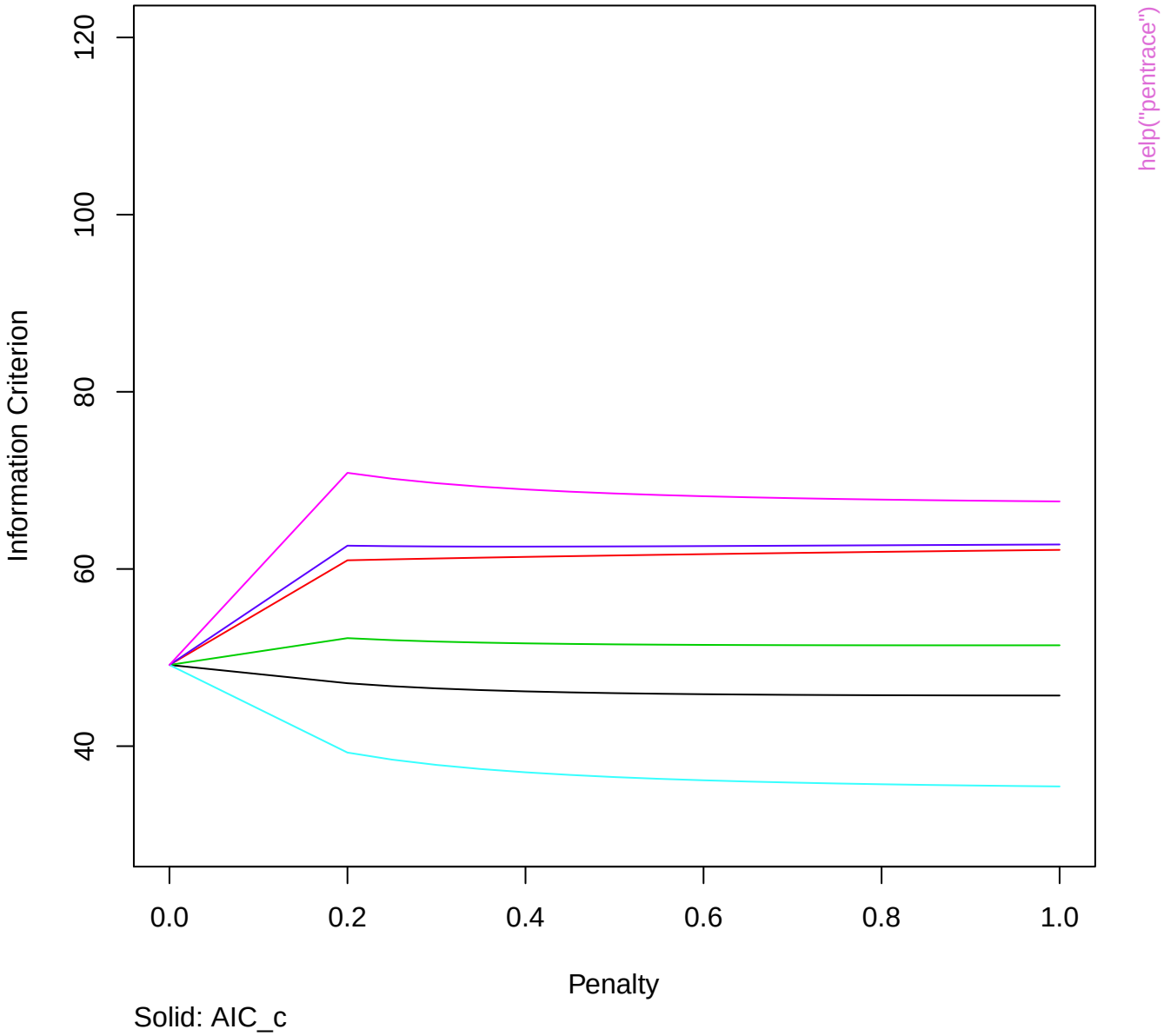

Points
0 10 20 30 40 50 60 70 80 90 100
age (sex=female)
90 80 70 60 50 40 30 20 10
age (sex=male)
90 70 50 30 10
Total Points
0 10 20 30 40 50 60 70 80 90 100
Linear Predictor
1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7
3−Month Survival Probability
0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95
6−month Survival Probability
0.45 0.5 0.55 0.6 0.65 0.7 0.75 0.8 0.85 0.9 0.95
help("nomogram")

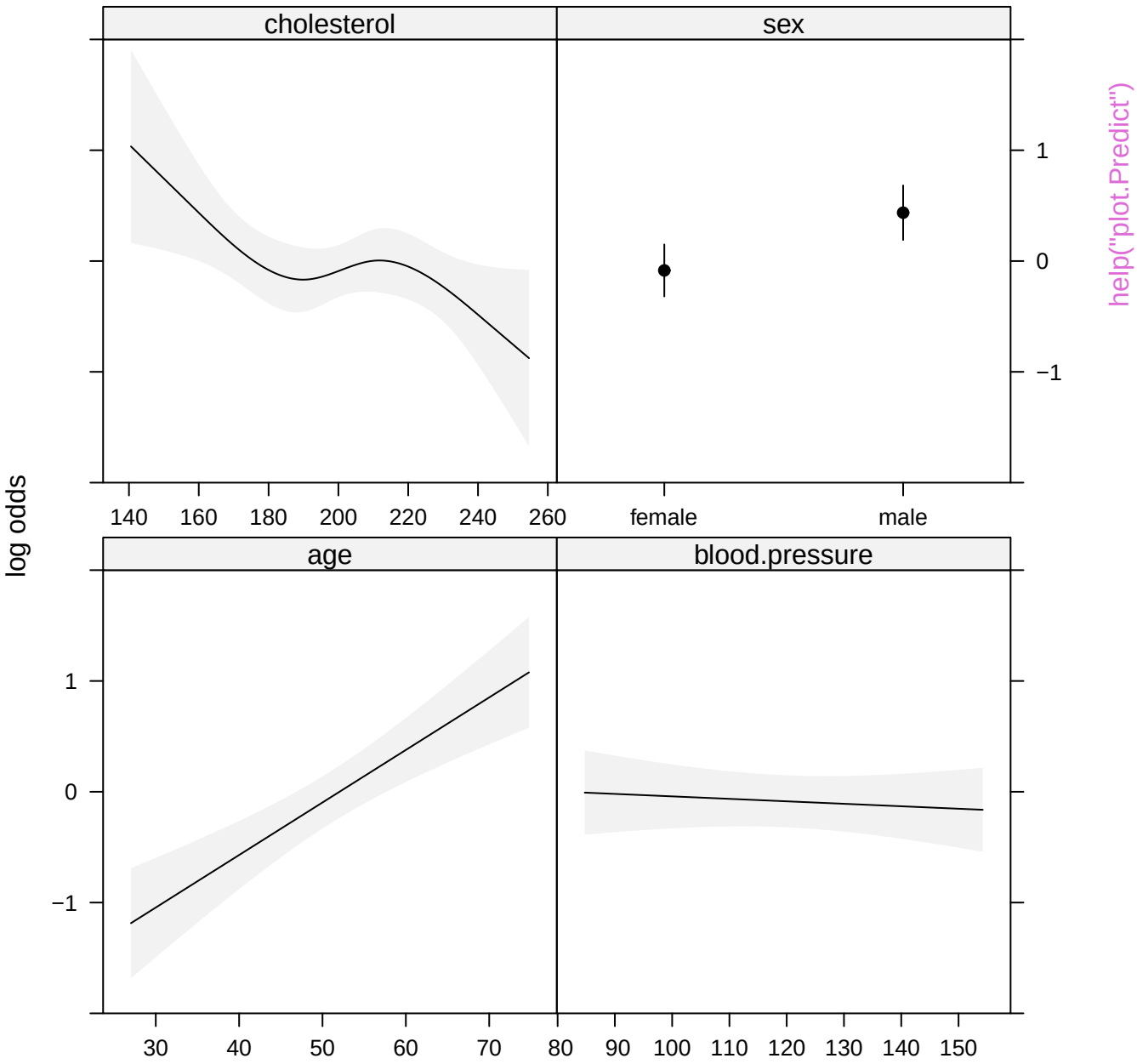

Points
0 10 20 30 40 50 60 70 80 90 100
Age in Years
10 20 30 40 50 60 70 80 90
cholesterol (sex=female)
280 260 240 220 160 140 120
cholesterol (sex=male)
120 140 160 180 200 220 240 260 280
Total Points
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140
Linear Predictor
−1.5 −1 −0.5 0 0.5 1 1.5
Prob Y>=1
0.2 0.3 0.4 0.5 0.6 0.7 0.8
Prob Y>=2
0.1 0.2 0.3 0.4 0.5 0.6
Prob Y=3
0.05 0.1 0.2 0.3 0.4
help("nomogram")

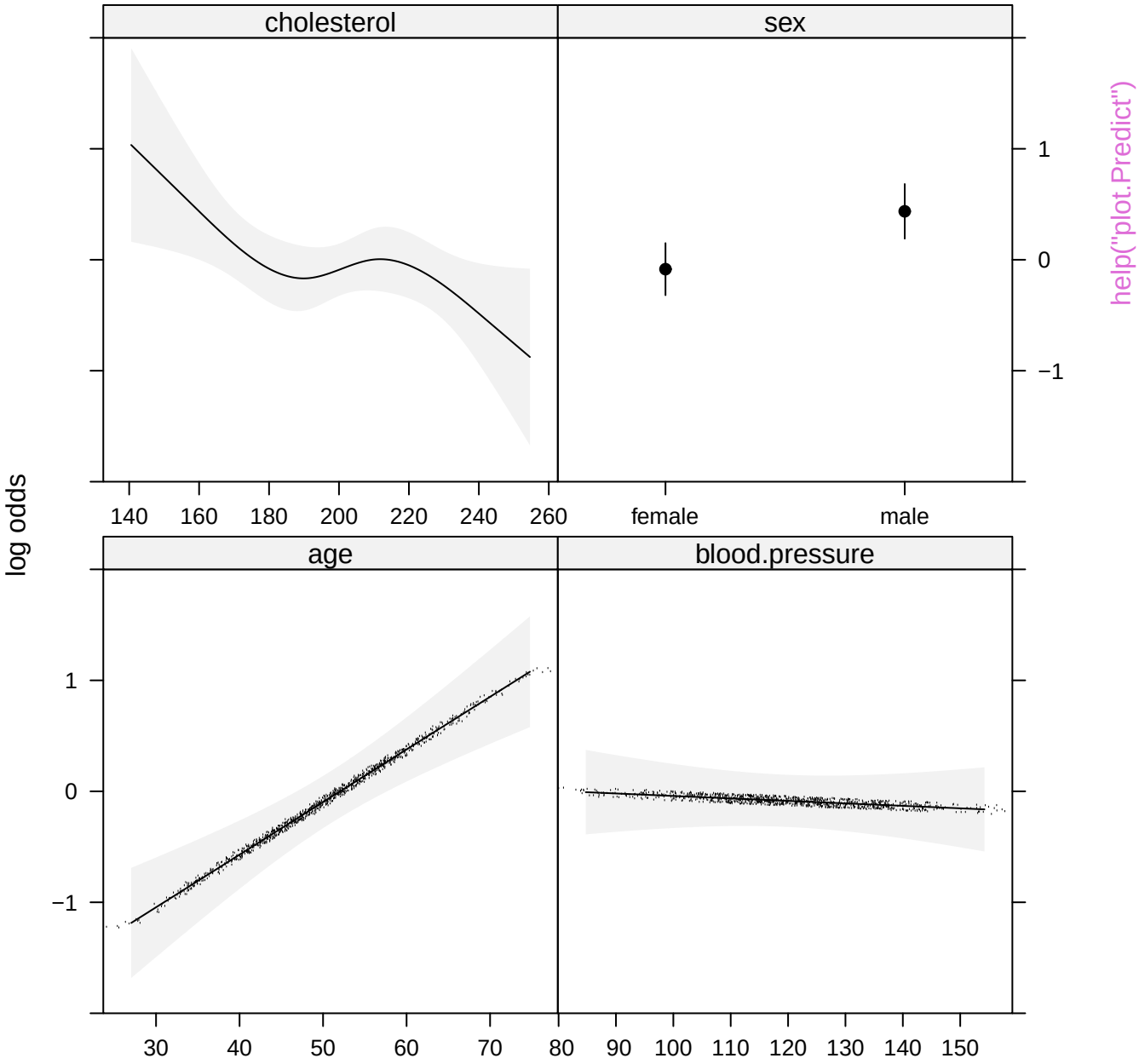


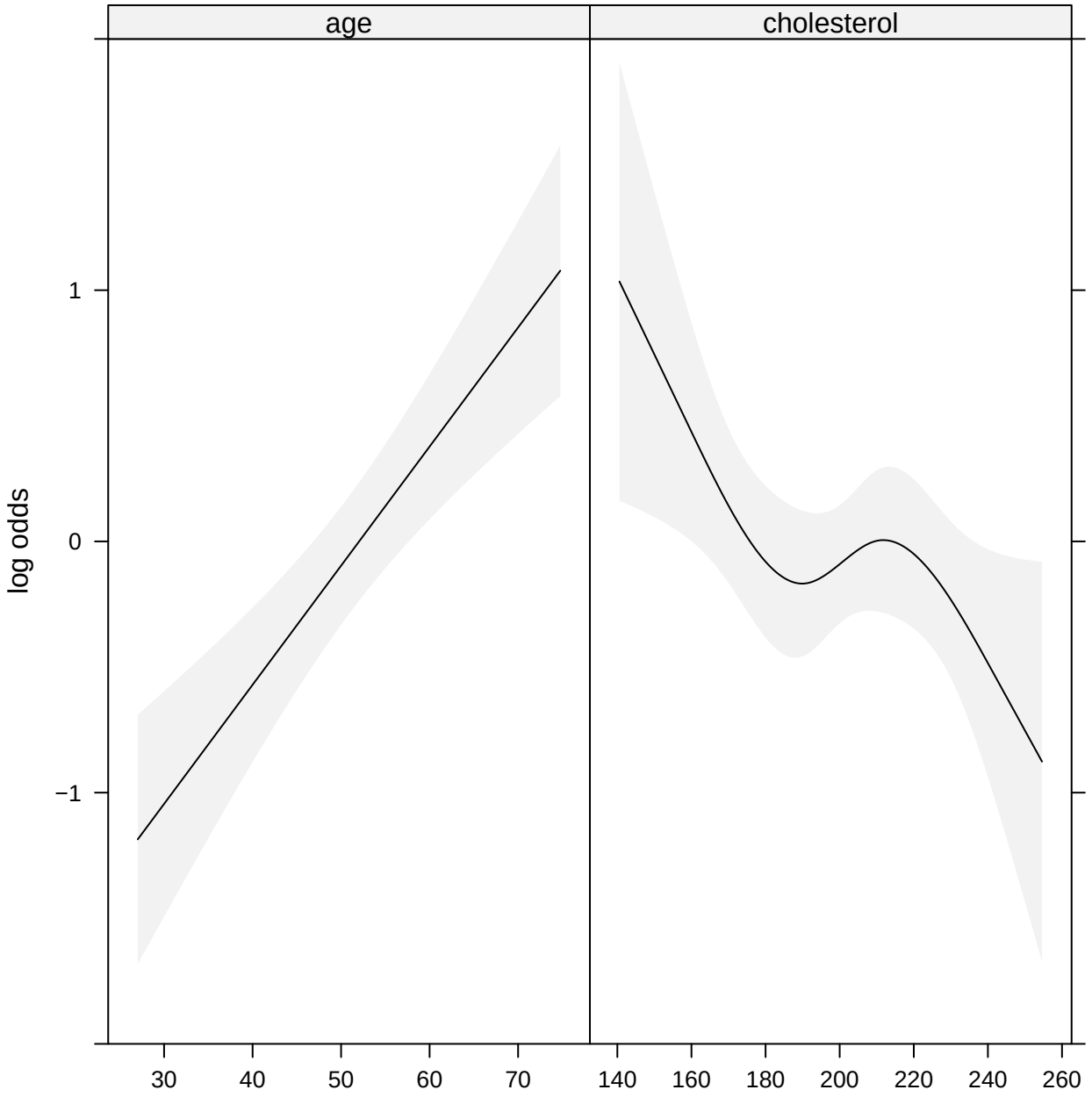
help("pentrace")

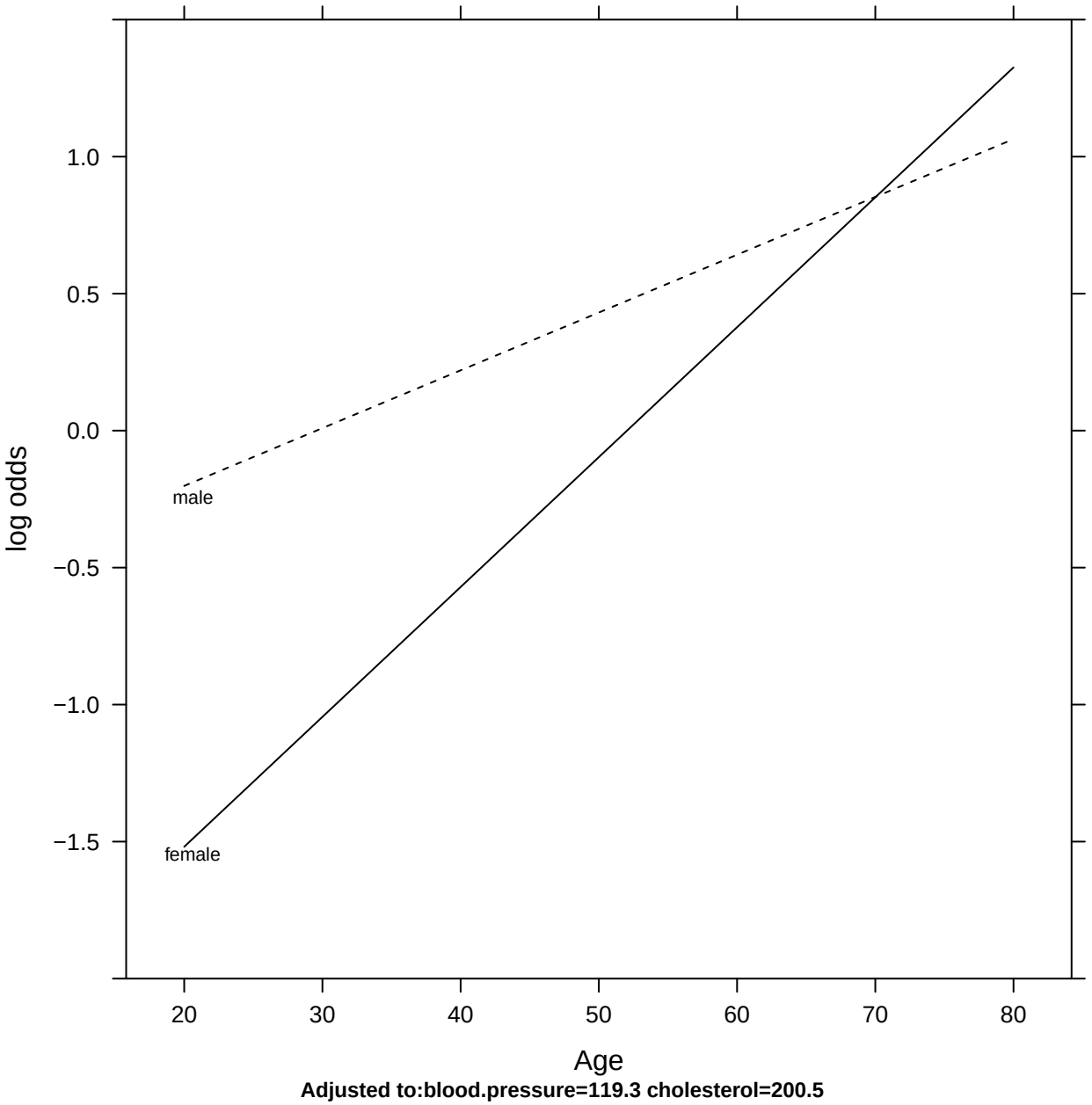

Information Criterion
0
10
20
30
40
50
0.0
0.2
0.4
0.6
0.8
1.0
Penalty
Solid: AIC_c Dotted: AIC Dashed: BIC
help("pentrace")


Information Criterion
120
100
80
60
40
0.0
0.2
0.4
0.6
0.8
1.0
Penalty
help("pentrace")
Solid: AIC_c

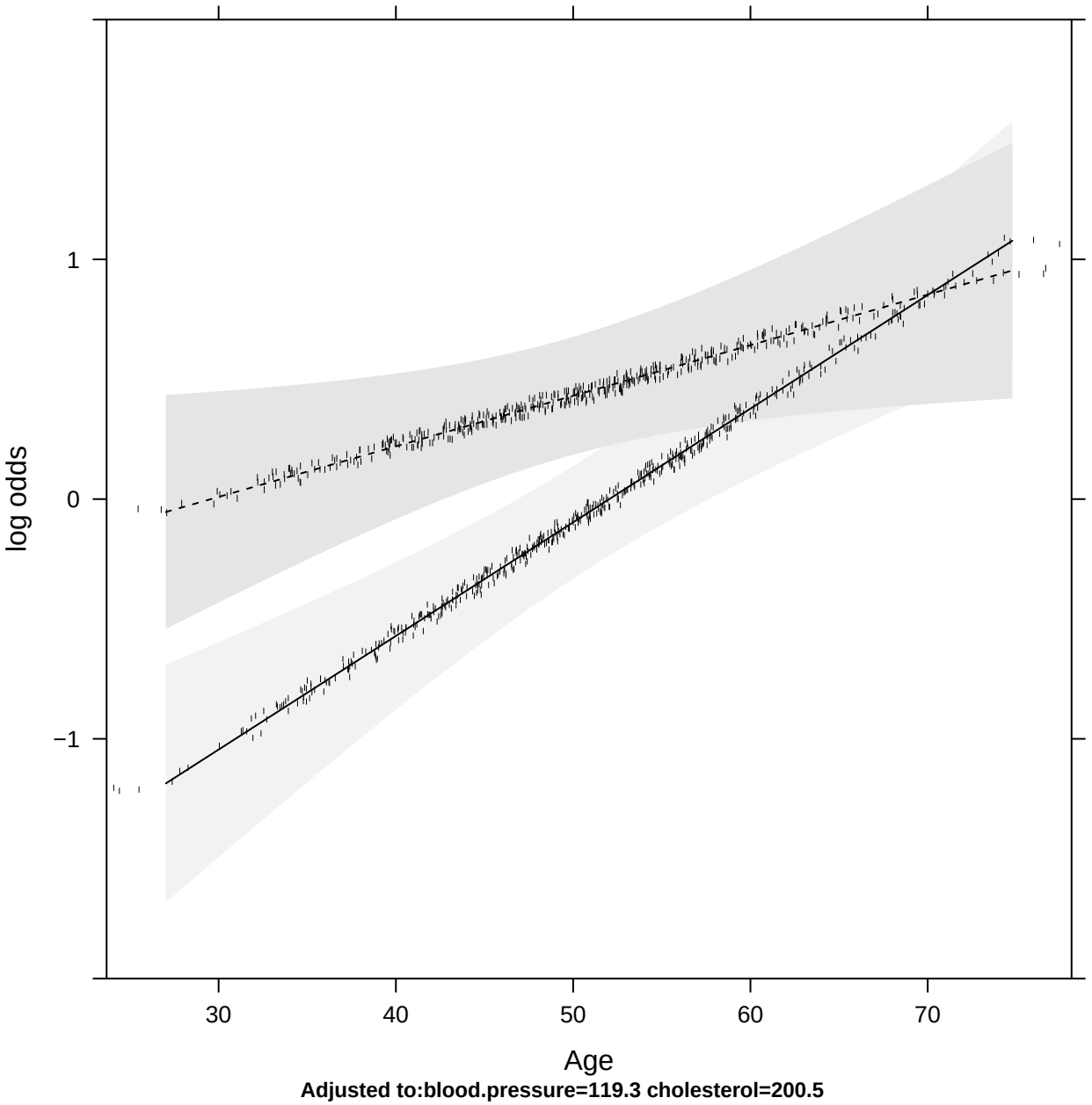

cholesterol
sex
age
blood.pressure
log odds
1
0
−1
140
160
180
200
220
240
260
female
male
30
40
50
60
70
80
90
100
110
120
130
140
150
help("plot.Predict")


cholesterol
sex
age
blood.pressure
log odds
1
0
−1
140
160
180
200
220
240
260
female
male
30
40
50
60
70
80
90
100
110
120
130
140
150
help("plot.Predict")

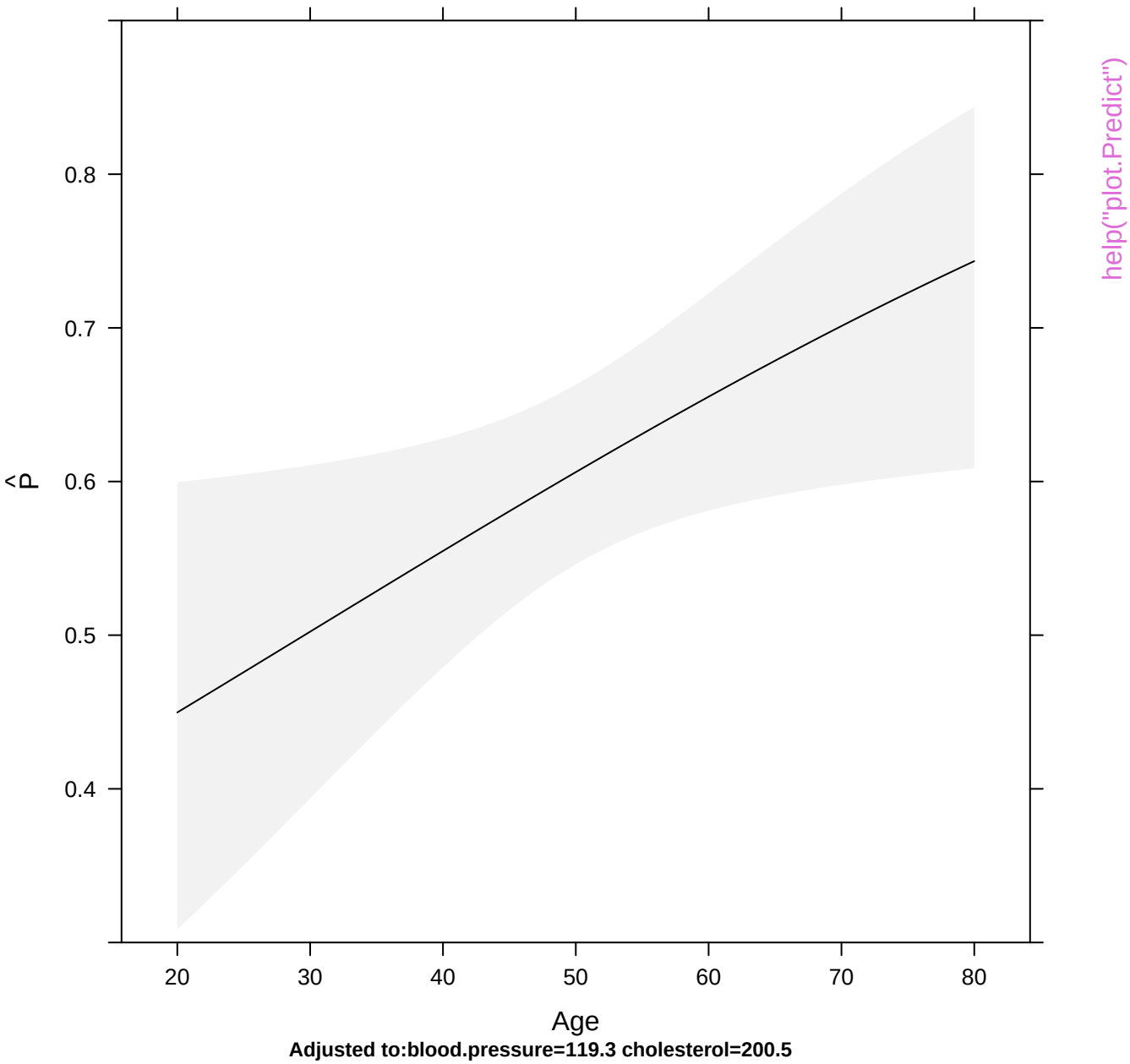

age
cholesterol
log odds
1
0
−1
30
40
50
60
70
140
160
180
200
220
240
260
help("plot.Predict")

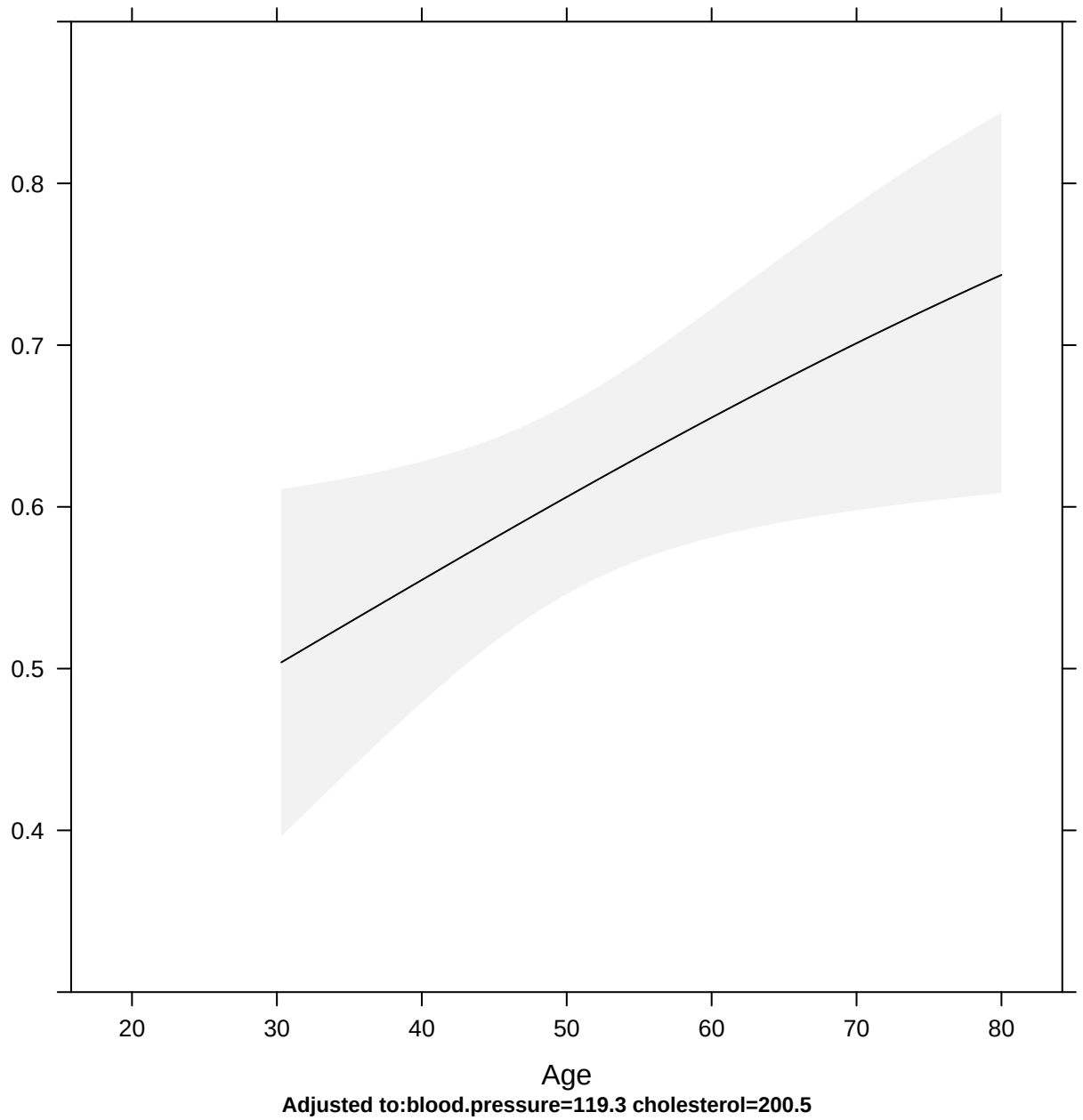


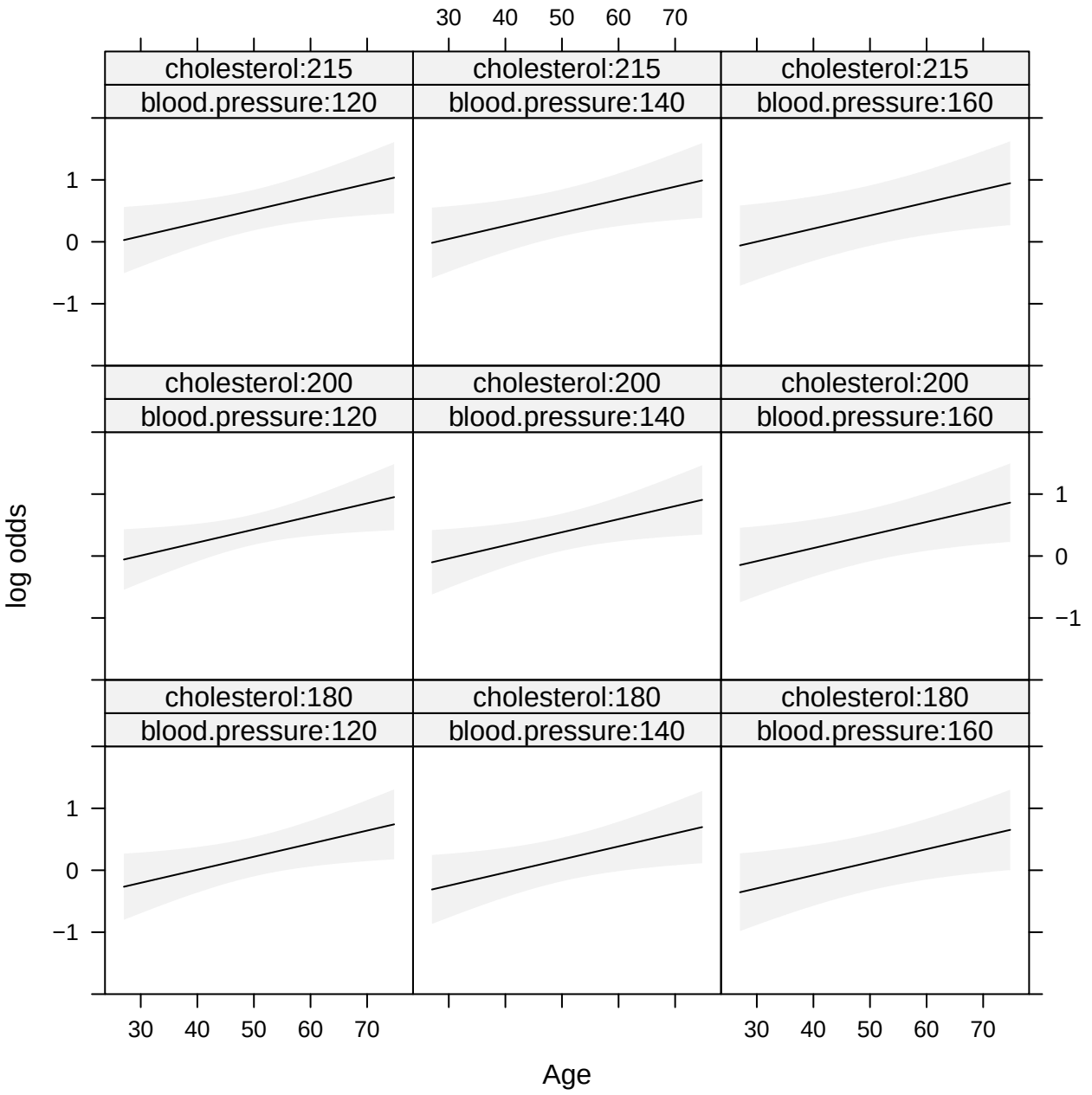
help("plot.Predict")

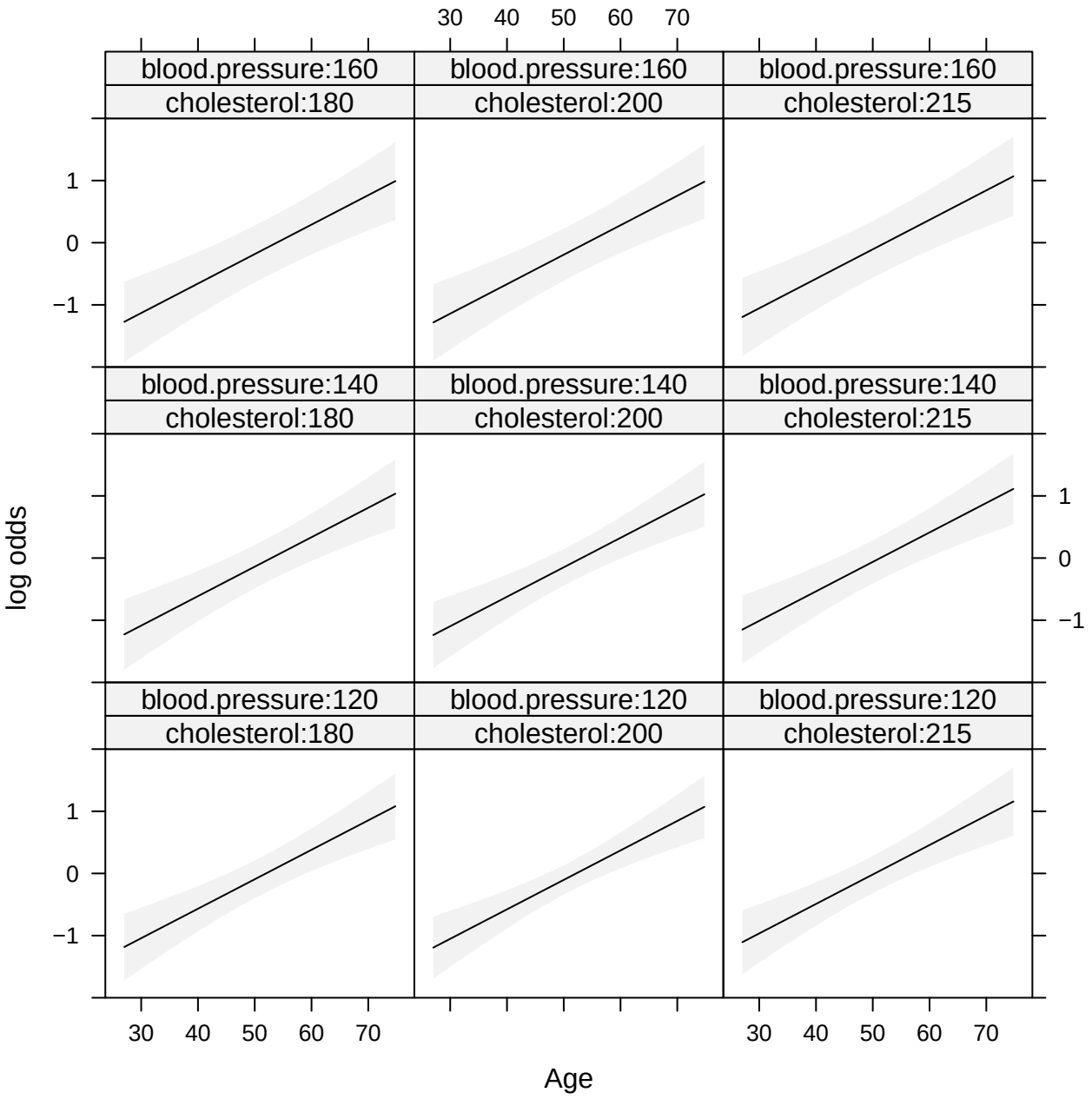


help("plot.Predict")

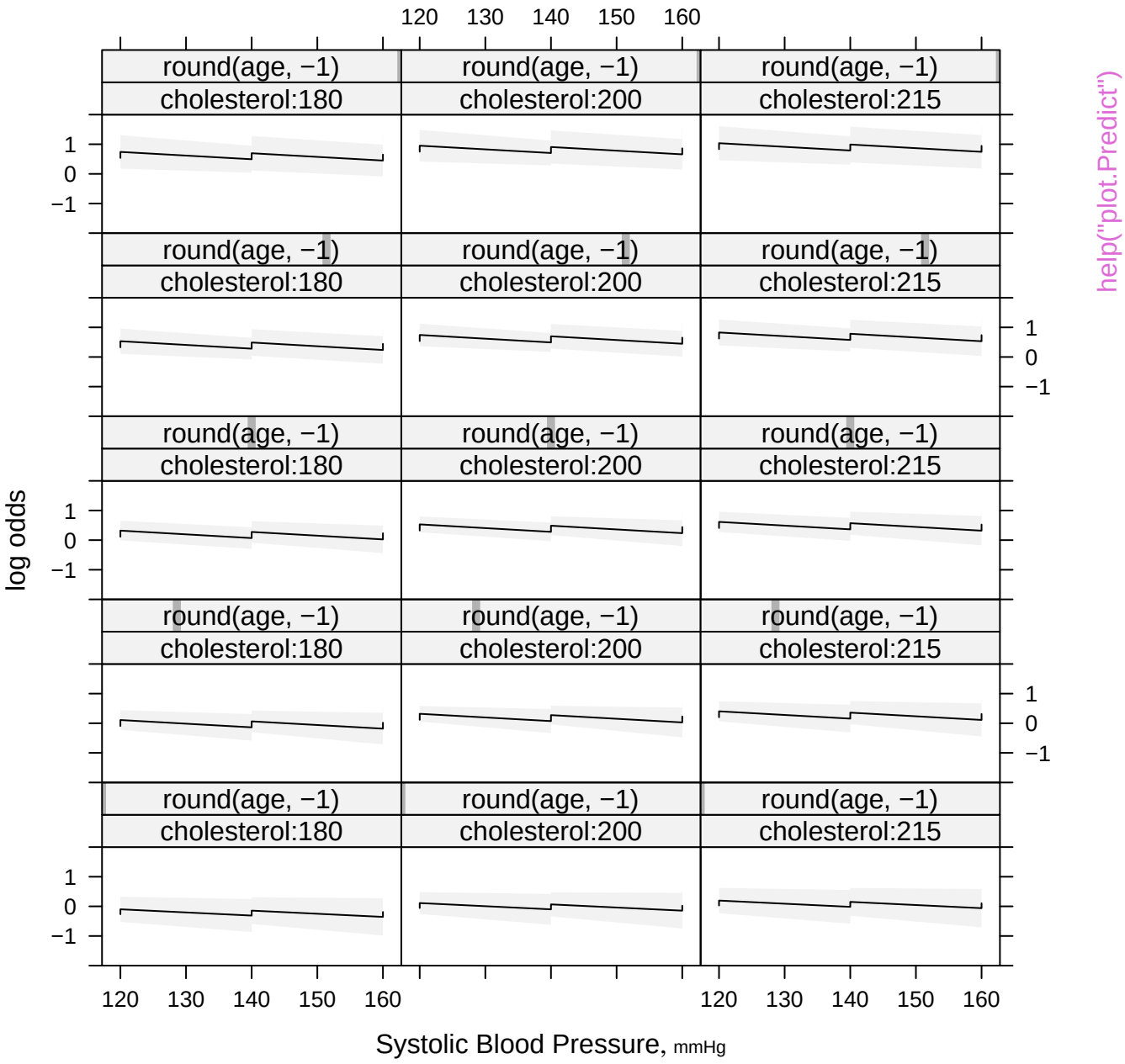

help("plot.Predict")
0.8
0.7
0.6
0.5
0.4
P
20
30
40
50
60
70
80
Age
Adjusted to:blood.pressure=119.3 cholesterol=200.5

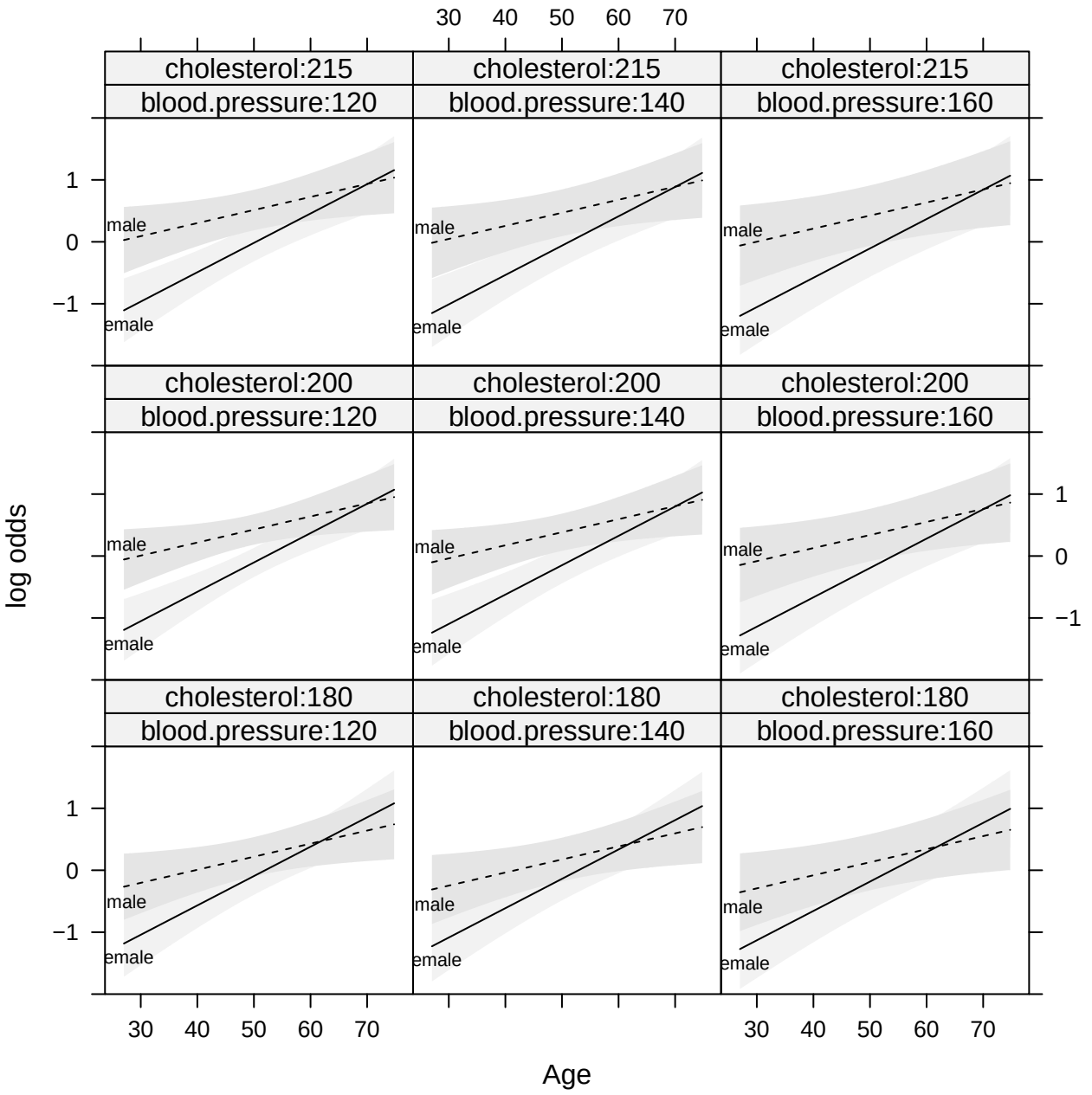

0.8
0.7
0.6
0.5
0.4
20
30
40
50
60
70
80
Age
Adjusted to:blood.pressure=119.3 cholesterol=200.5
help("plot.Predict")


cholesterol:215
blood.pressure:120
cholesterol:215
blood.pressure:140
cholesterol:215
blood.pressure:160
cholesterol:200
blood.pressure:120
cholesterol:200
blood.pressure:140
cholesterol:200
blood.pressure:160
cholesterol:180
blood.pressure:120
cholesterol:180
blood.pressure:140
cholesterol:180
blood.pressure:160
30 40 50 60 70
1
0
−1
log odds
Age
help("plot.Predict")

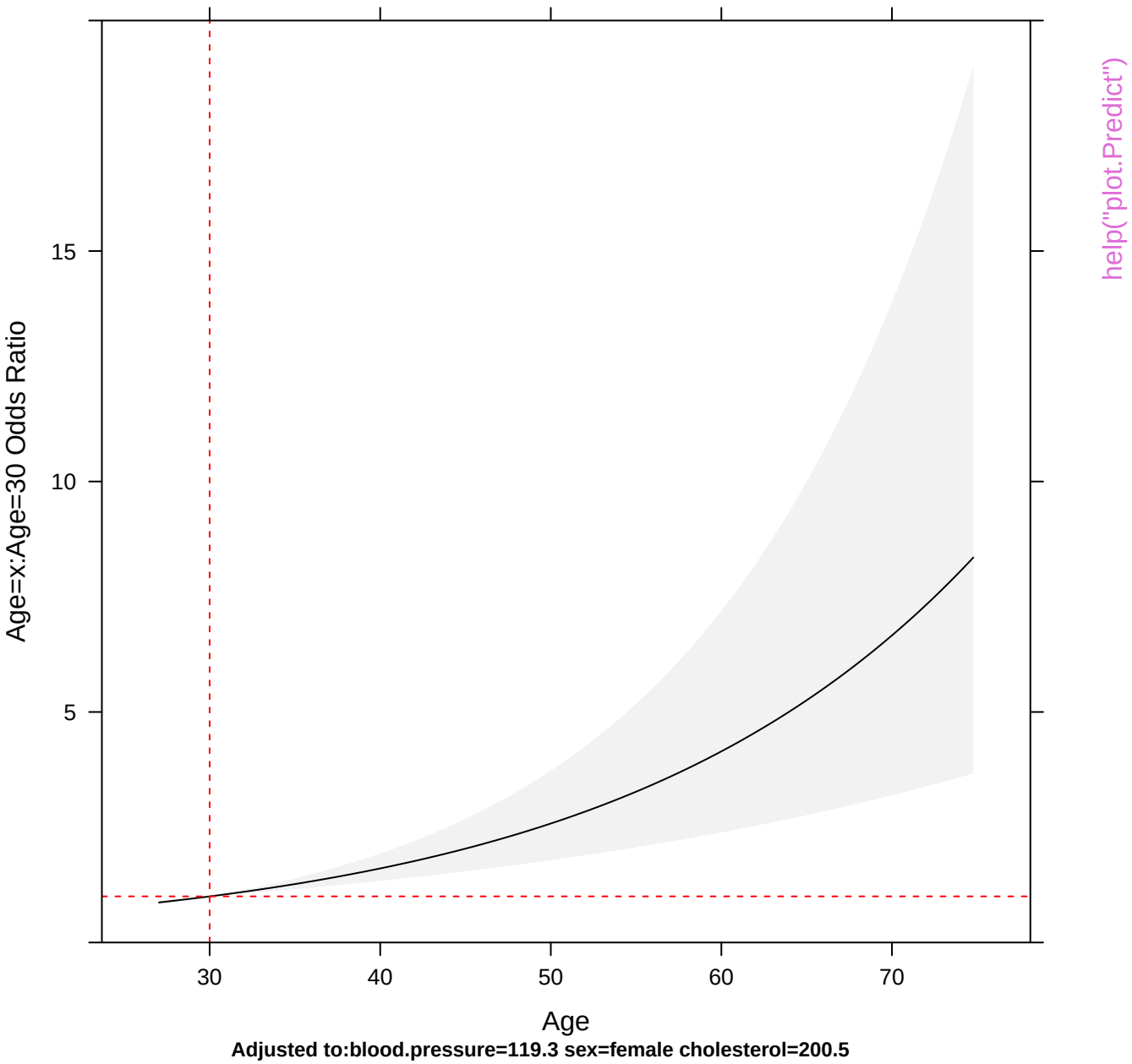


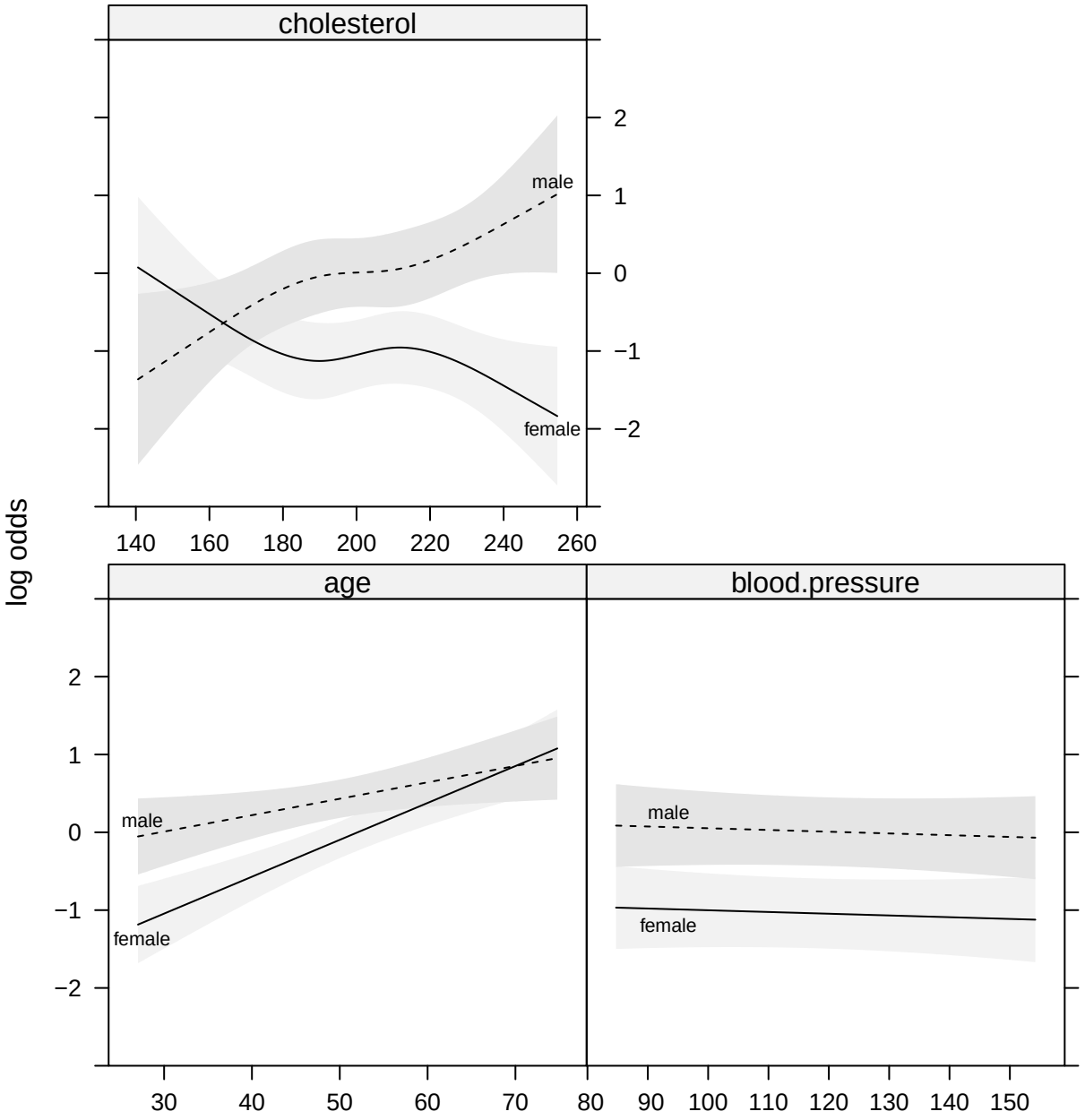
help("plot.Predict")


round(age, −1)
cholesterol:180
cholesterol:200
cholesterol:215
120
130
140
150
160
1
0
−1
log odds
Systolic Blood Pressure, mmHg
help("plot.Predict")

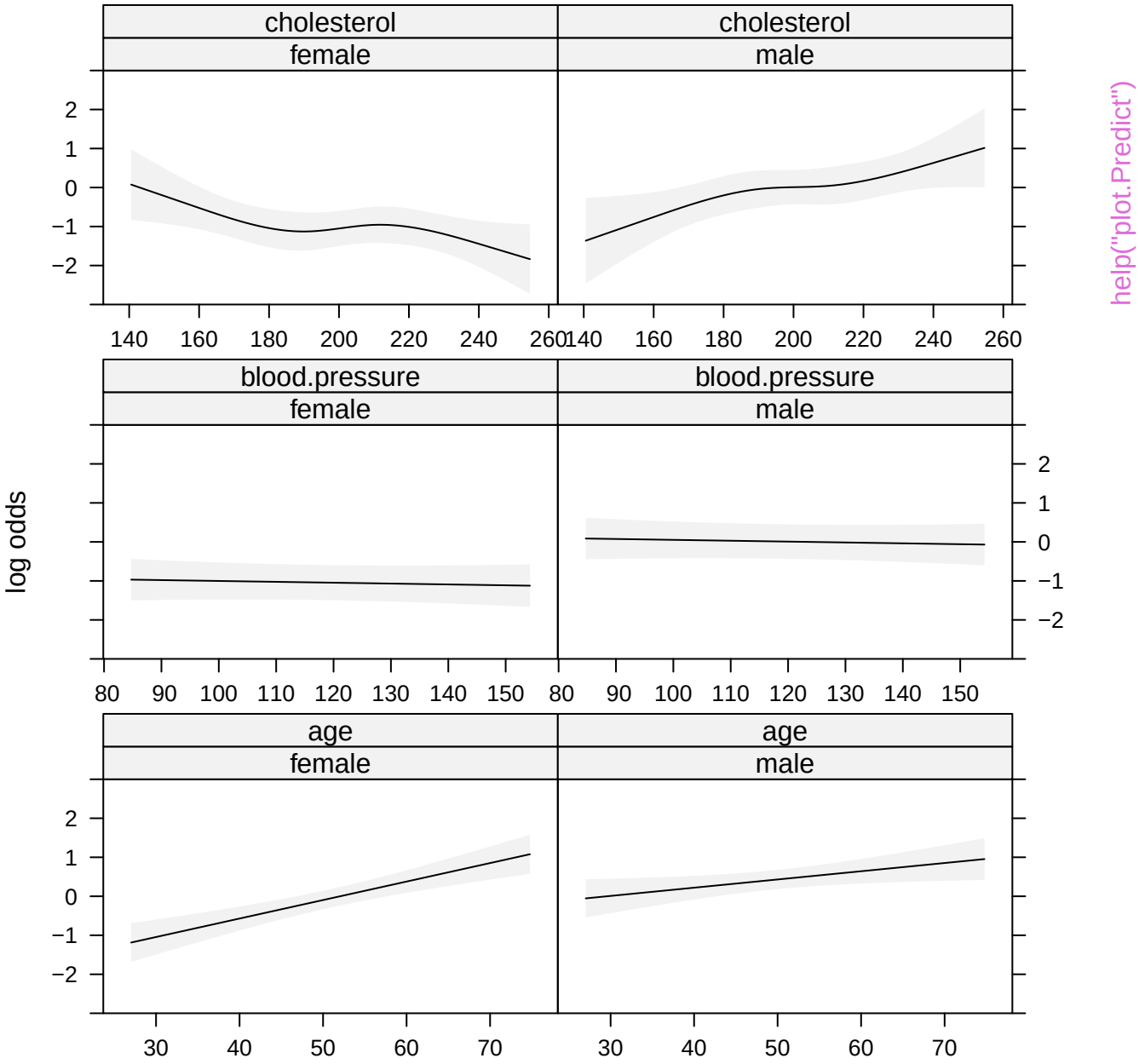


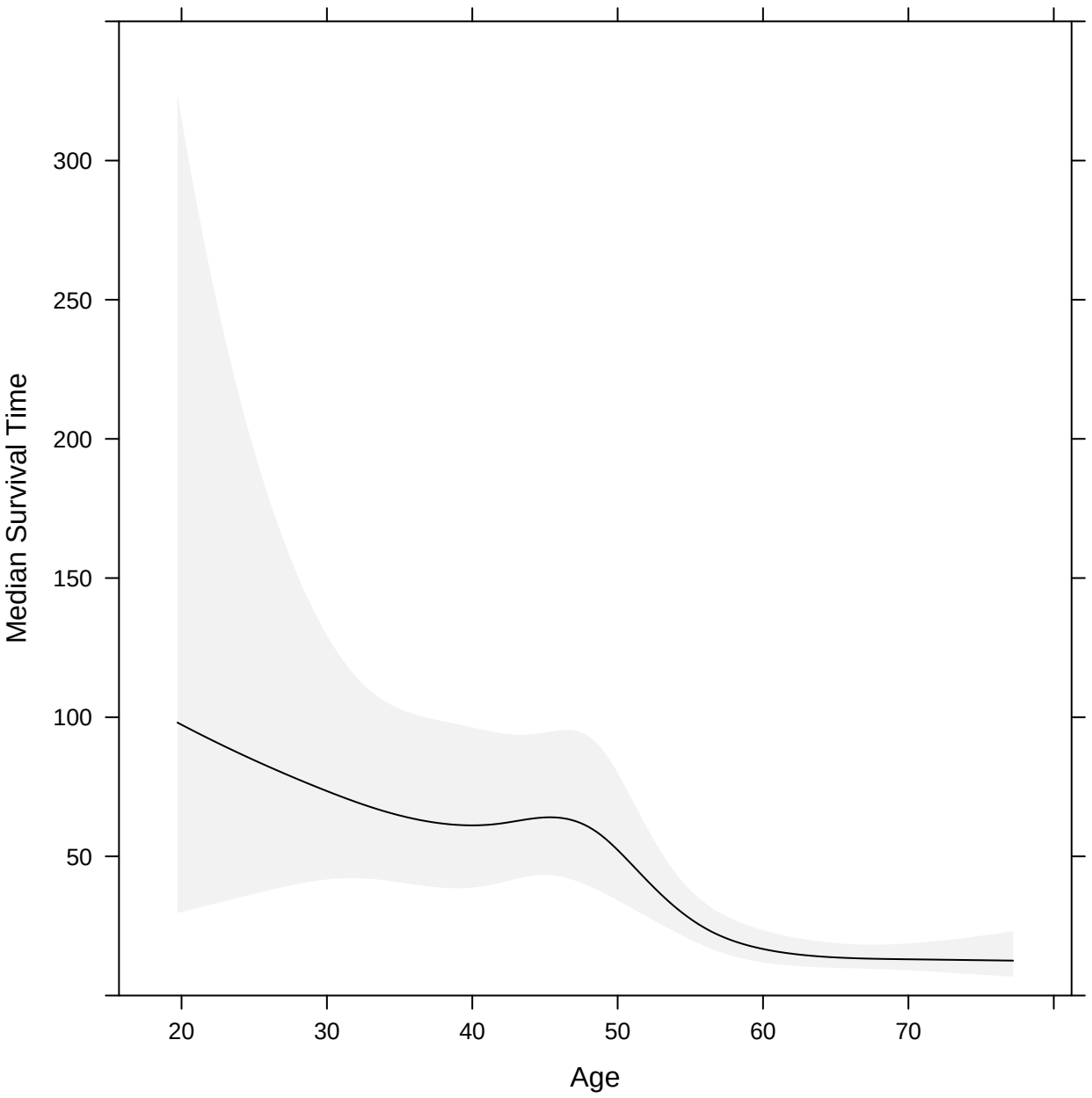
help("plot.Predict")


Age=x:Age=30 Odds Ratio
15
10
5
30
40
50
60
70
Age
Adjusted to:blood.pressure=119.3 sex=female cholesterol=200.5
help("plot.Predict")

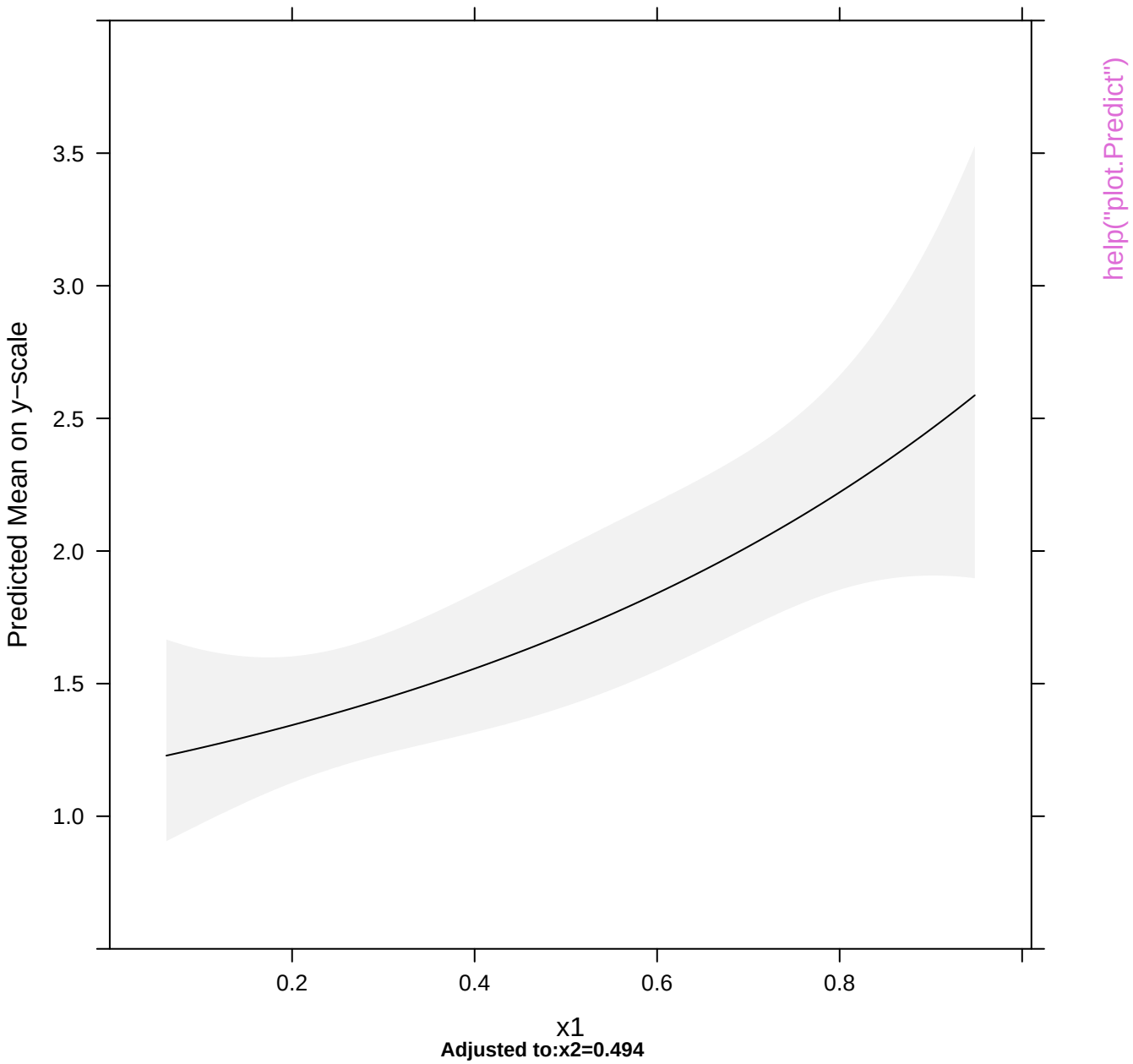


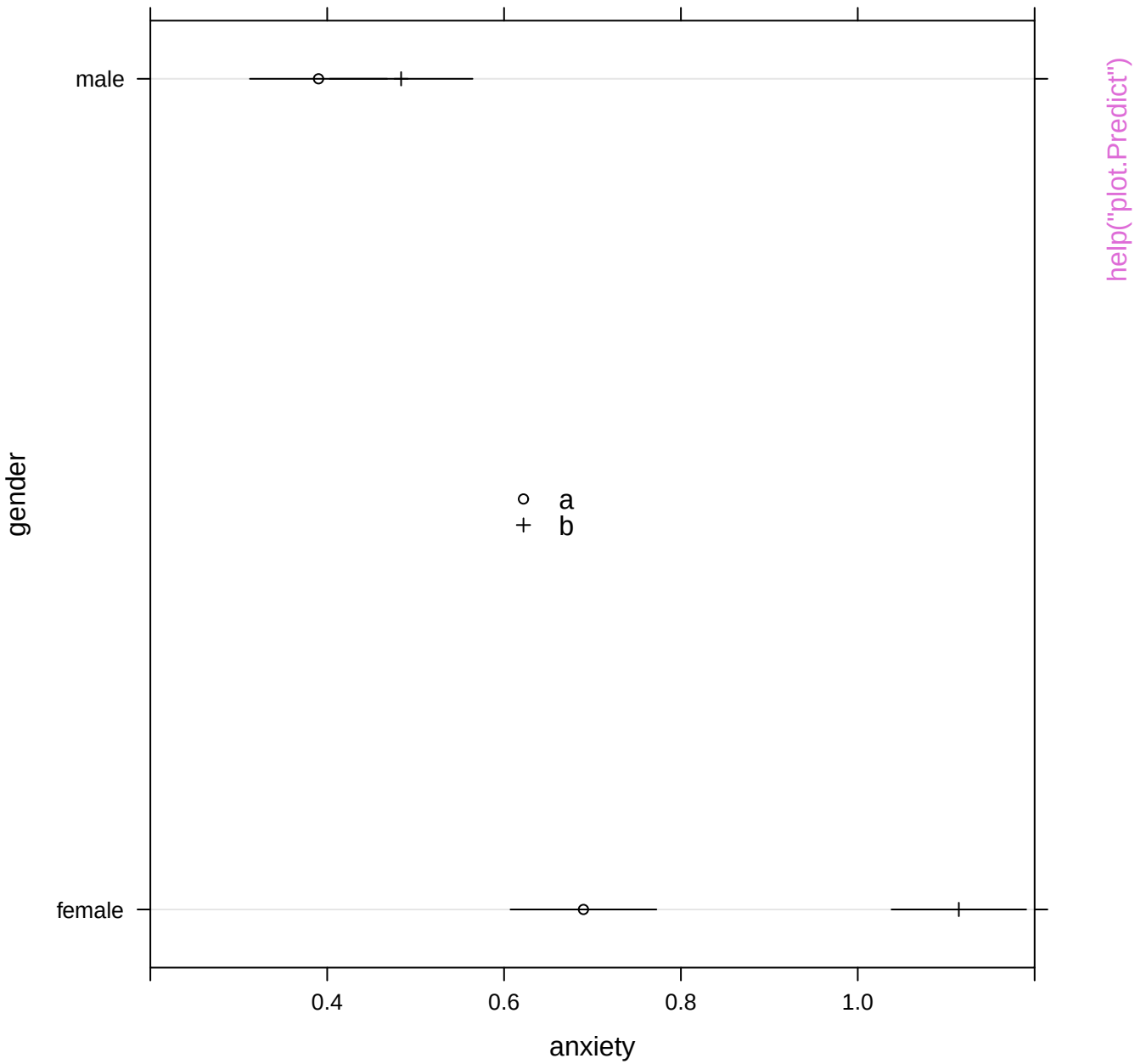
help("plot.Predict")

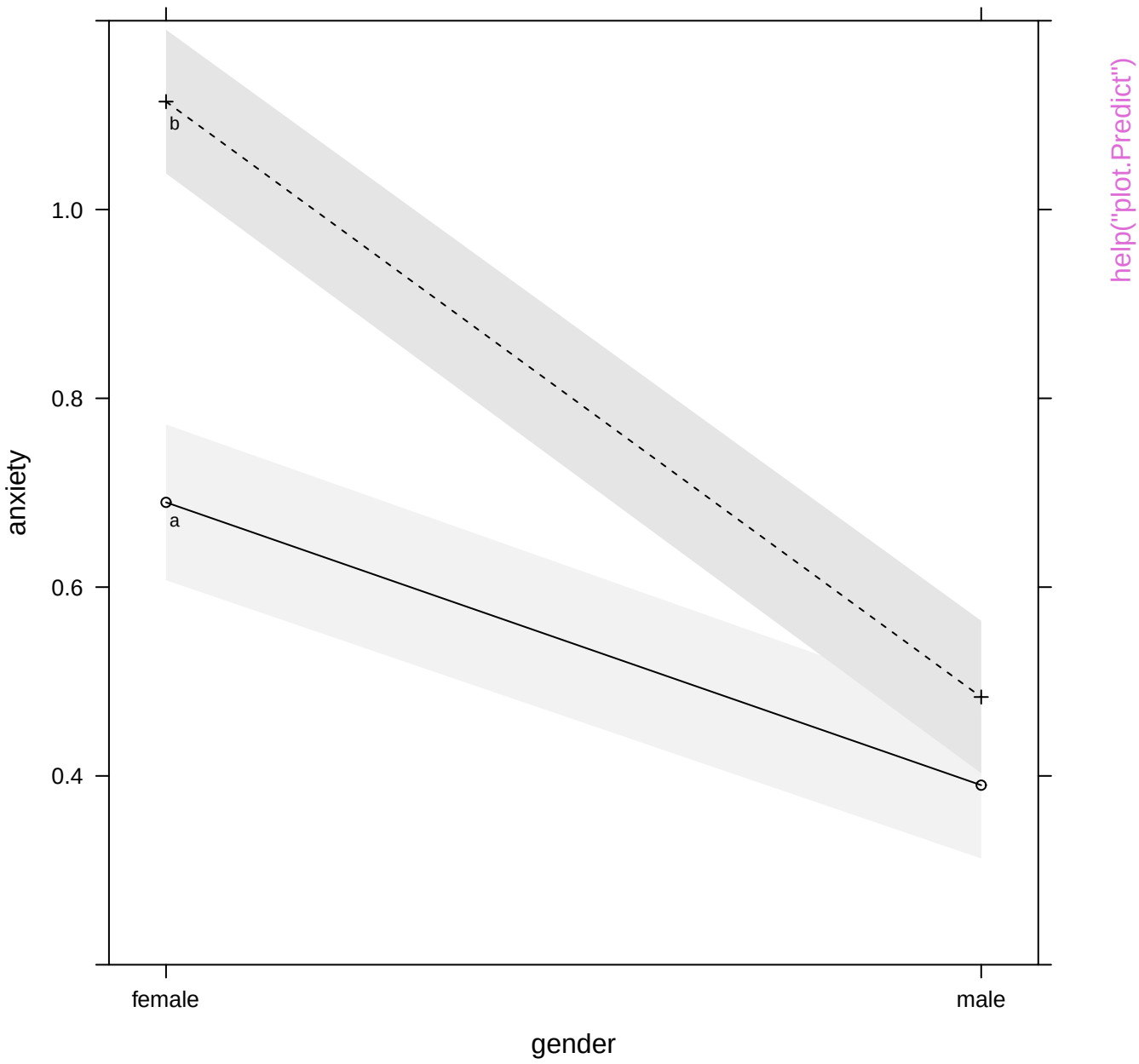

cholesterol
female
cholesterol
male
blood.pressure
female
blood.pressure
male
age
female
age
male
log odds
help("plot.Predict")

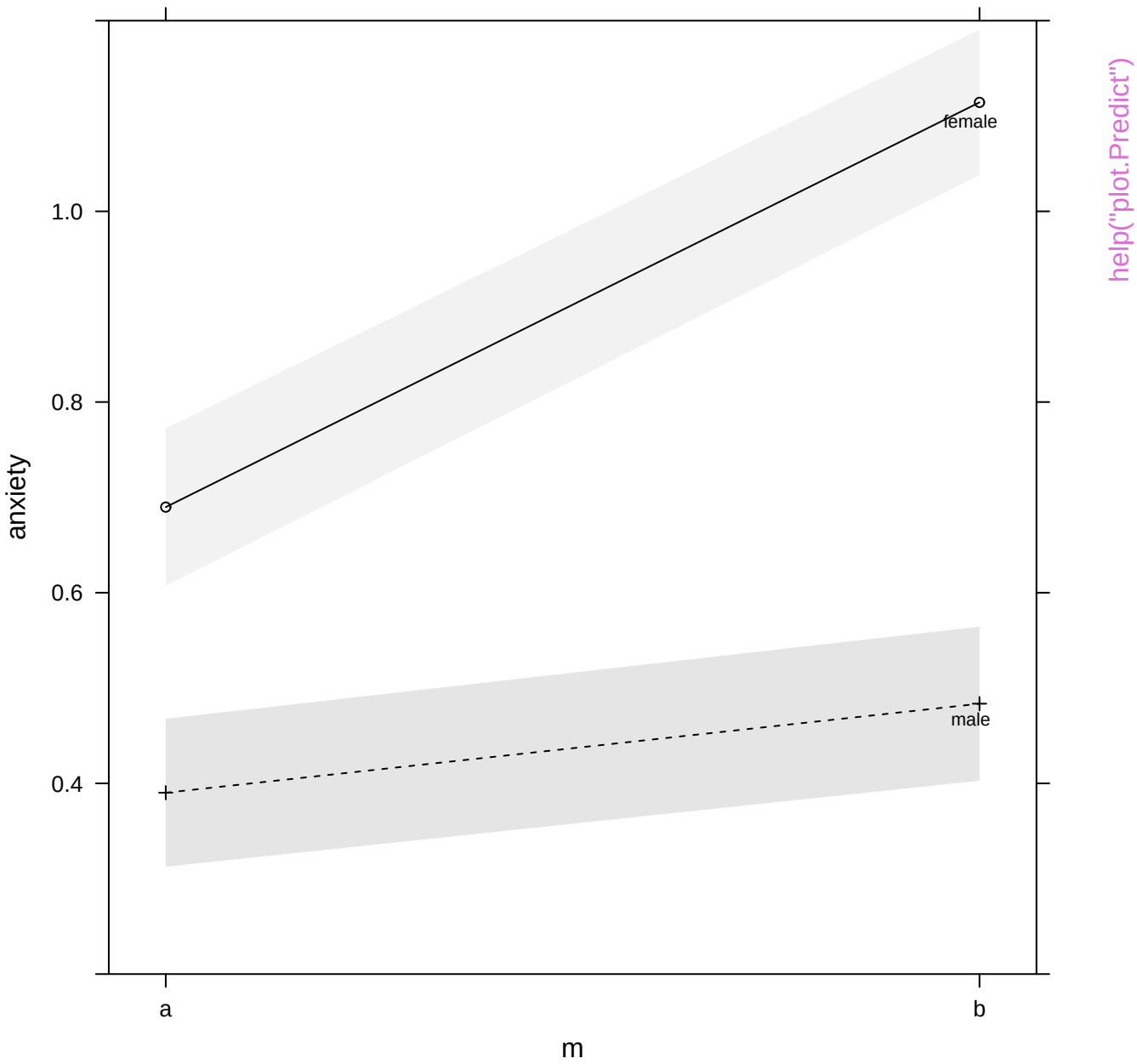


help("plot.Predict")

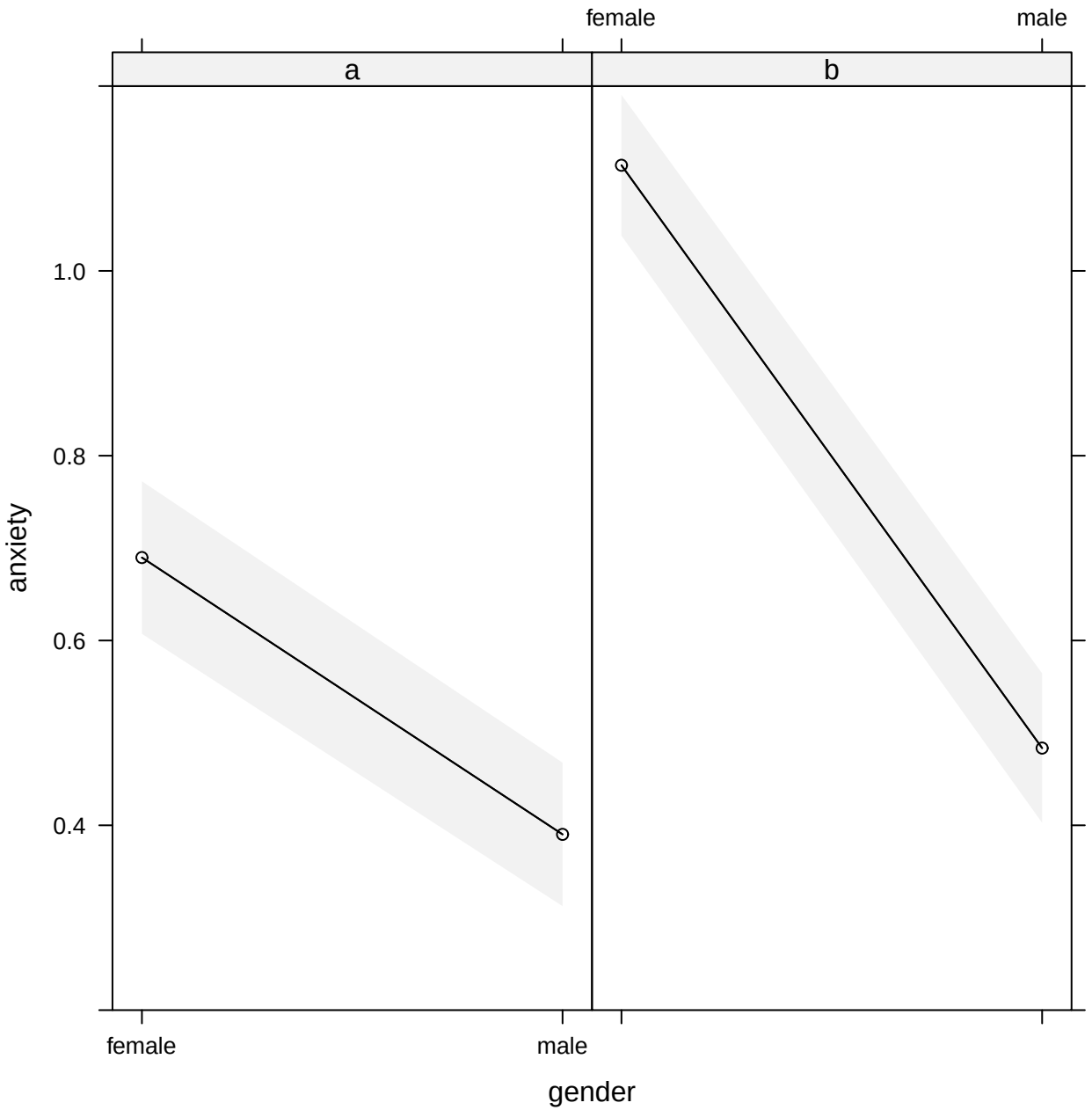

Predicted Mean on y−scale
3.5
3.0
2.5
2.0
1.5
1.0
0.2
0.4
0.6
0.8
x1
Adjusted to:x2=0.494
help("plot.Predict")

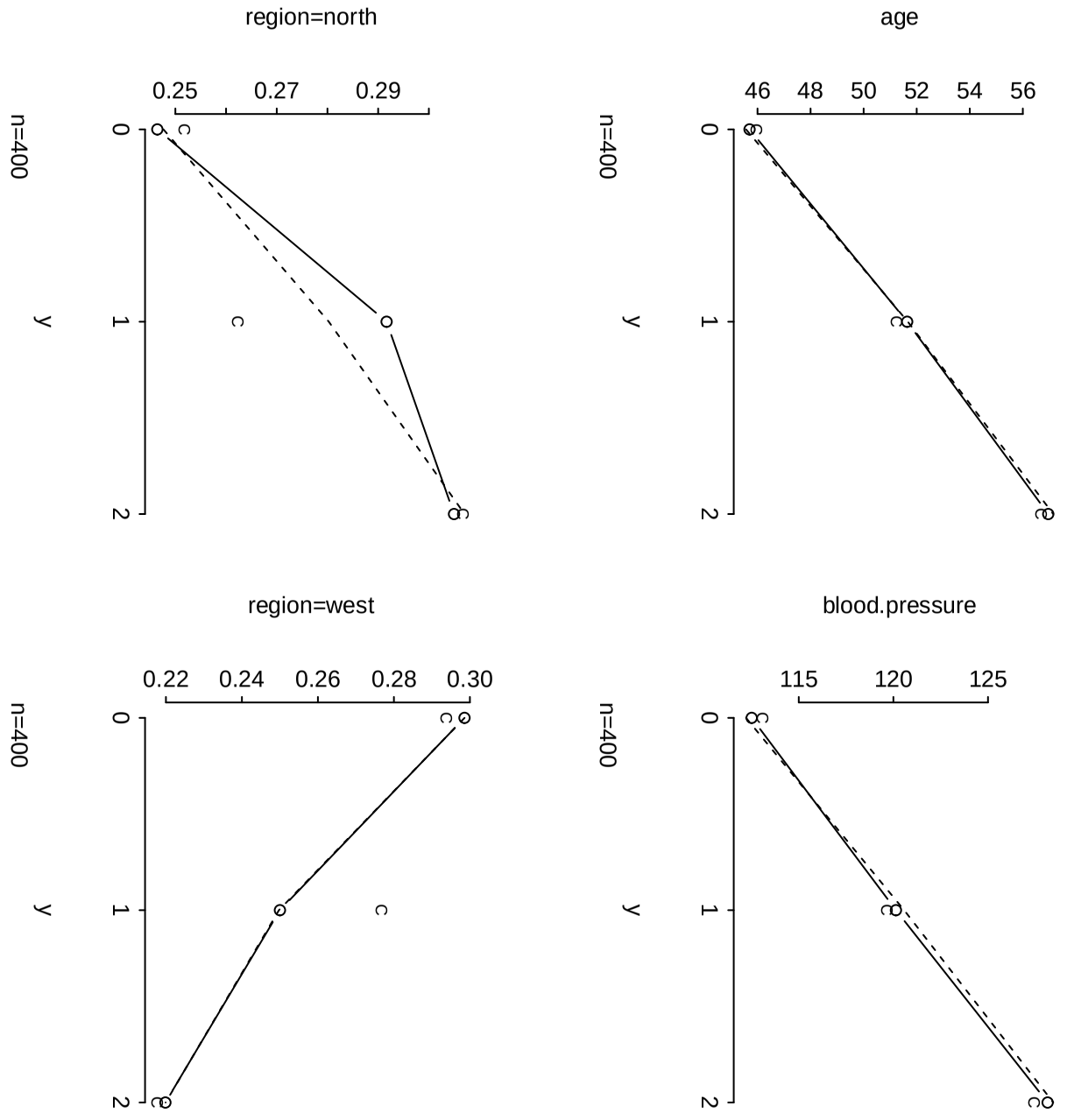

male
female
gender
a
b
0.4
0.6
0.8
1.0
anxiety
help("plot.Predict")


anxiety
1.0
0.8
0.6
0.4
b
a
female
male
gender
help("plot.Predict")

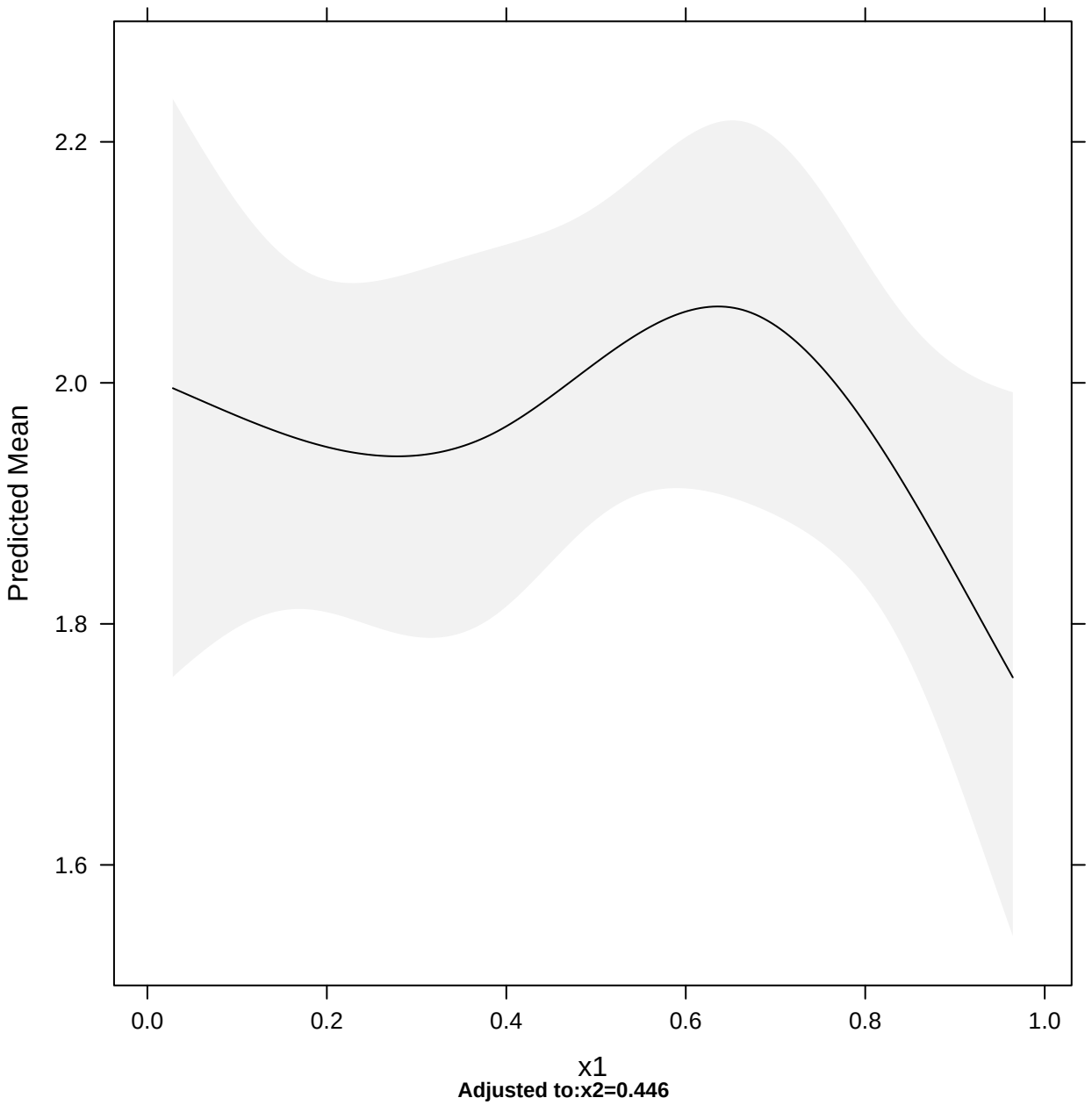


help("plot.Predict")

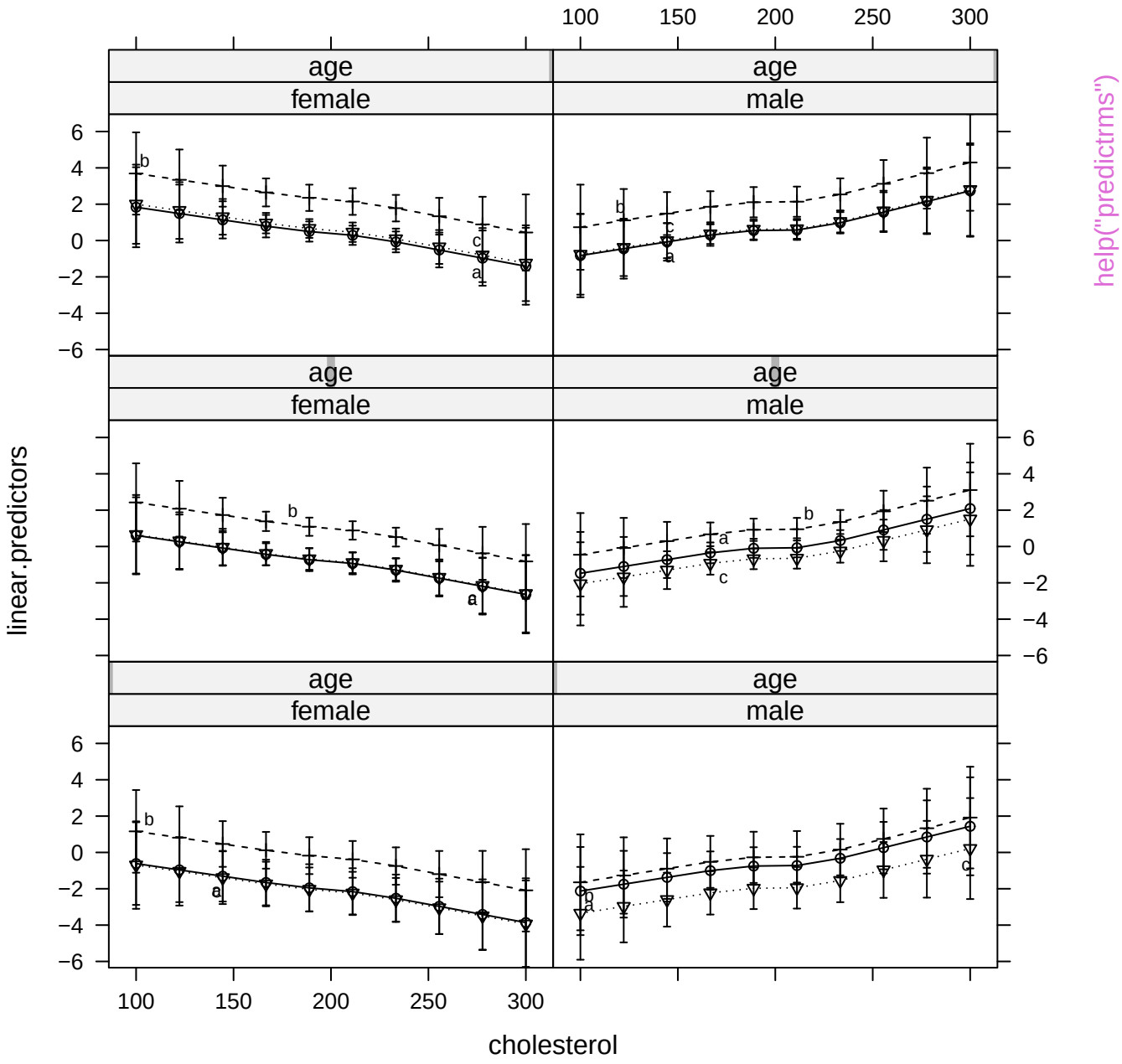

female
male
a
b
1.0
0.8
0.6
0.4
anxiety
female
male
gender
help("plot.Predict")

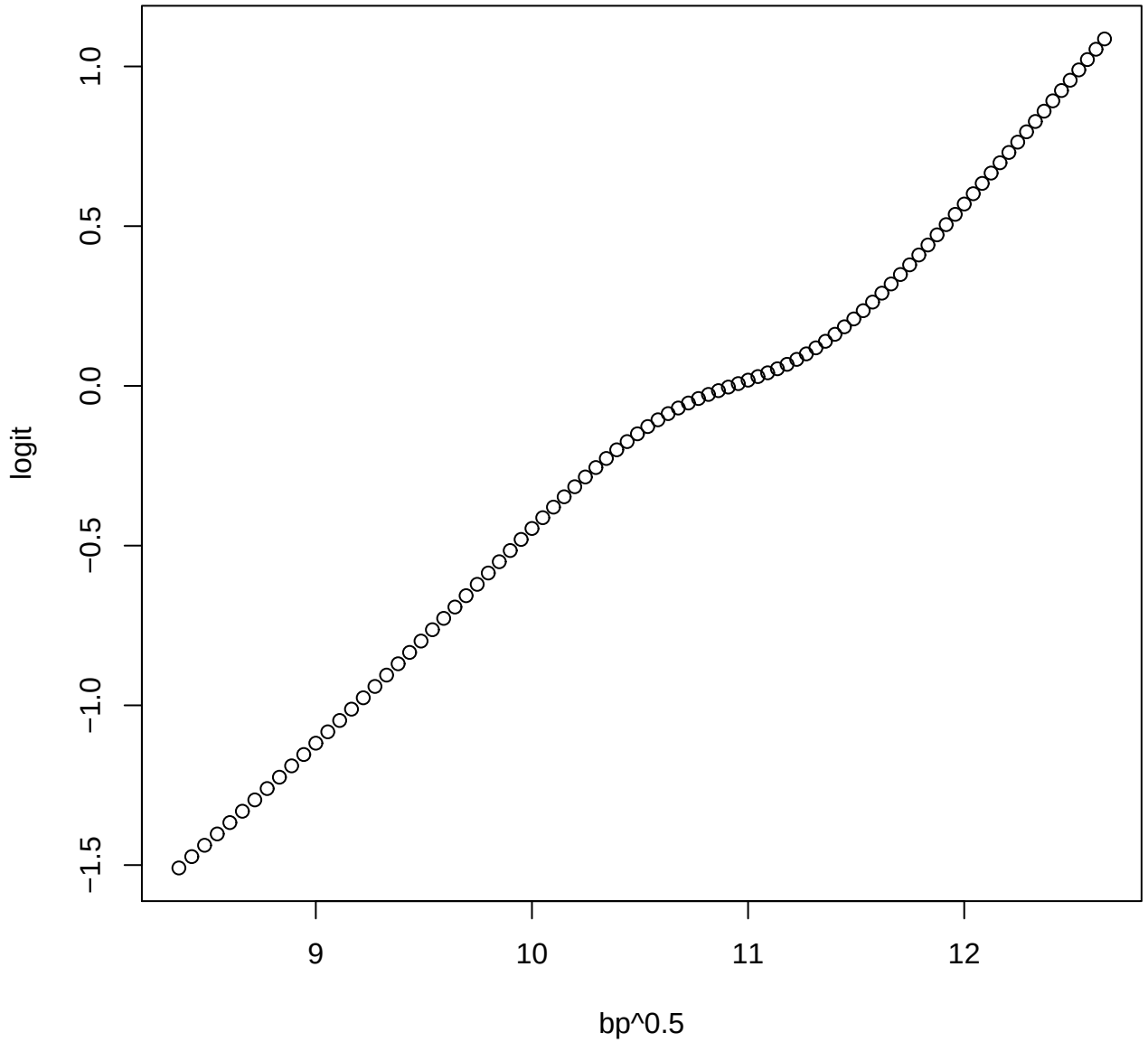


help("plot.xmean.ordinaly")

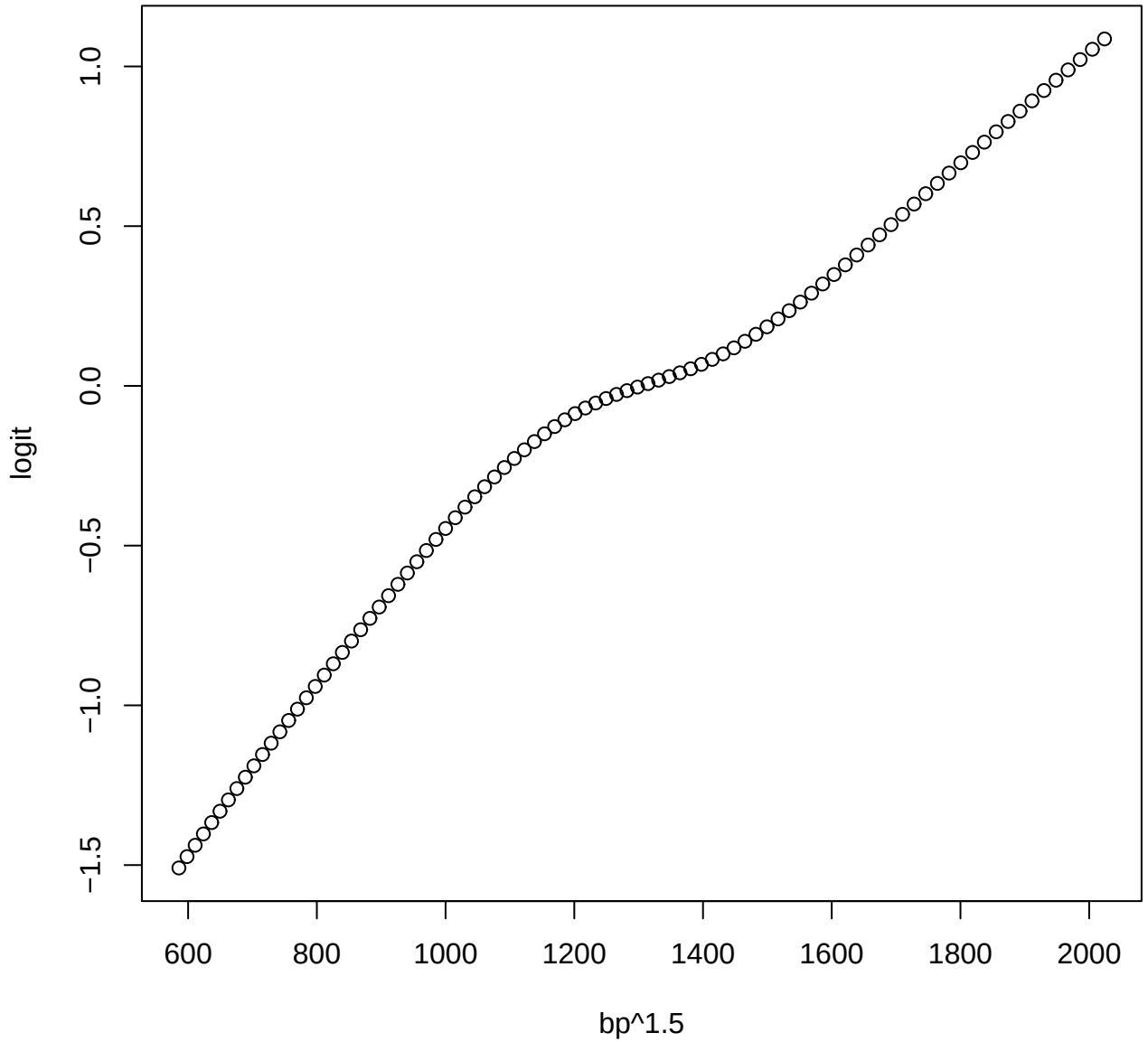


help("predict.lrm")

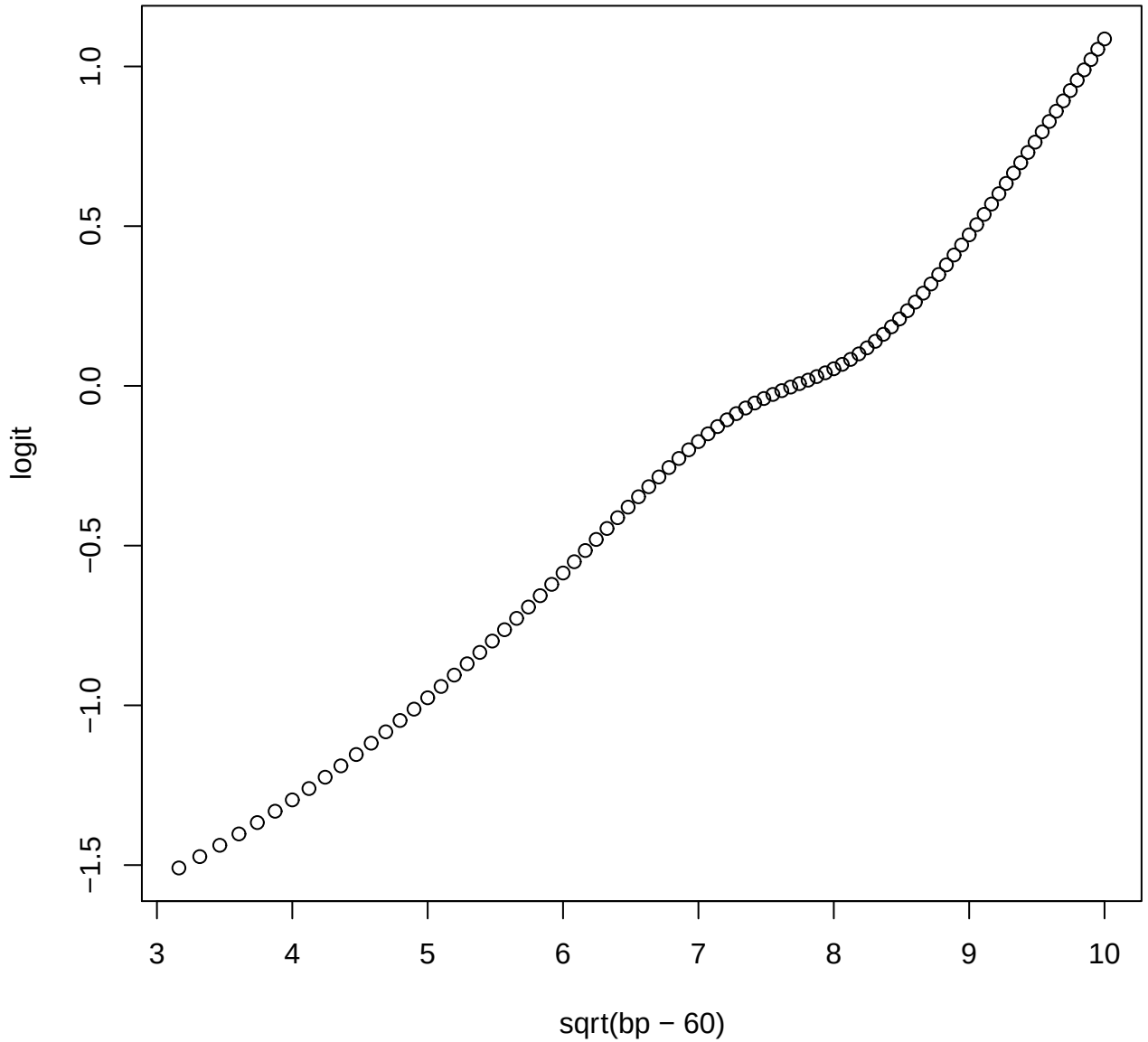

age
female
male
linear.predictors
cholesterol
help("predictrms")



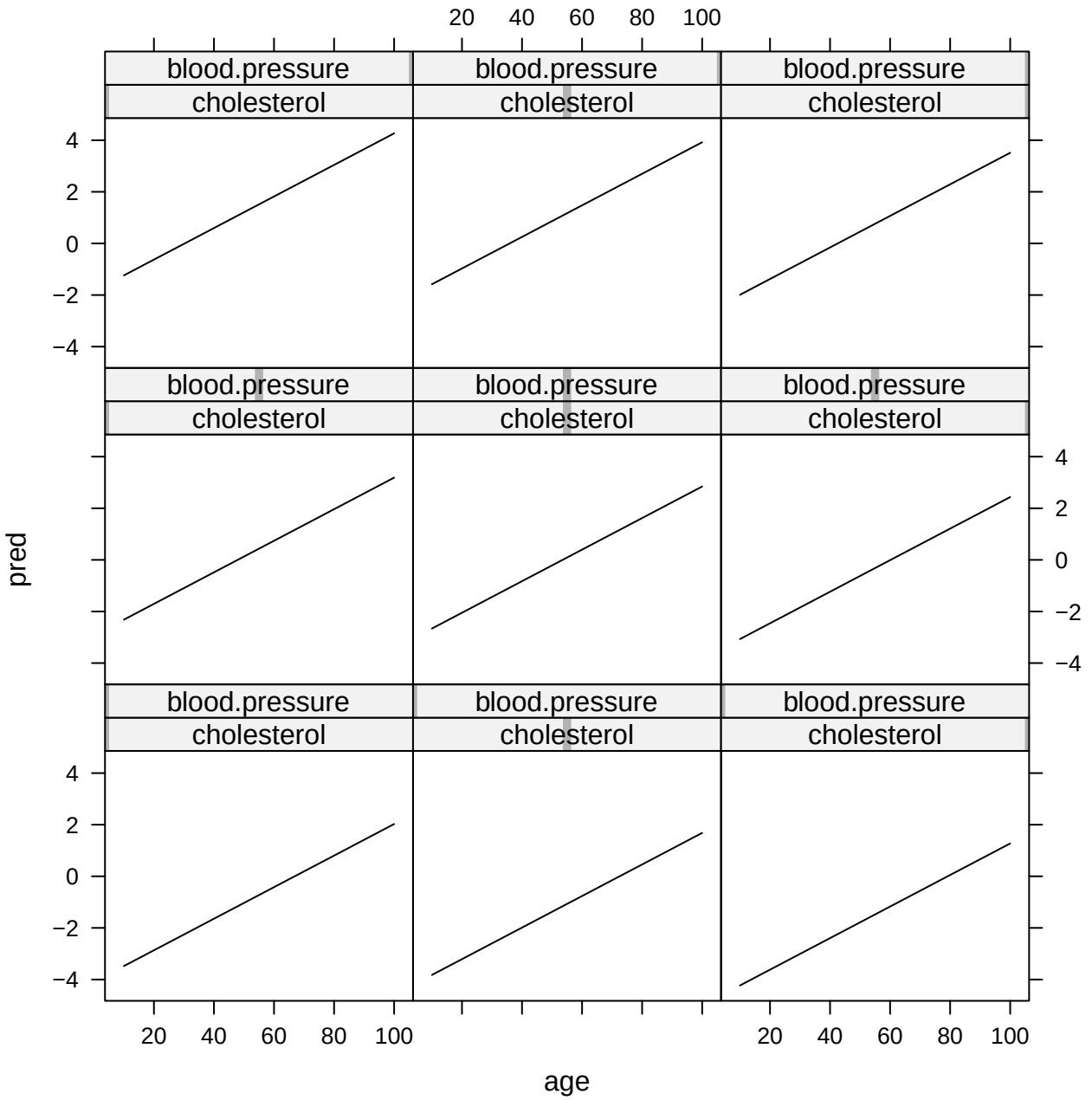
help("predictrms")



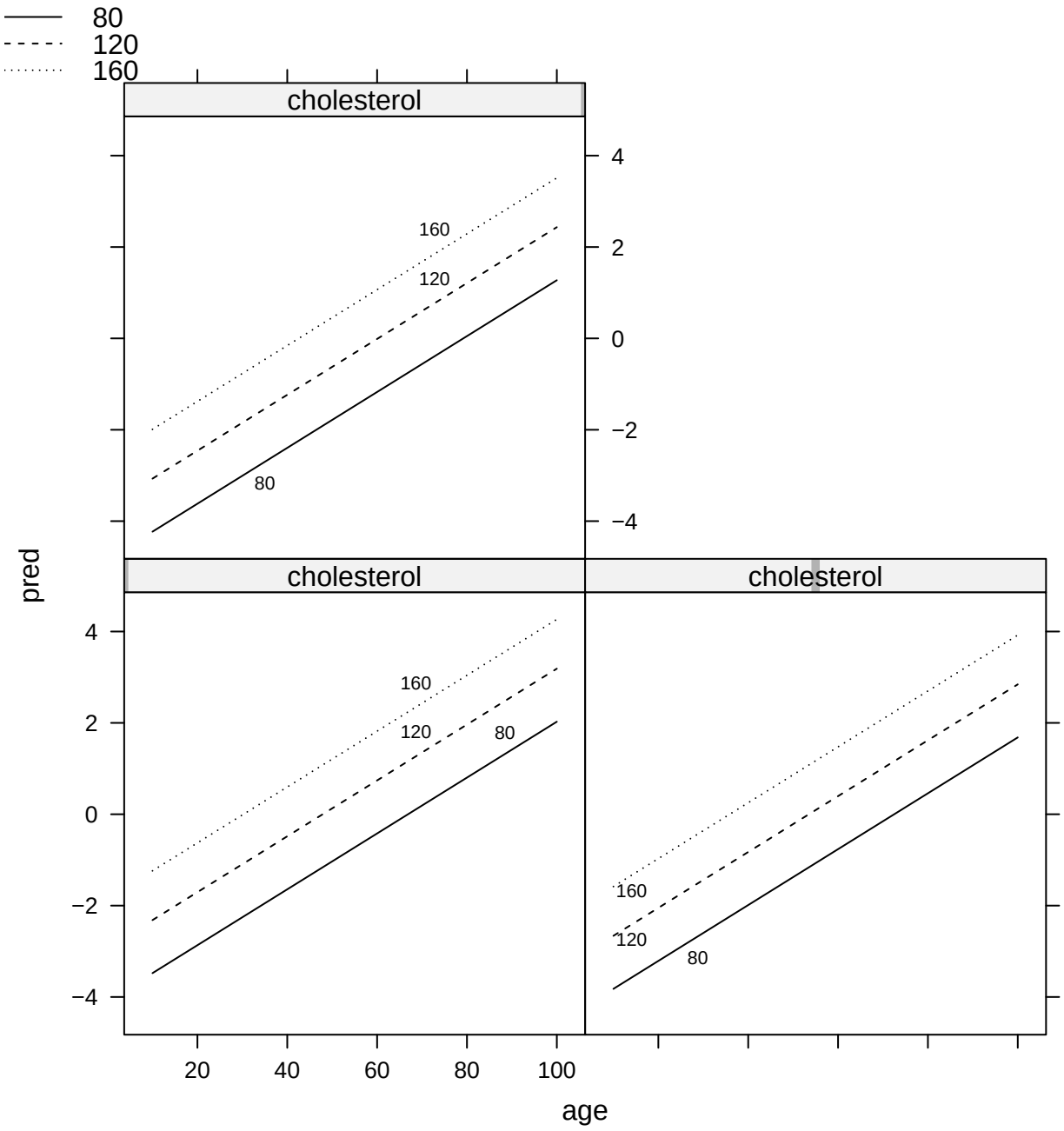
help("predictrms")



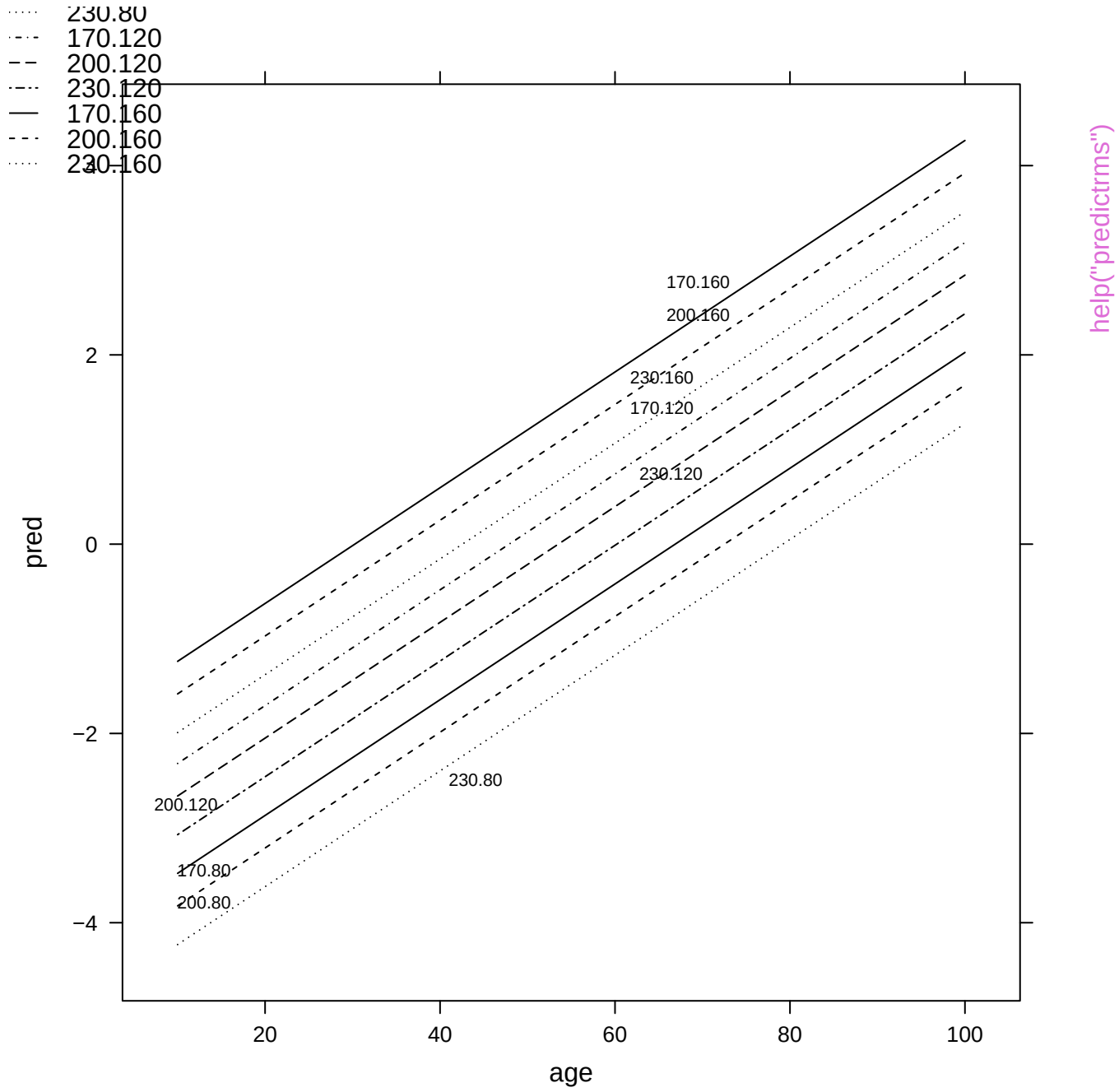
help("predictrms")

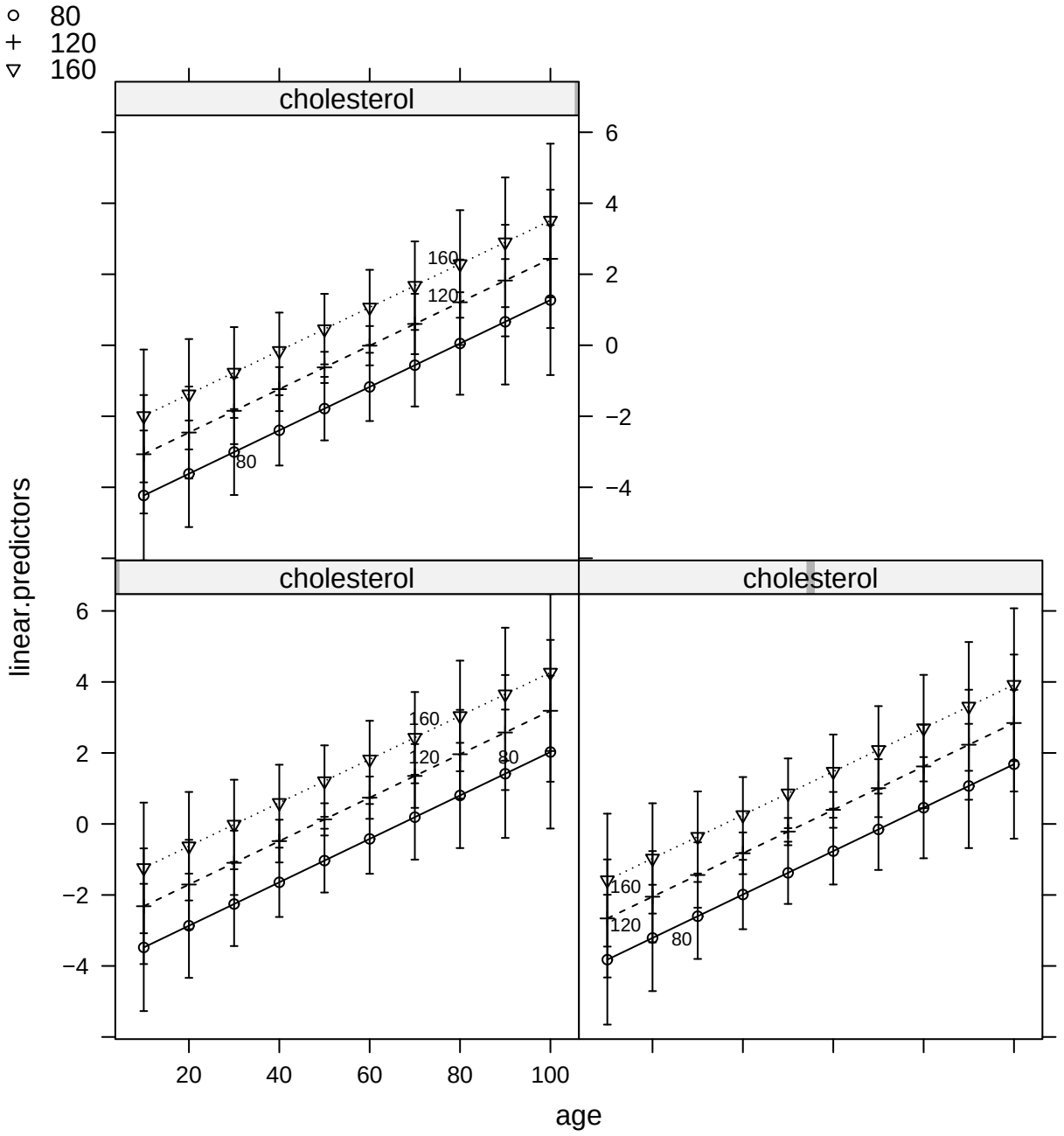


help("predictrms")

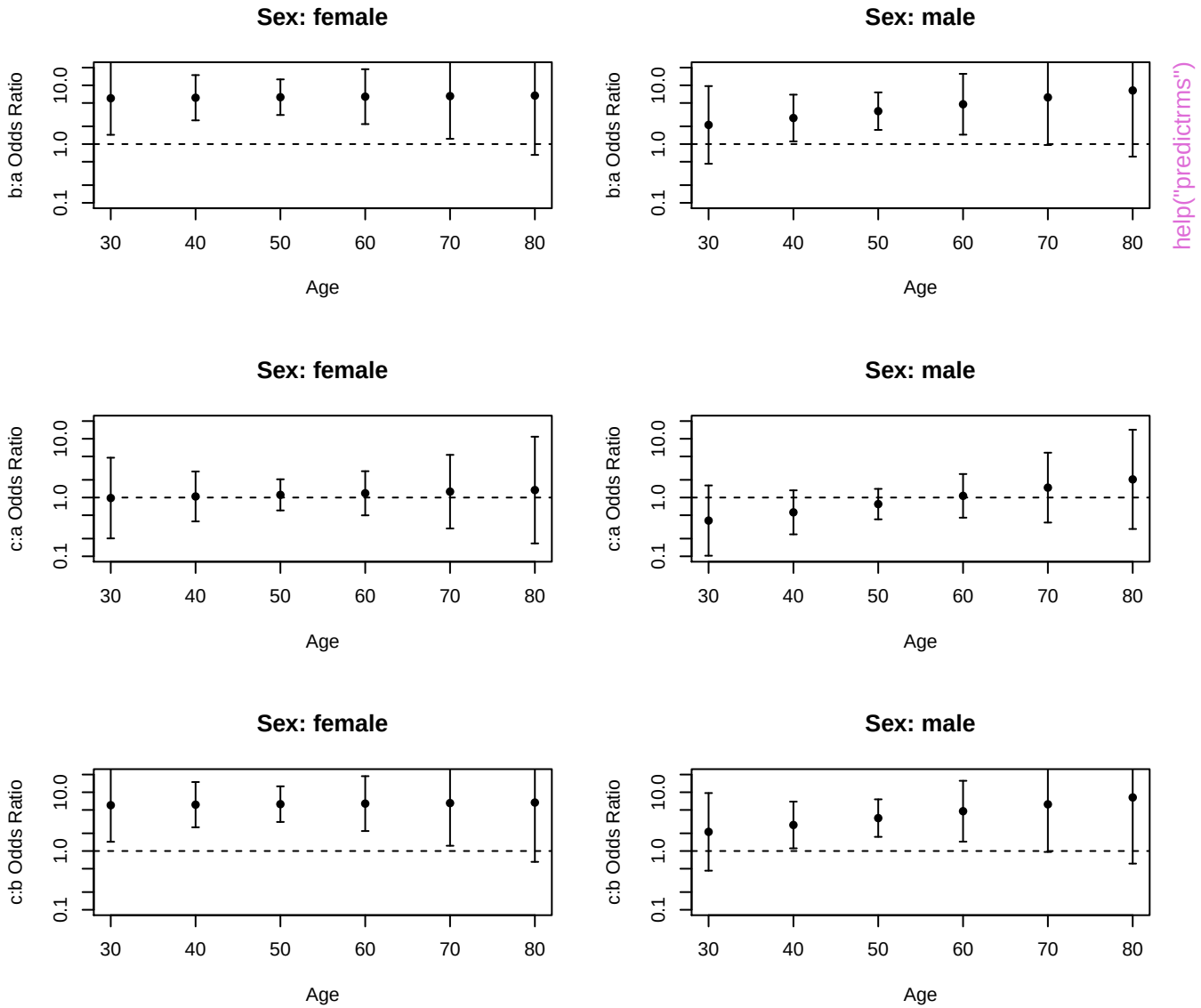


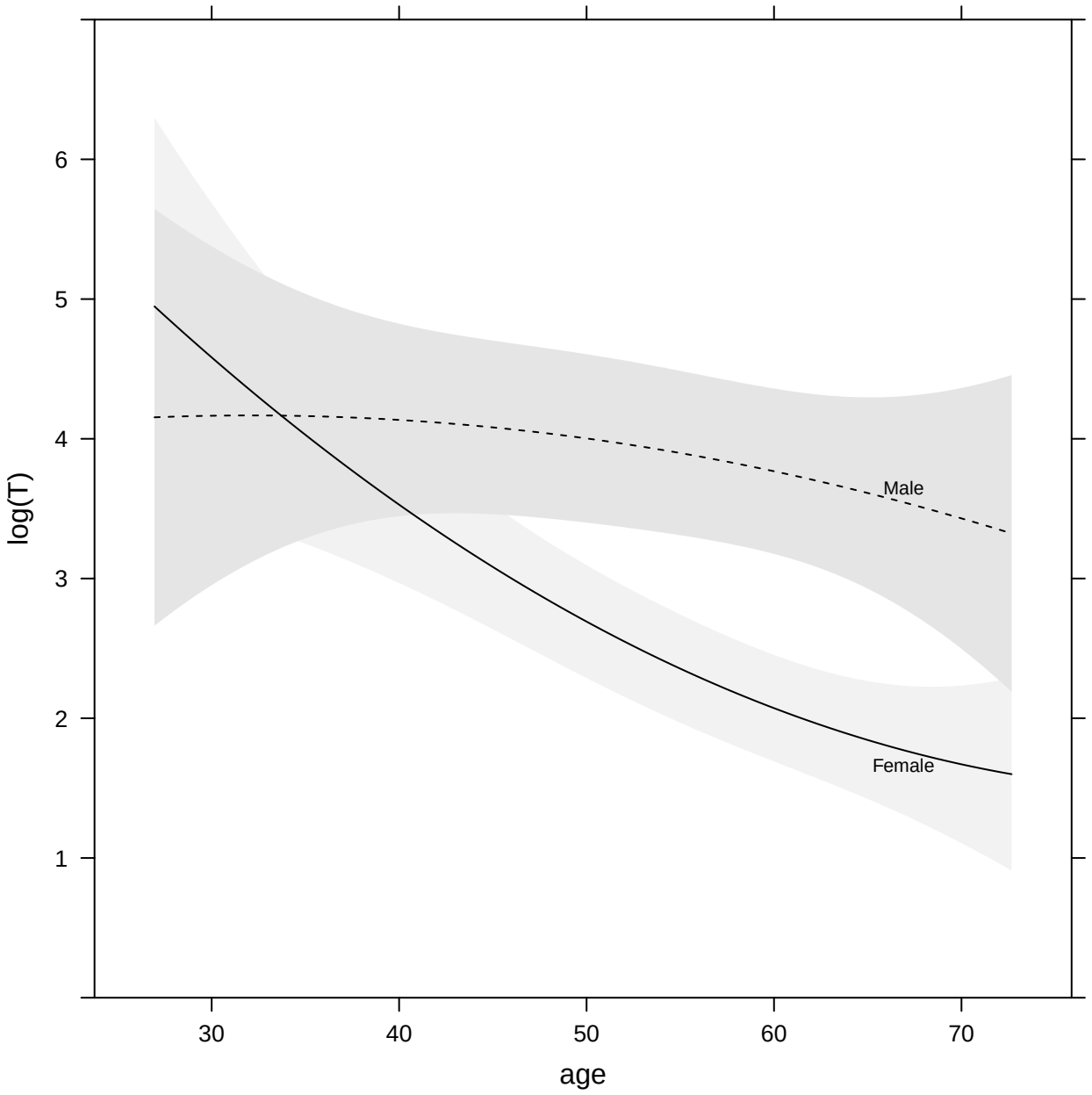
help("predictrms")


230.80
170.120
200.120
230.120
170.160
200.160
230.160
pred
age
help("predictrms")
170.160
200.160
230.160
170.120
230.120
230.80
200.120
170.80
200.80

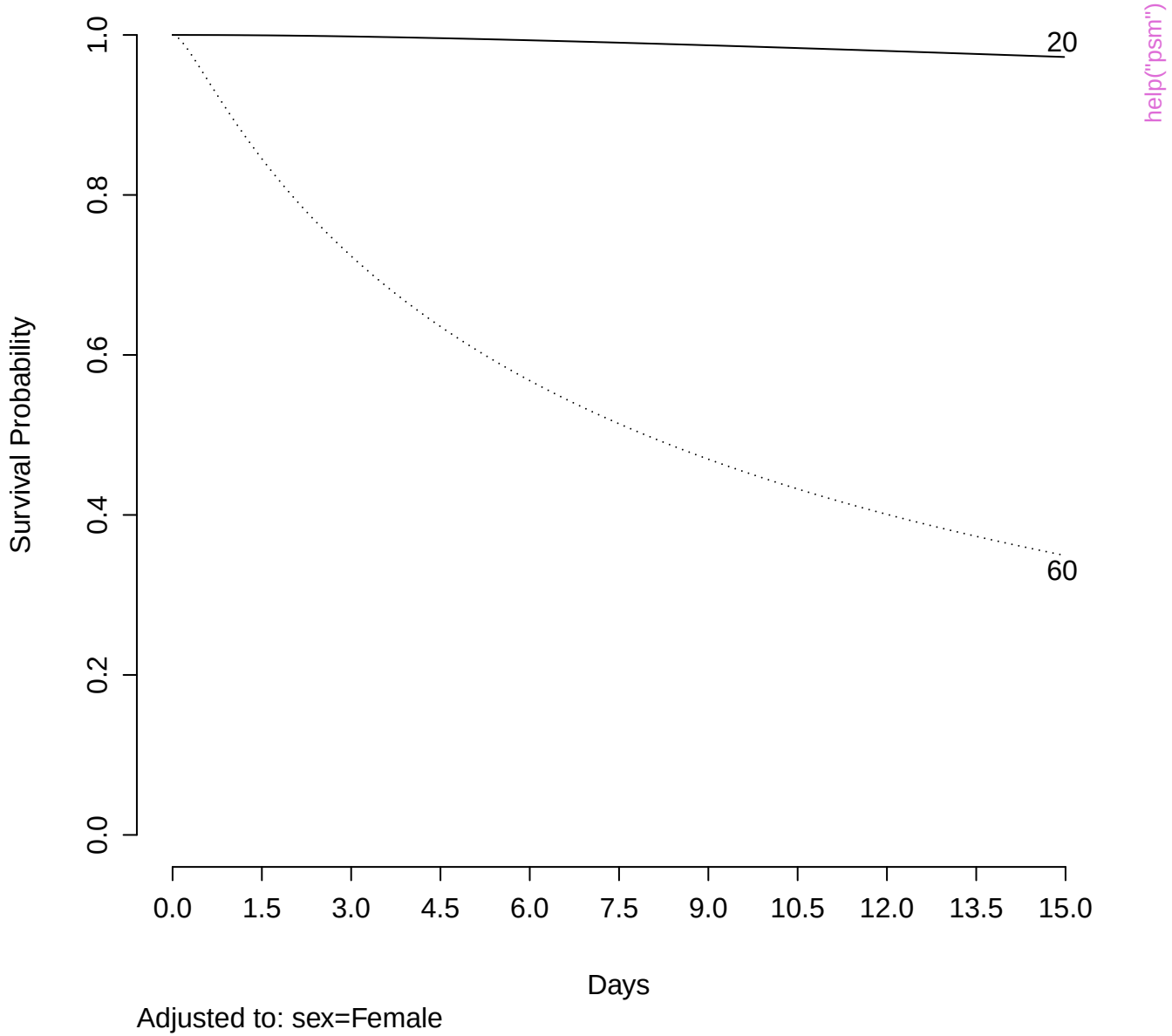


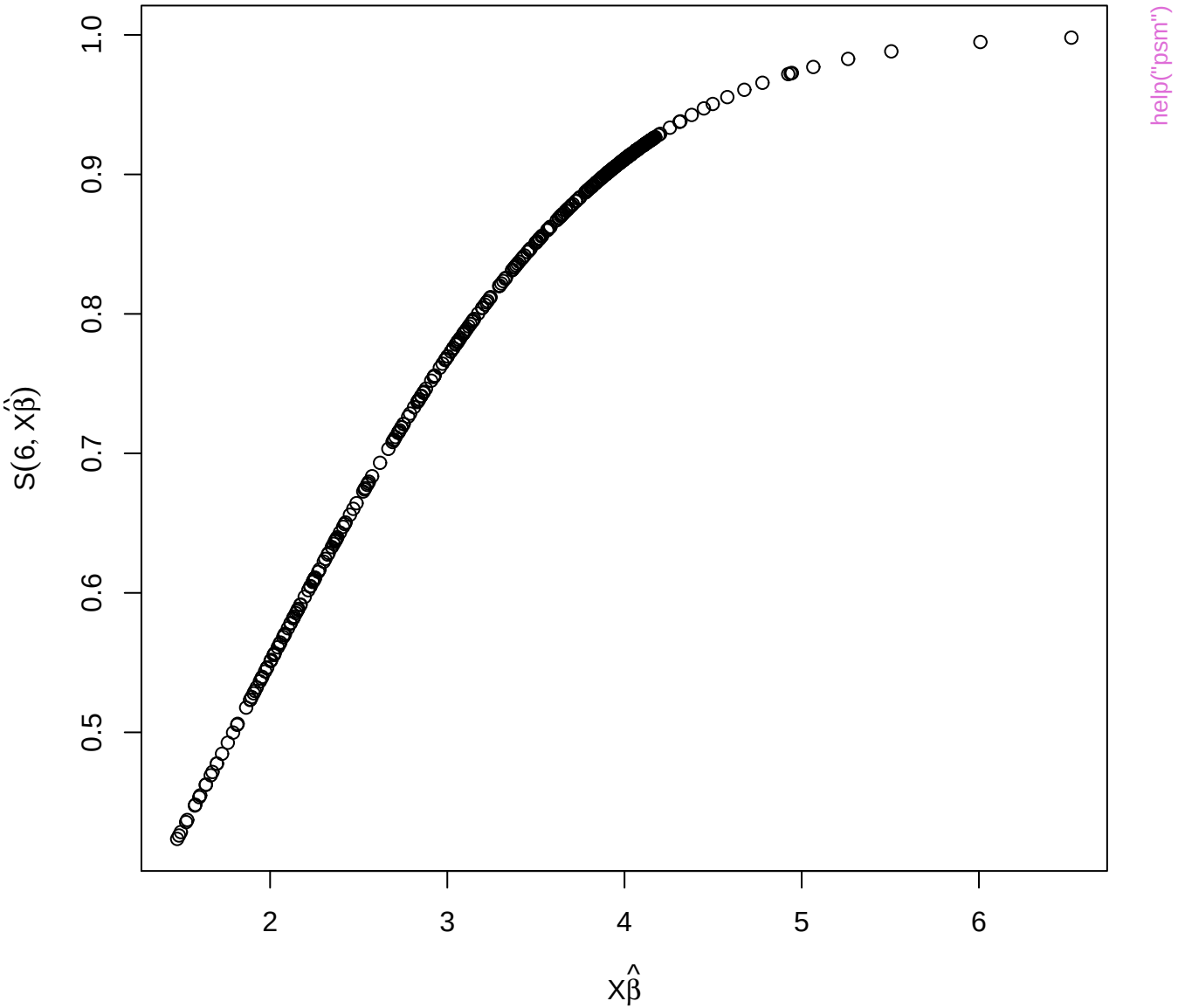
help("predictrms")


Sex: female
b:a Odds Ratio
0.1
1.0
10.0
30
40
50
60
70
80
Age
Sex: male
b:a Odds Ratio
0.1
1.0
10.0
30
40
50
60
70
80
Age
help("predictrms")
Sex: female
c:a Odds Ratio
0.1
1.0
10.0
30
40
50
60
70
80
Age
Sex: male
c:a Odds Ratio
0.1
1.0
10.0
30
40
50
60
70
80
Age
Sex: female
c:b Odds Ratio
0.1
1.0
10.0
30
40
50
60
70
80
Age
Sex: male
c:b Odds Ratio
0.1
1.0
10.0
30
40
50
60
70
80
Age

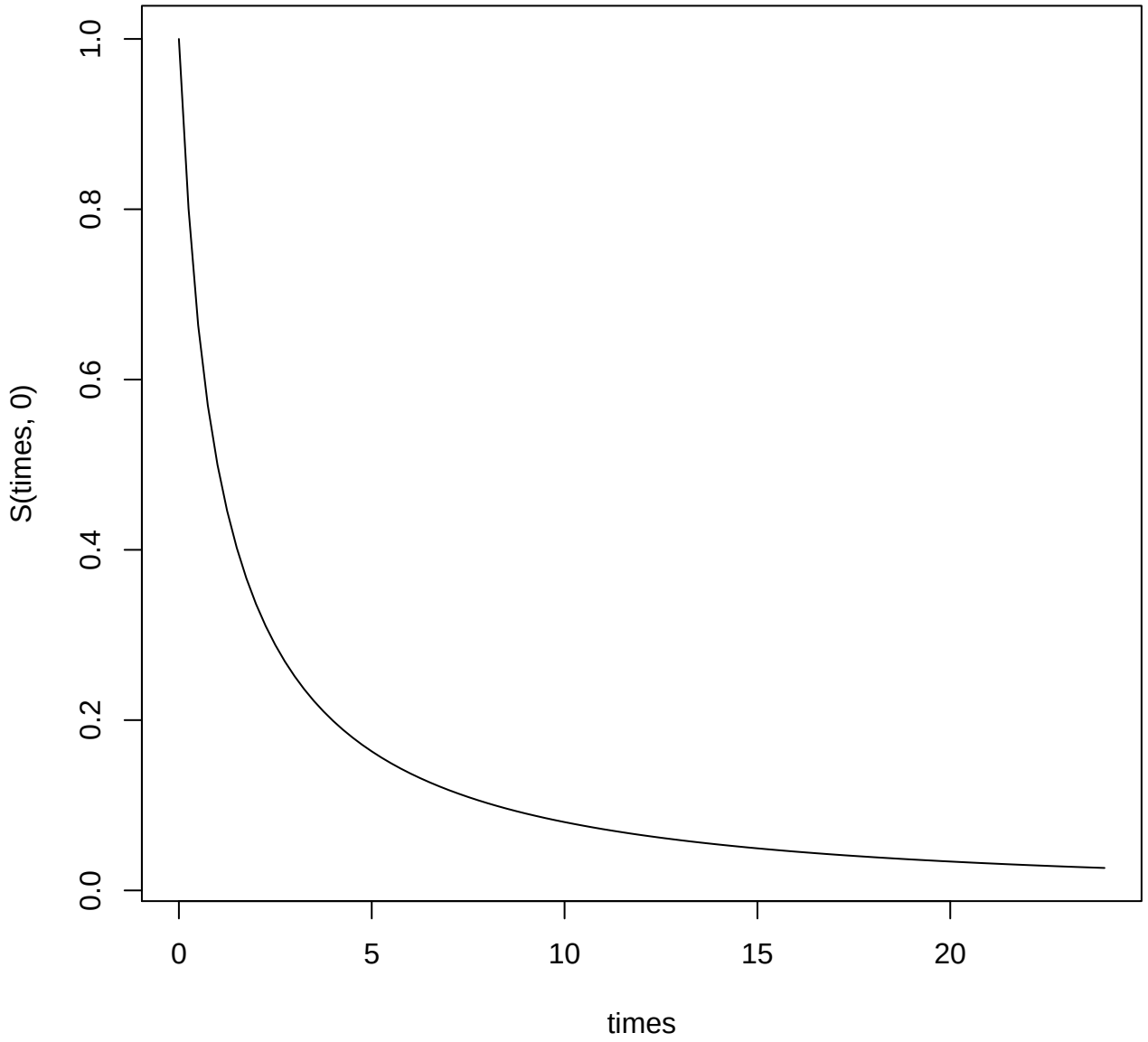


help("psm")

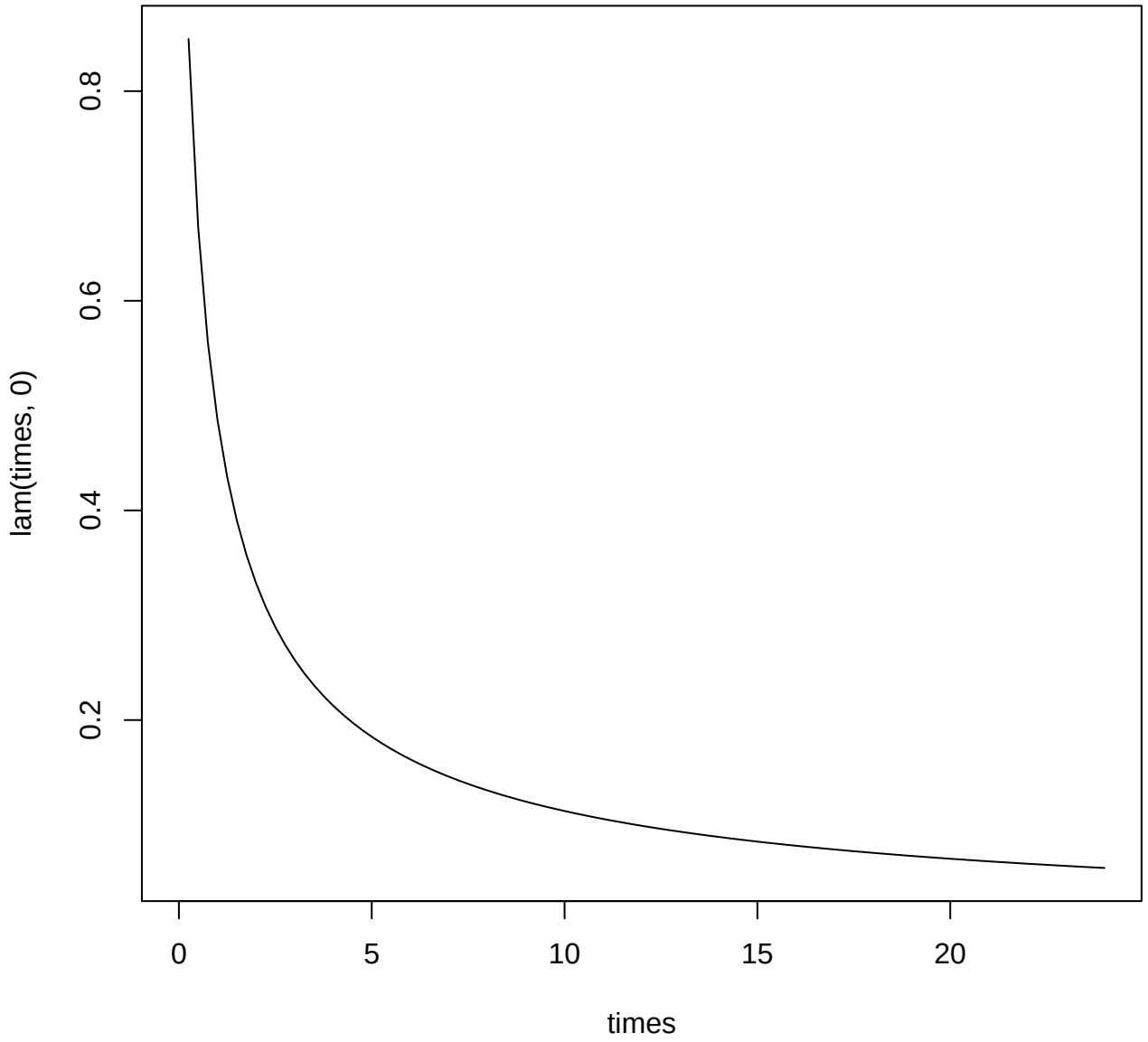

help("psm")
20
60
Survival Probability
1.0
0.8
0.6
0.4
0.2
0.0
0.0
1.5
3.0
4.5
6.0
7.5
9.0
10.5
12.0
13.5
15.0
Days
Adjusted to: sex=Female



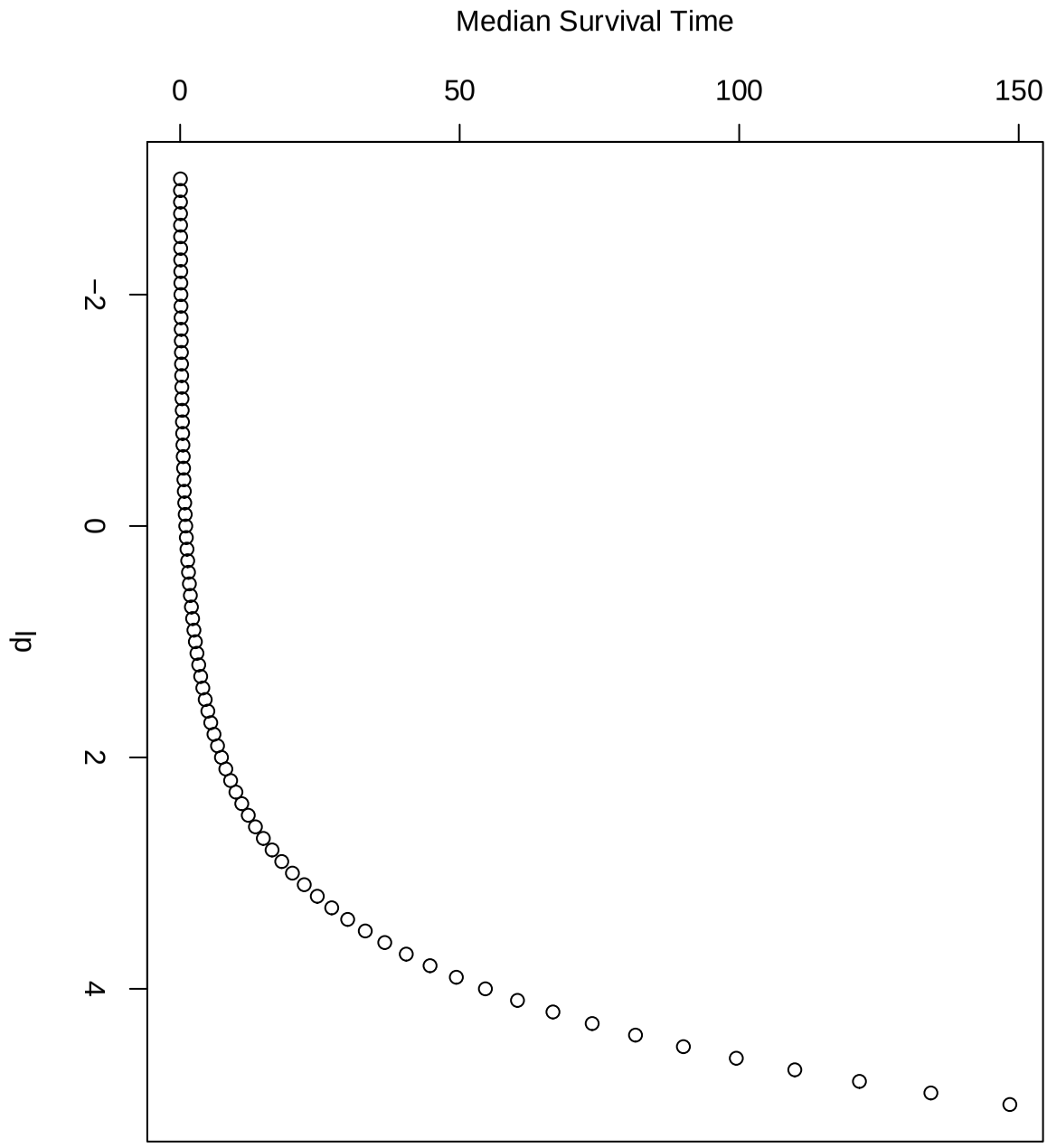
help("psm")



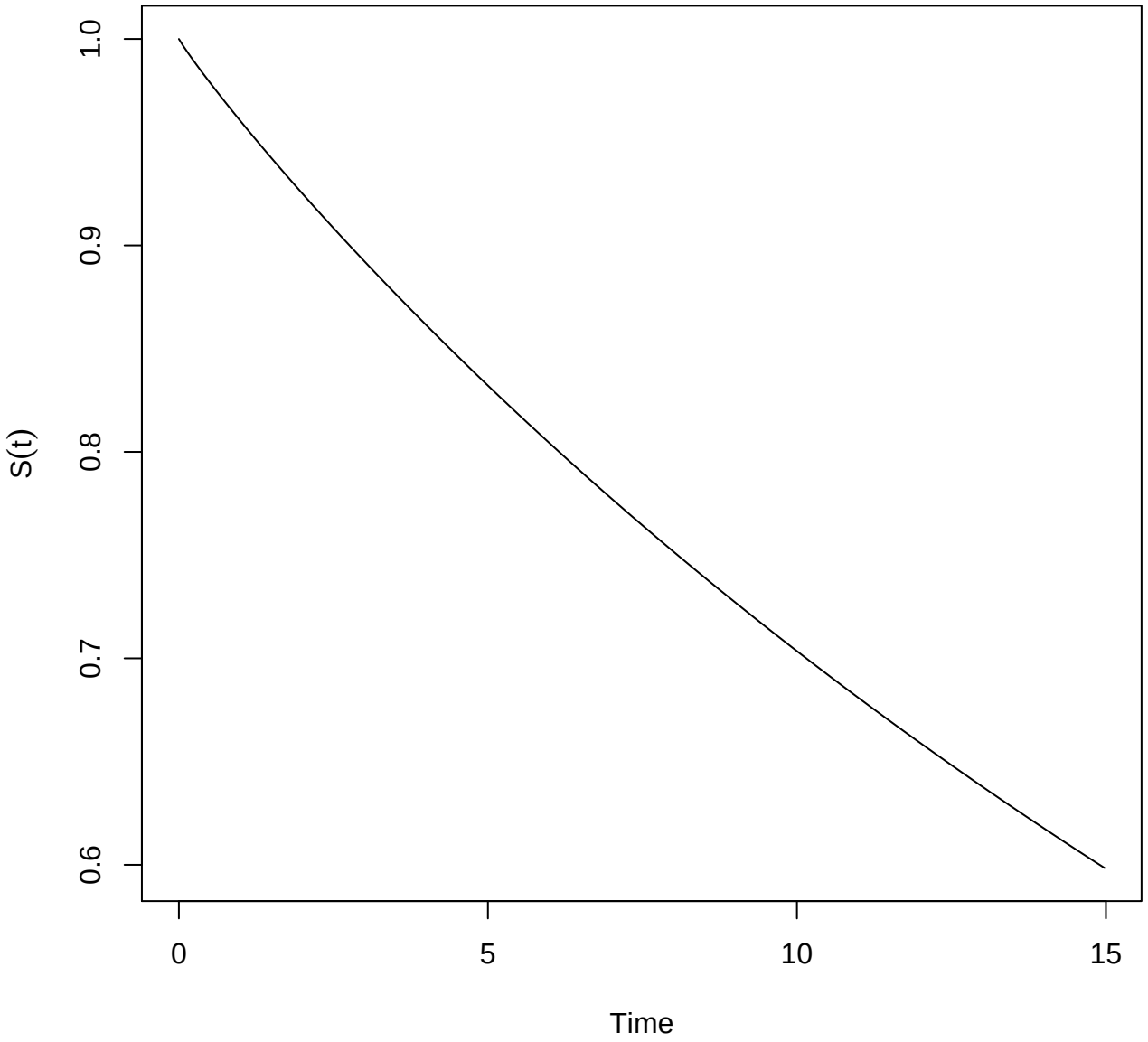
help("psm")

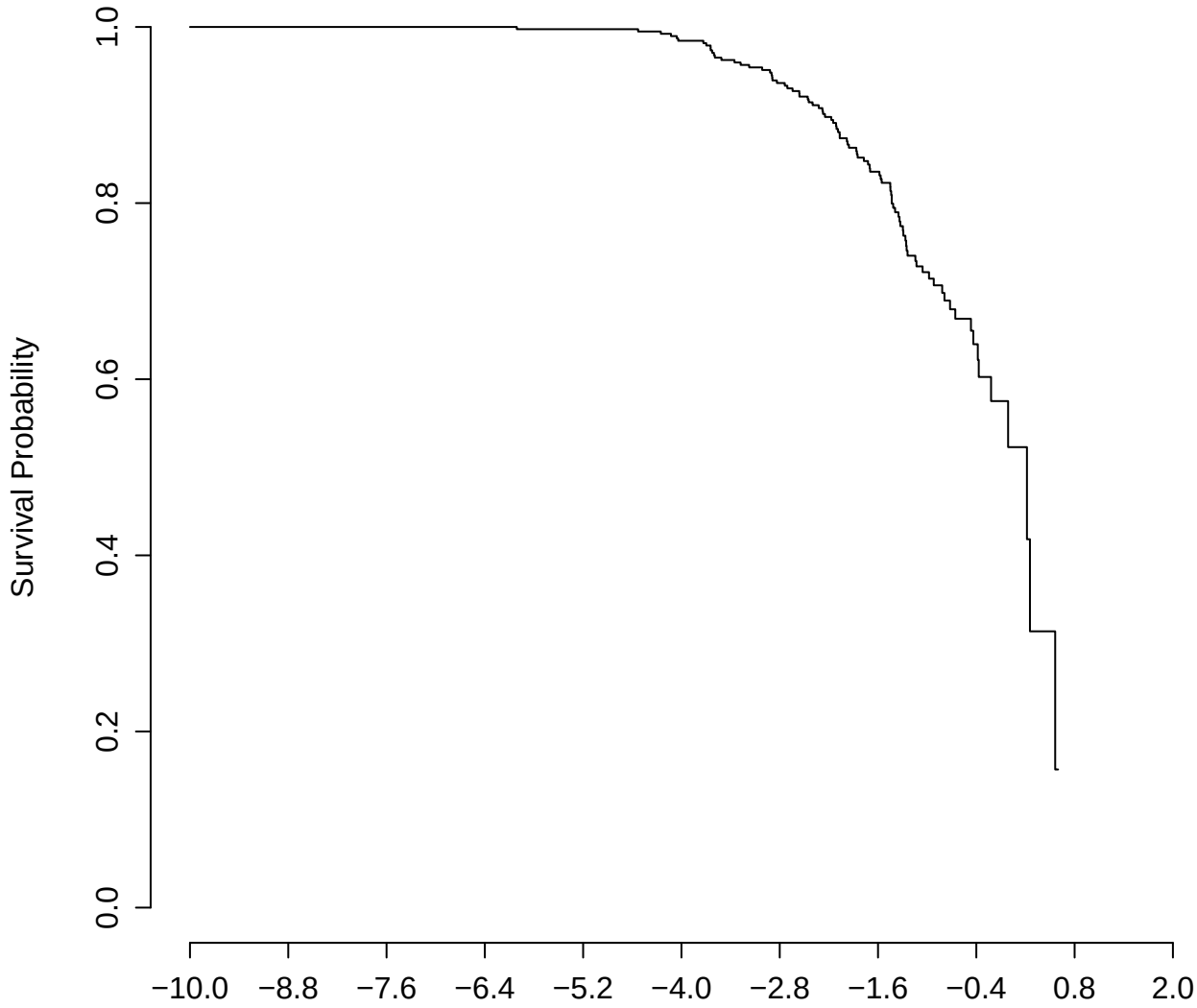


help("psm")

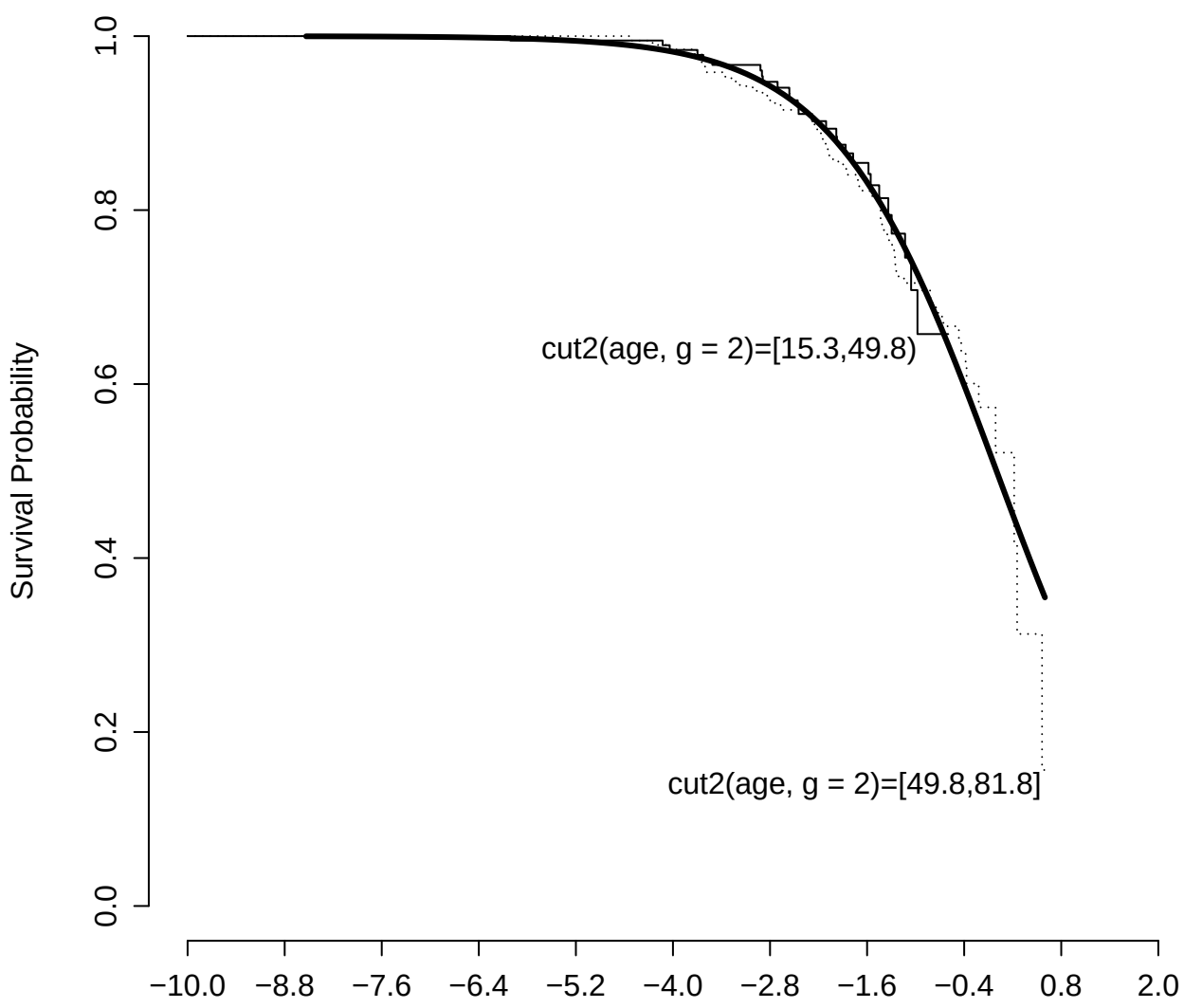


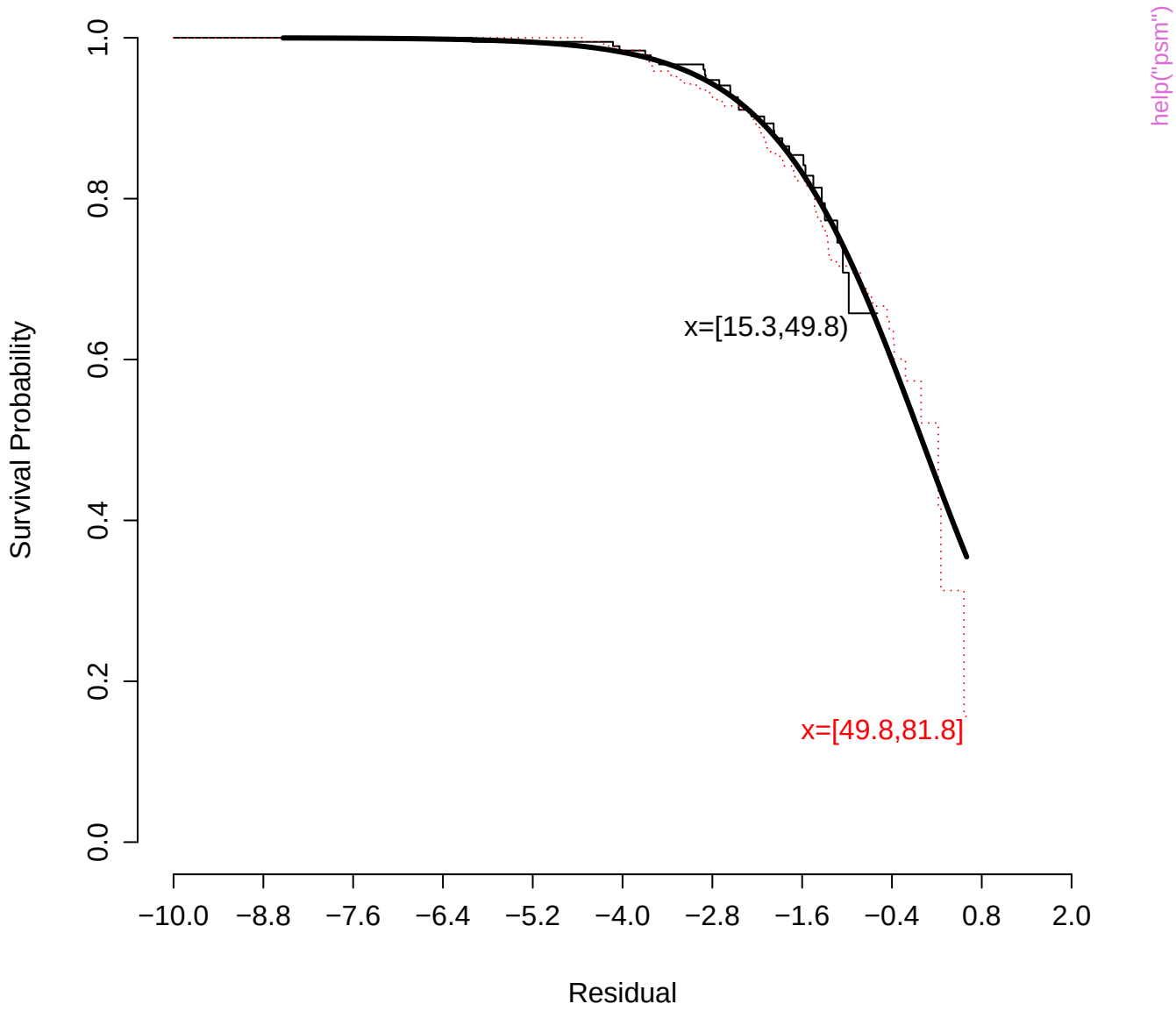
help("psm")

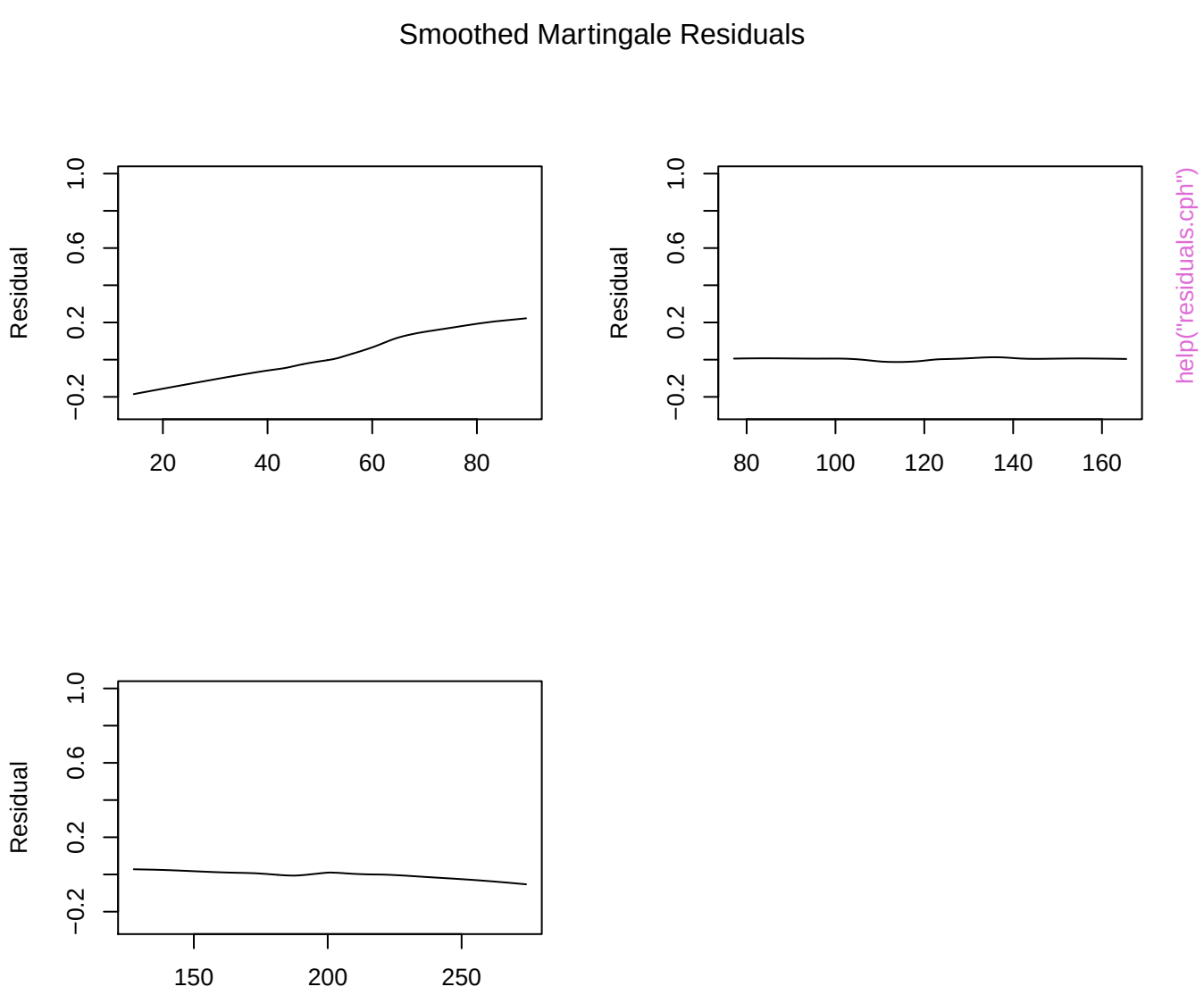

S(t)
1.0
0.9
0.8
0.7
0.6
0
5
10
15
Time
help("psm")


Survival Probability
0.0
0.2
0.4
0.6
0.8
1.0
−10.0
−8.8
−7.6
−6.4
−5.2
−4.0
−2.8
−1.6
−0.4
0.8
2.0

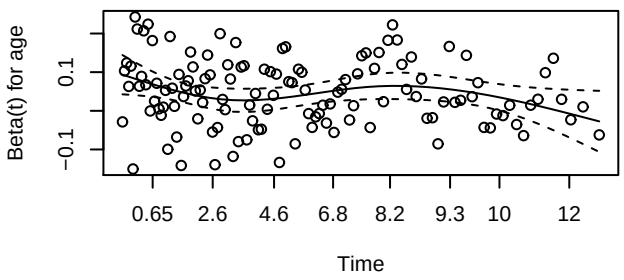
help("psm")

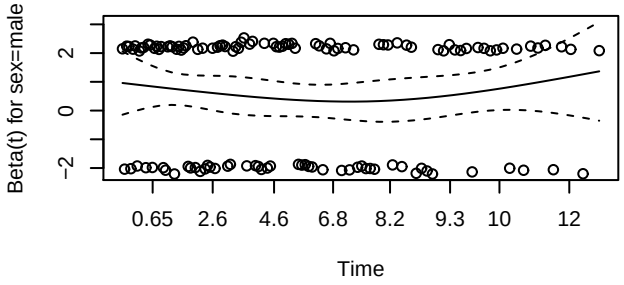

Survival Probability
1.0
0.8
0.6
0.4
0.2
0.0
cut2(age, g = 2)=[15.3,49.8)
cut2(age, g = 2)=[49.8,81.8]
−10.0
−8.8
−7.6
−6.4
−5.2
−4.0
−2.8
−1.6
−0.4
0.8
2.0
help("psm")

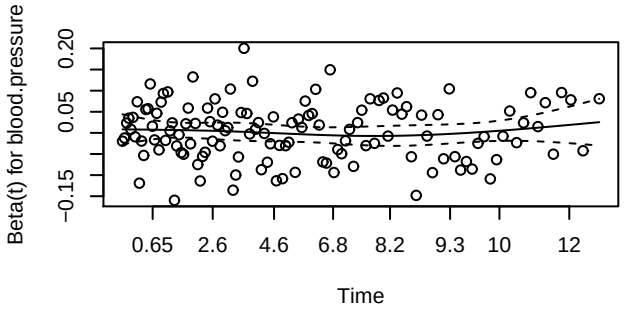

help("psm")
Survival Probability
1.0
0.8
0.6
0.4
0.2
0.0
x=[15.3,49.8)
x=[49.8,81.8]
−10.0
−8.8
−7.6
−6.4
−5.2
−4.0
−2.8
−1.6
−0.4
0.8
2.0
Residual


Smoothed Martingale Residuals
Residual
1.0
0.6
0.2
−0.2
20
40
60
80
Residual
1.0
0.6
0.2
−0.2
80
100
120
140
160
help("residuals.cph")
Residual
1.0
0.6
0.2
−0.2
150
200
250

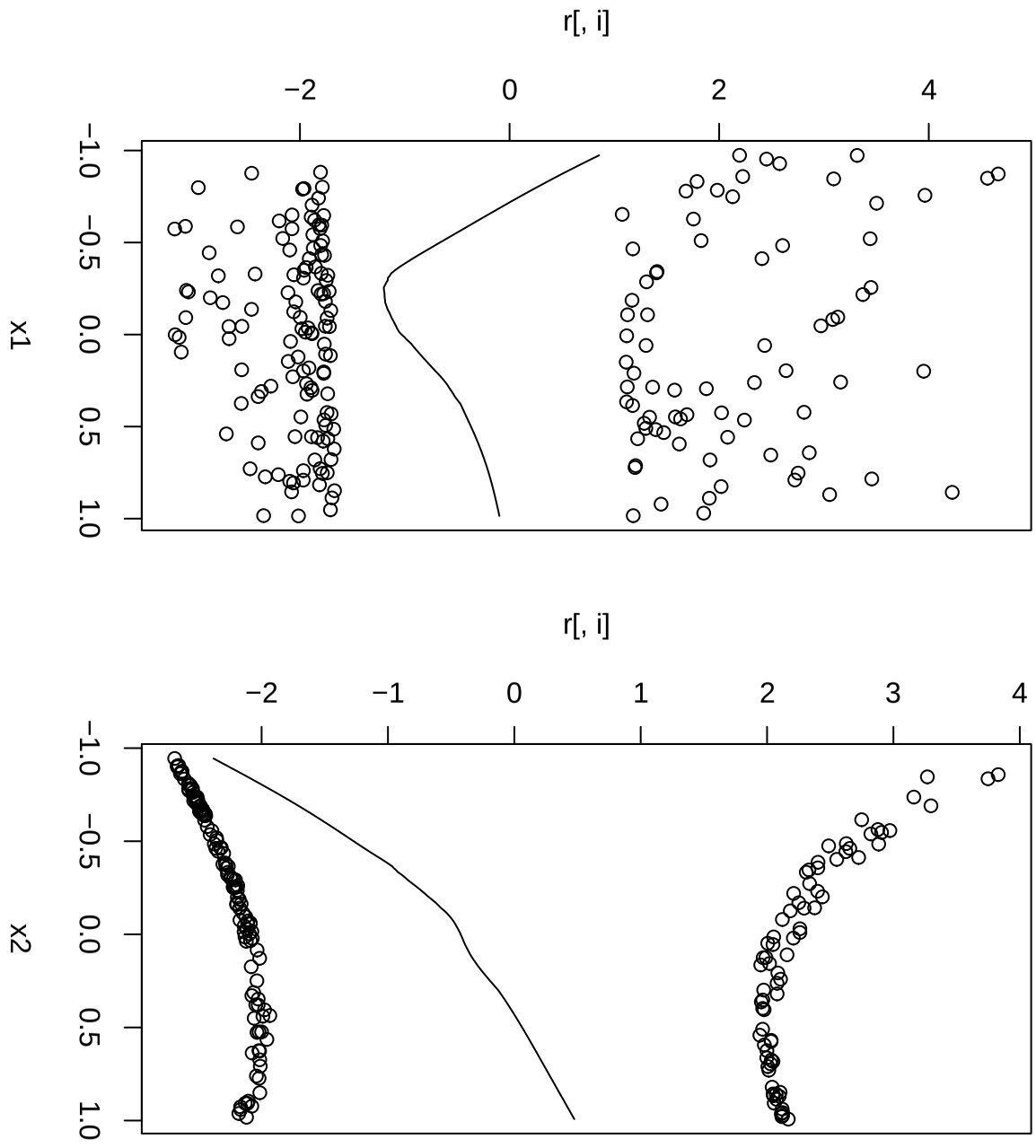
Transformed I(r[, i])
−0.1
0.1
−0.1
0.0
0.1
0.2
I(r[, i])
Transformed tt
−0.04
0.00
0
2
4
6
8
10
12
tt
help("residuals.cph")
Transformed I(r[, i])
−2
0
1
2
−2
−1
0
1
2
I(r[, i])
Transformed tt
−0.5
0.5
0
2
4
6
8
10
12
tt
Transformed I(r[, i])
−0.15
0.00
0.15
−0.15
−0.05
0.00
0.05
0.10
0.15
0.20
I(r[, i])
Transformed tt
−0.02
0.01
0.04
0
2
4
6
8
10
12
tt



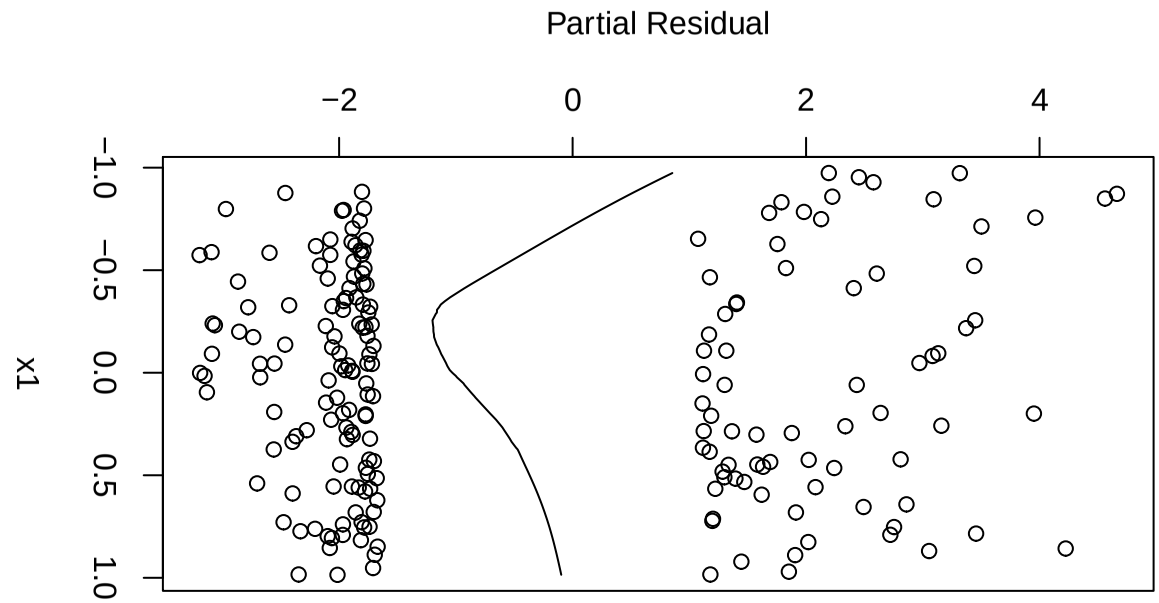


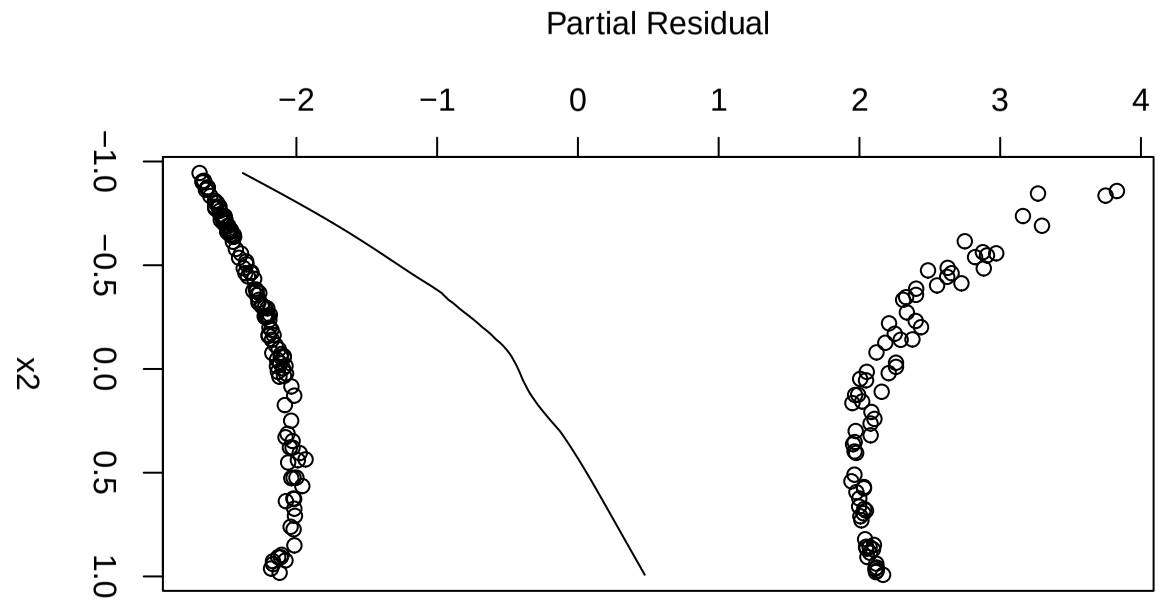


help("residuals.cph")

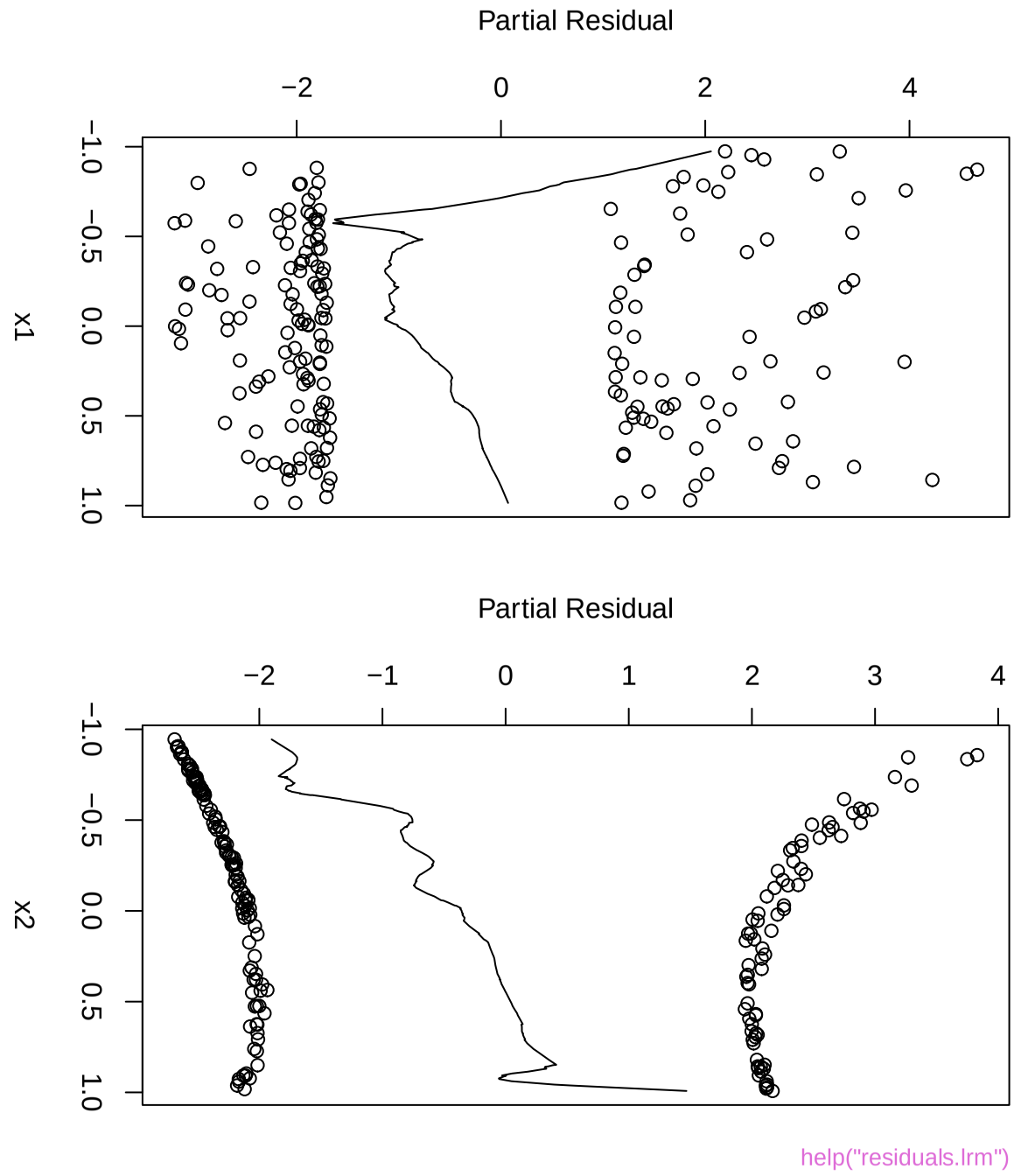


help("residuals.lrm")

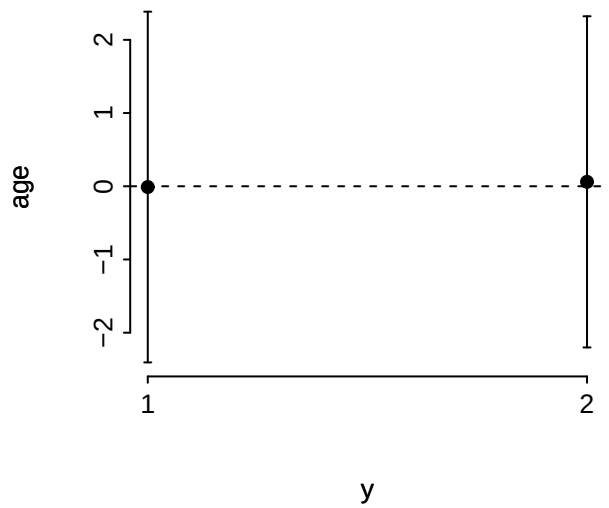


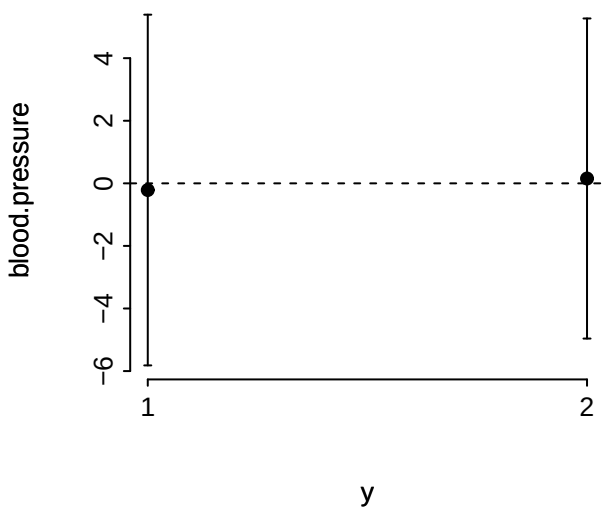


help("residuals.lrm")

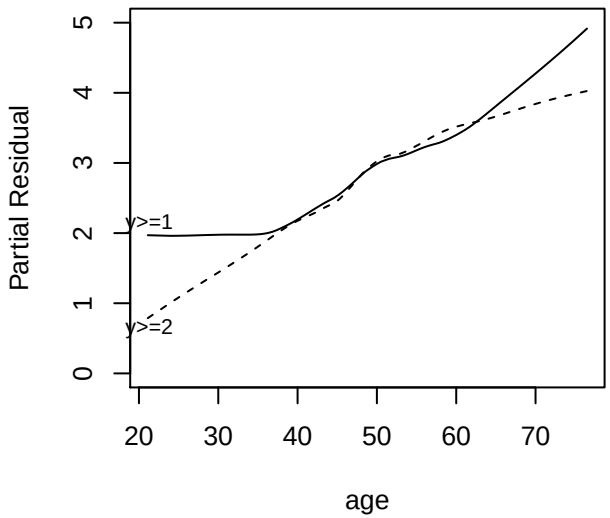


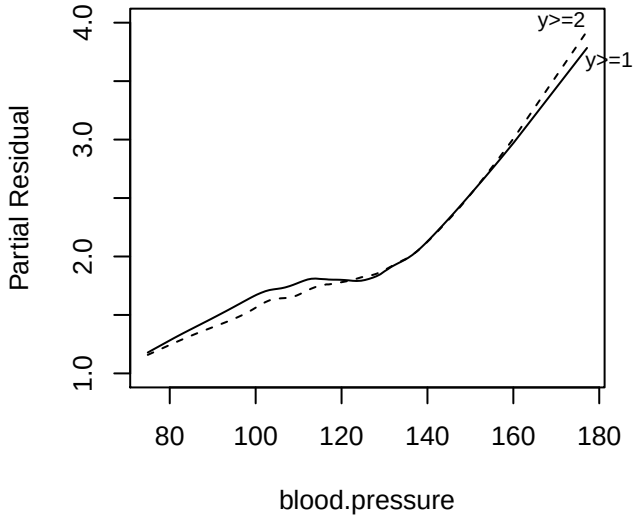
help("residuals.lrm")

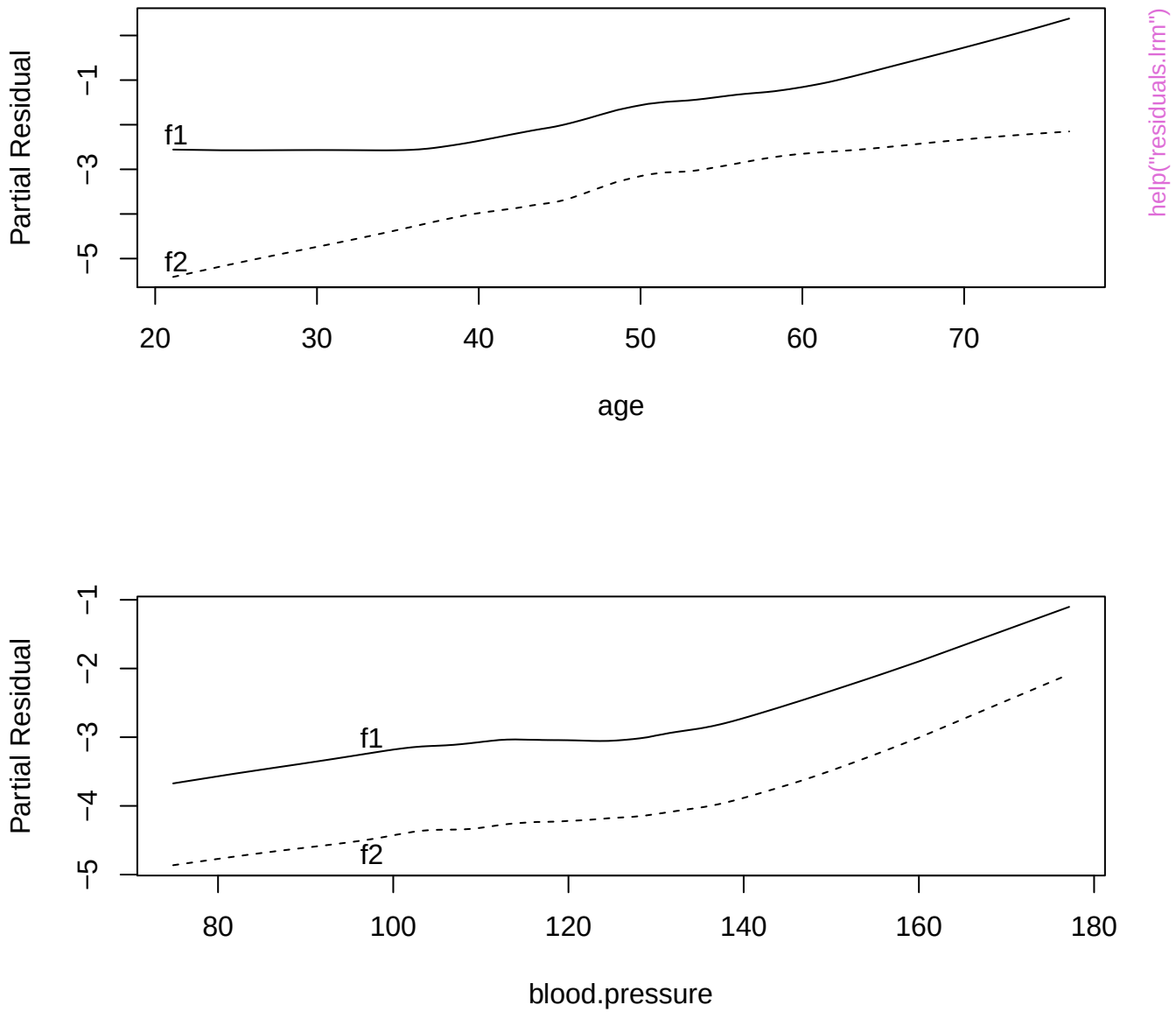


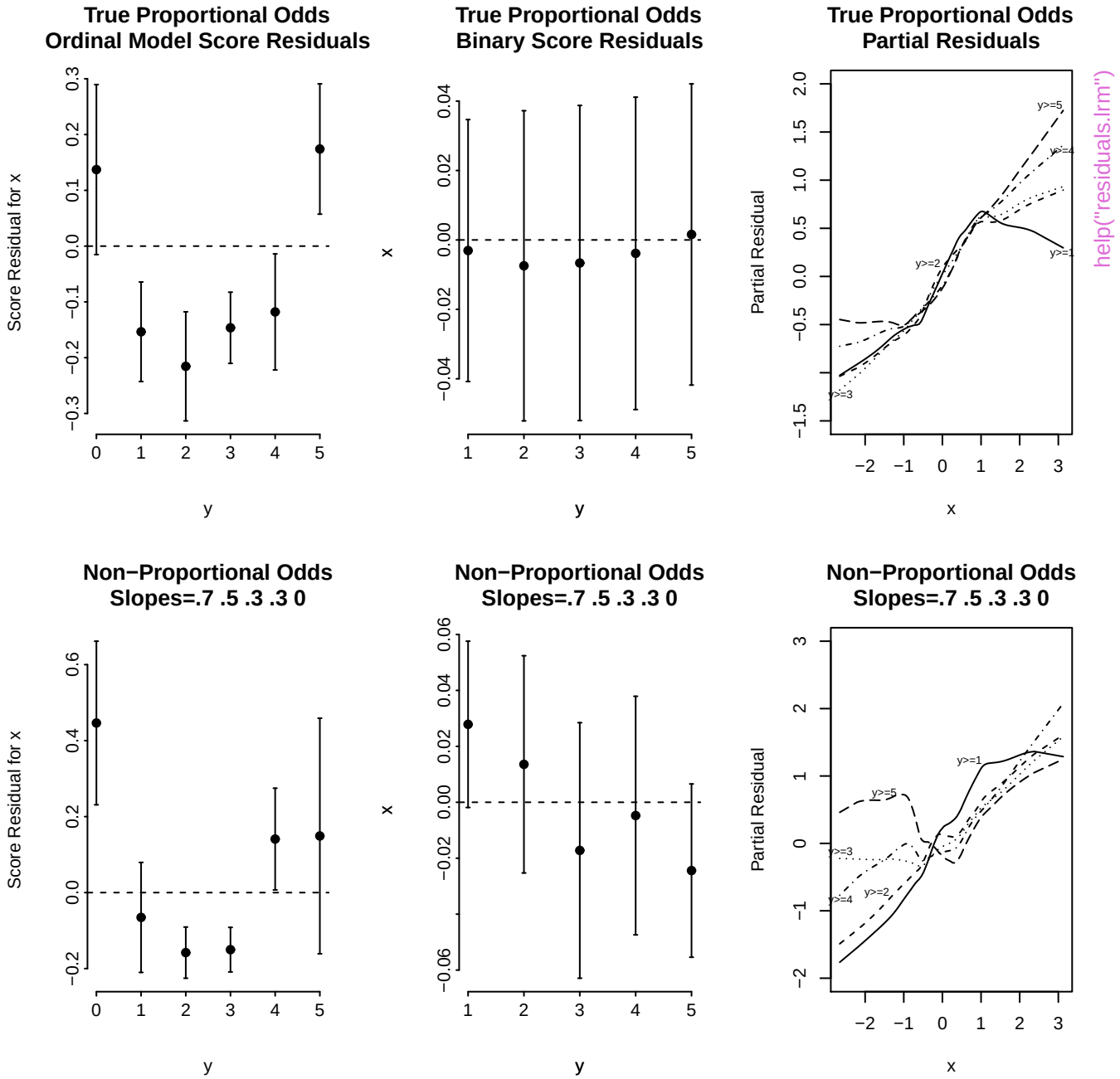


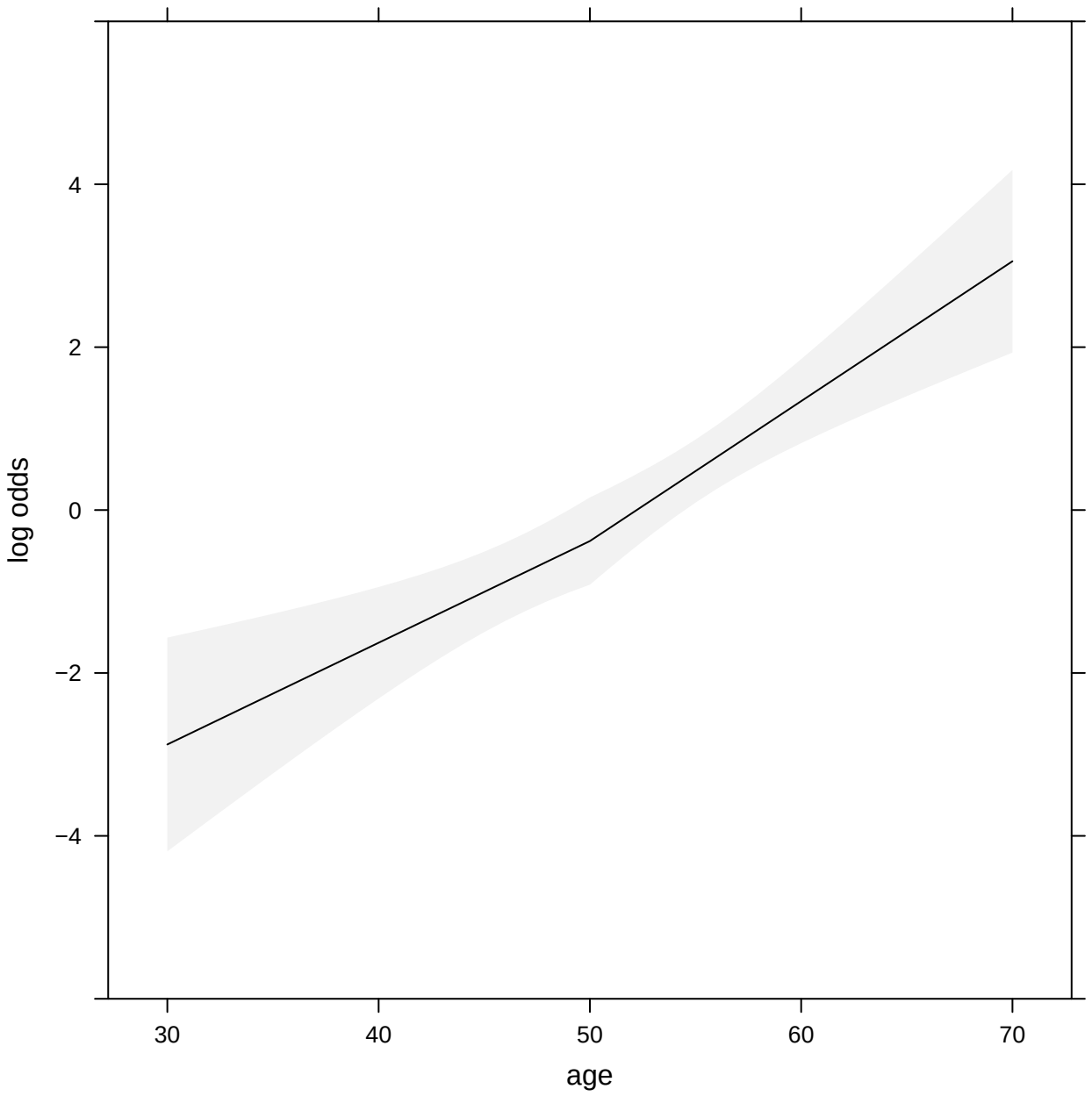
help("residuals.lrm")

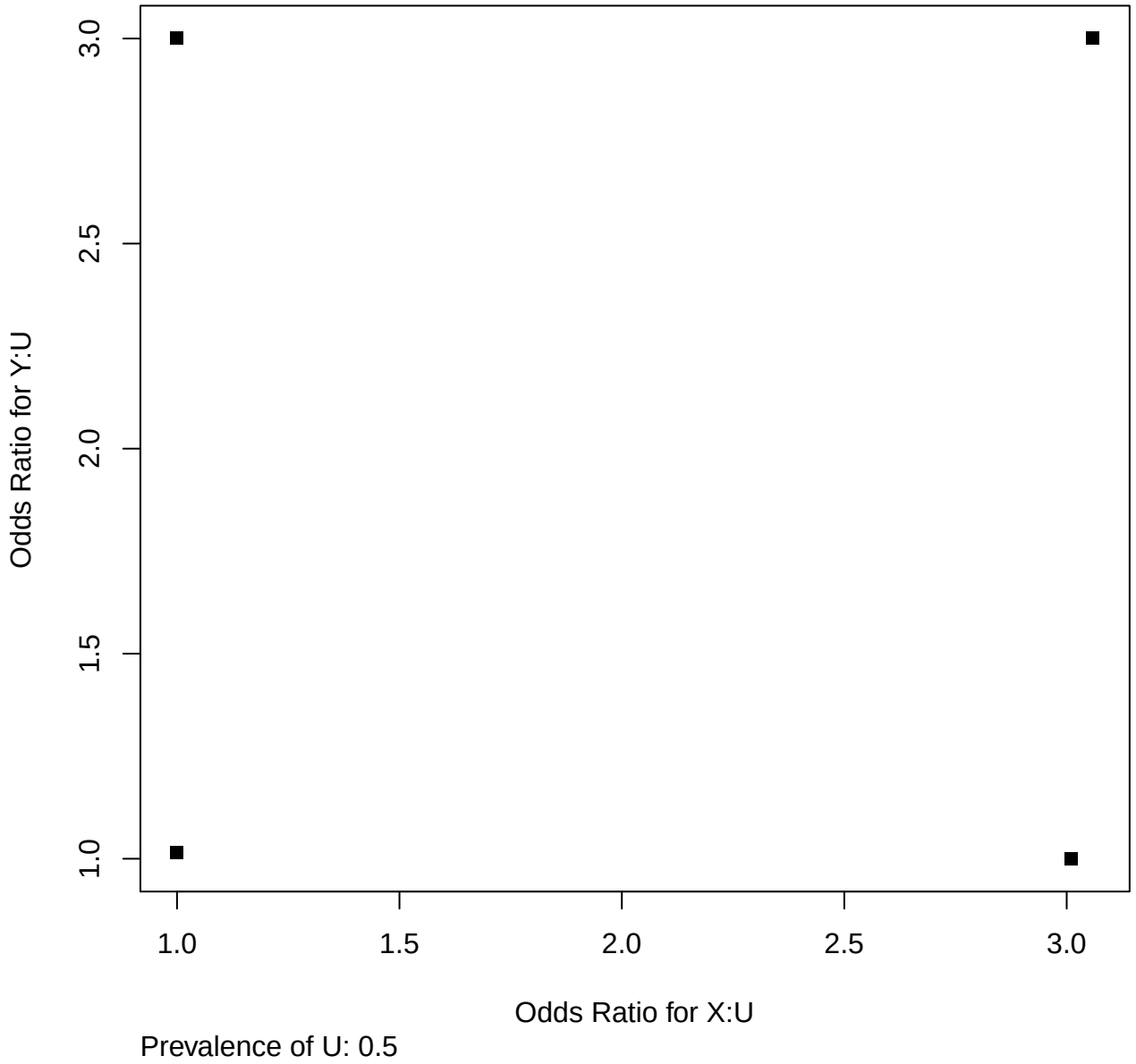


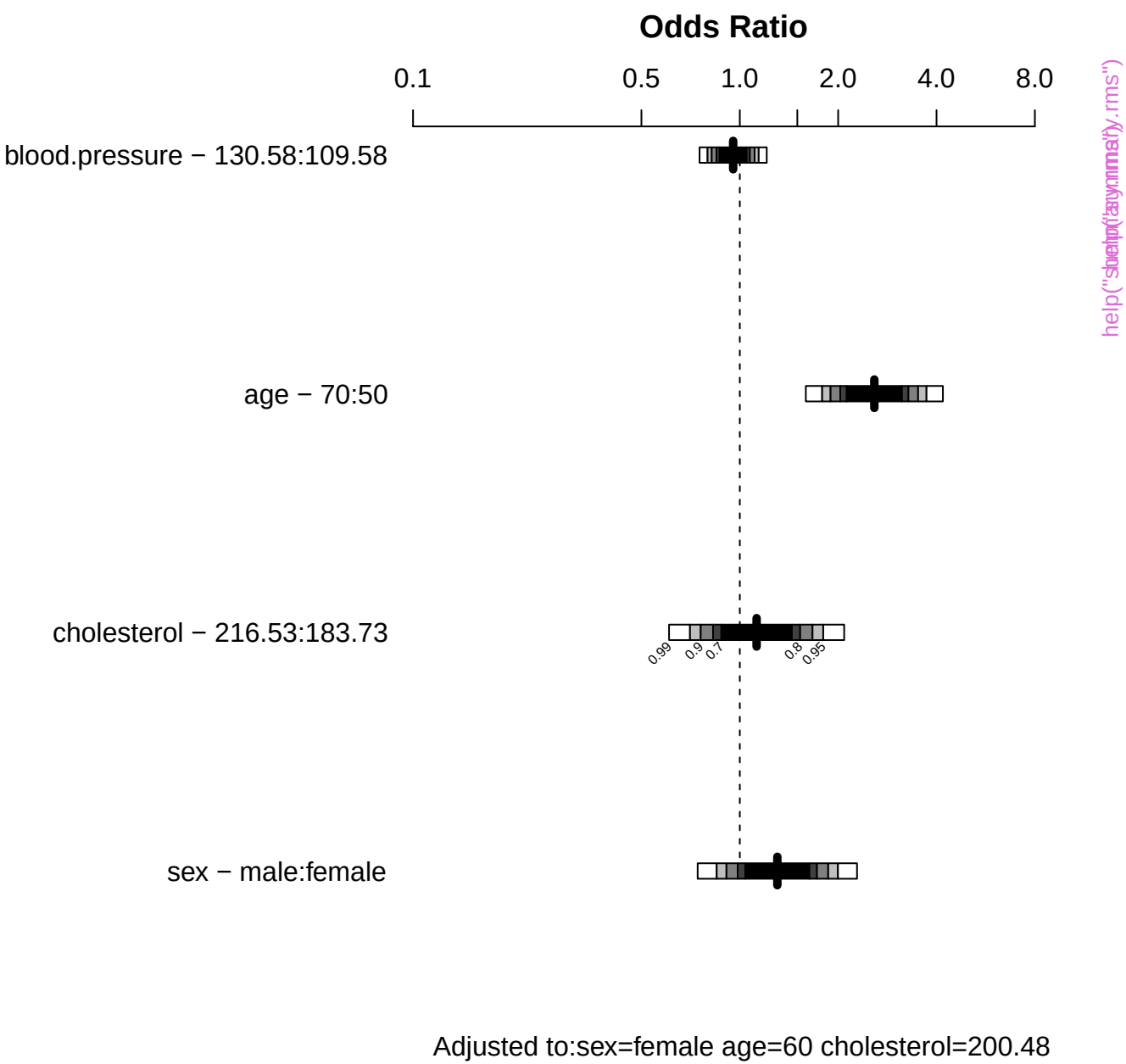


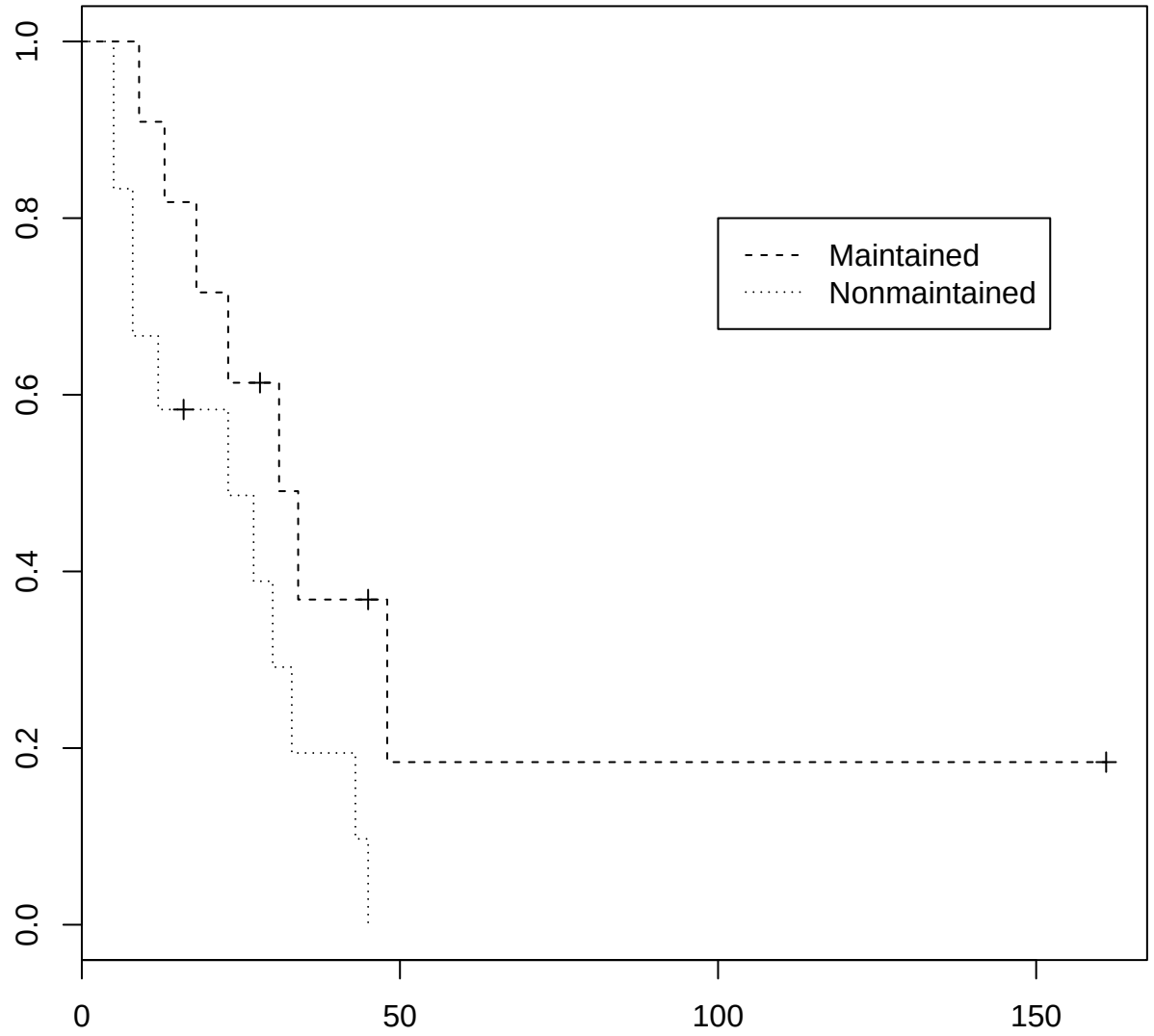

Partial Residual
−1
−3
−5
f1
f2
20
30
40
50
60
70
age
Partial Residual
−1
−2
−3
−4
−5
f1
f2
80
100
120
140
160
180
blood.pressure
help("residuals.lrm")

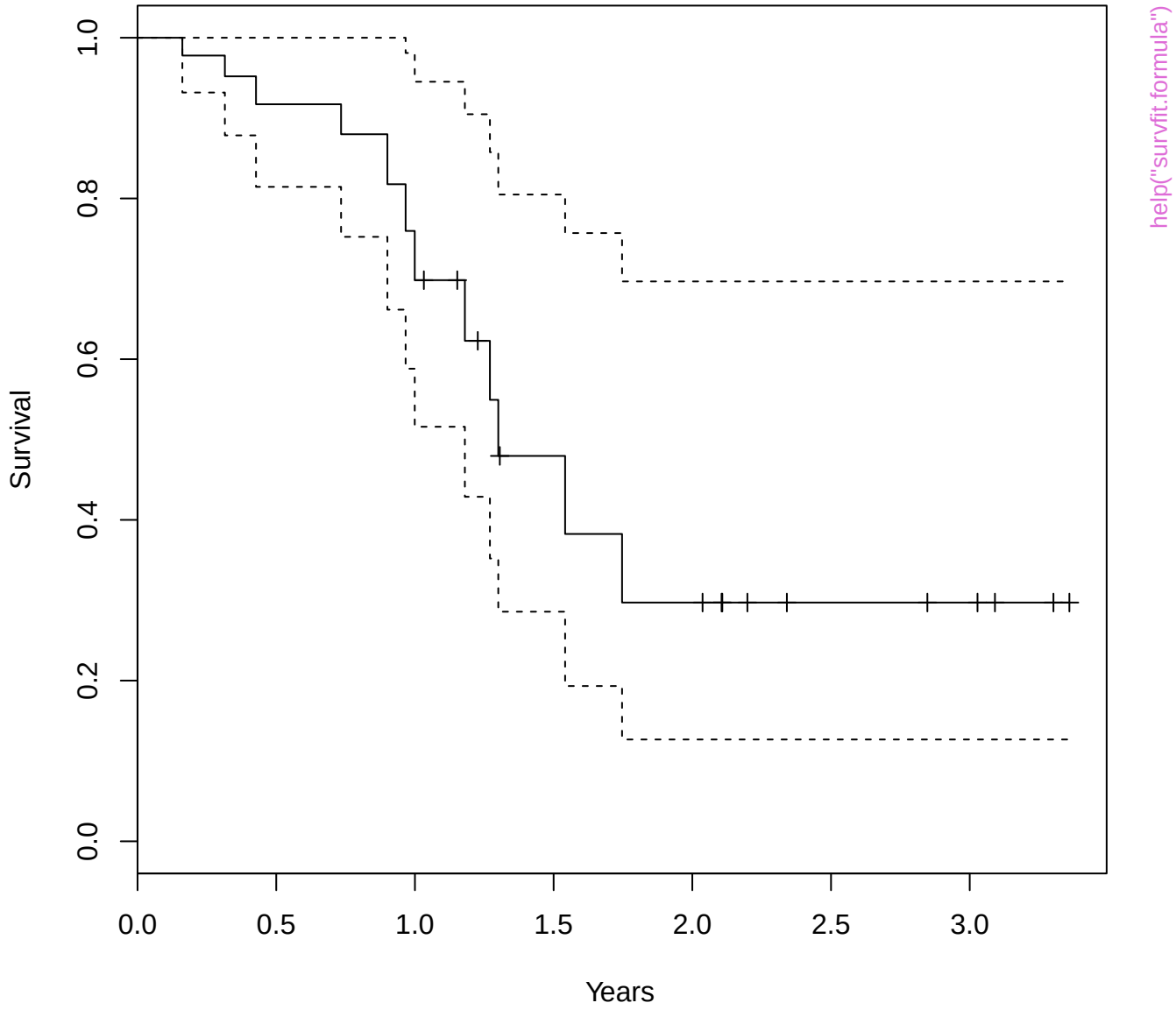

True Proportional Odds
Ordinal Model Score Residuals
Score Residual for x
y
True Proportional Odds
Binary Score Residuals
x
y
True Proportional Odds
Partial Residuals
Partial Residual
x
y>=5
y>=4
y>=2
y>=1
y>=3
help("residuals.lrm")
Non−Proportional Odds
Slopes=.7 .5 .3 .3 0
Score Residual for x
y
Non−Proportional Odds
Slopes=.7 .5 .3 .3 0
x
y
Non−Proportional Odds
Slopes=.7 .5 .3 .3 0
Partial Residual
x
y>=1
y>=5
y>=3
y>=4
y>=2

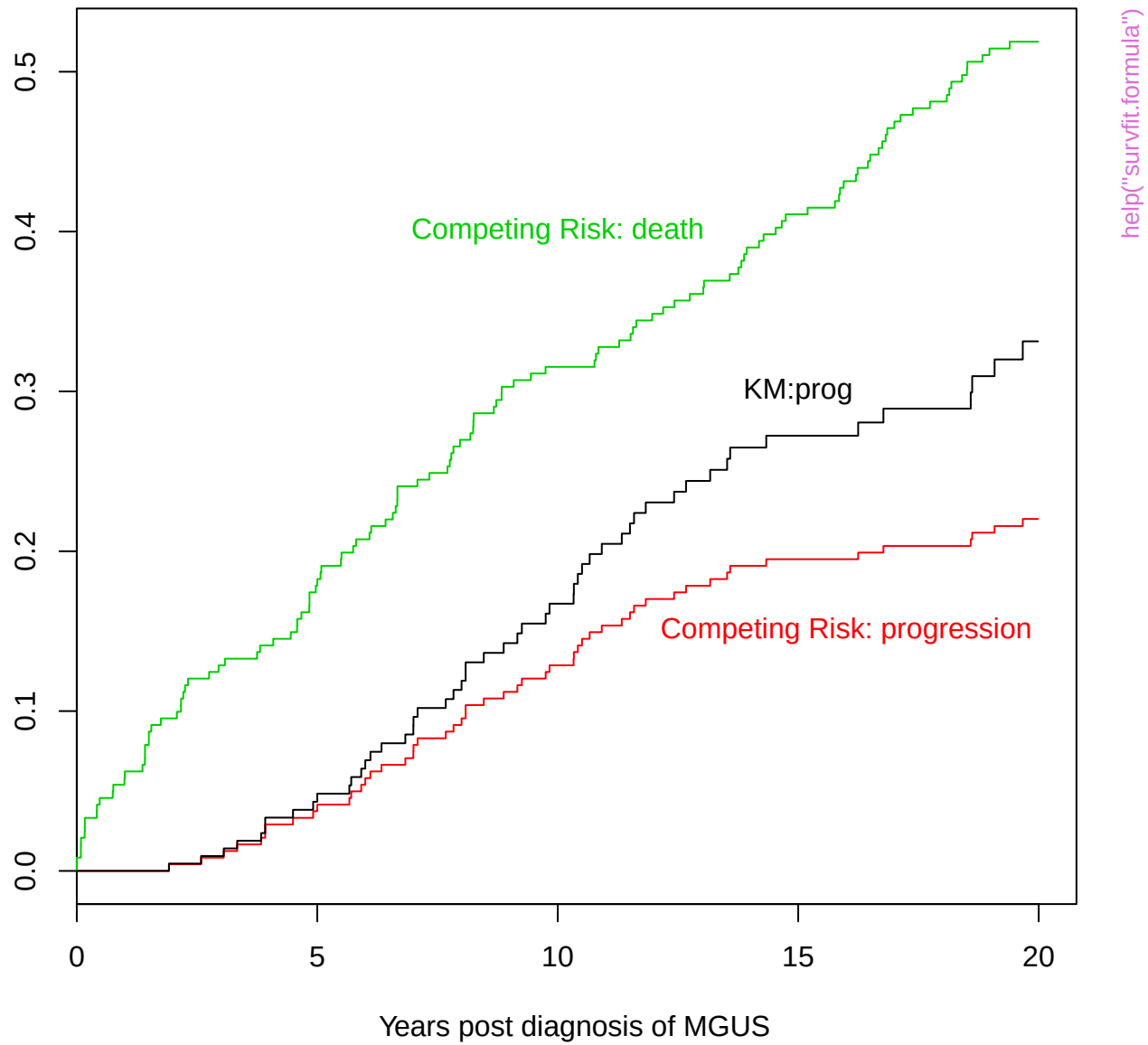

log odds
4
2
0
−2
−4
30
40
50
60
70
age
help("robcov")

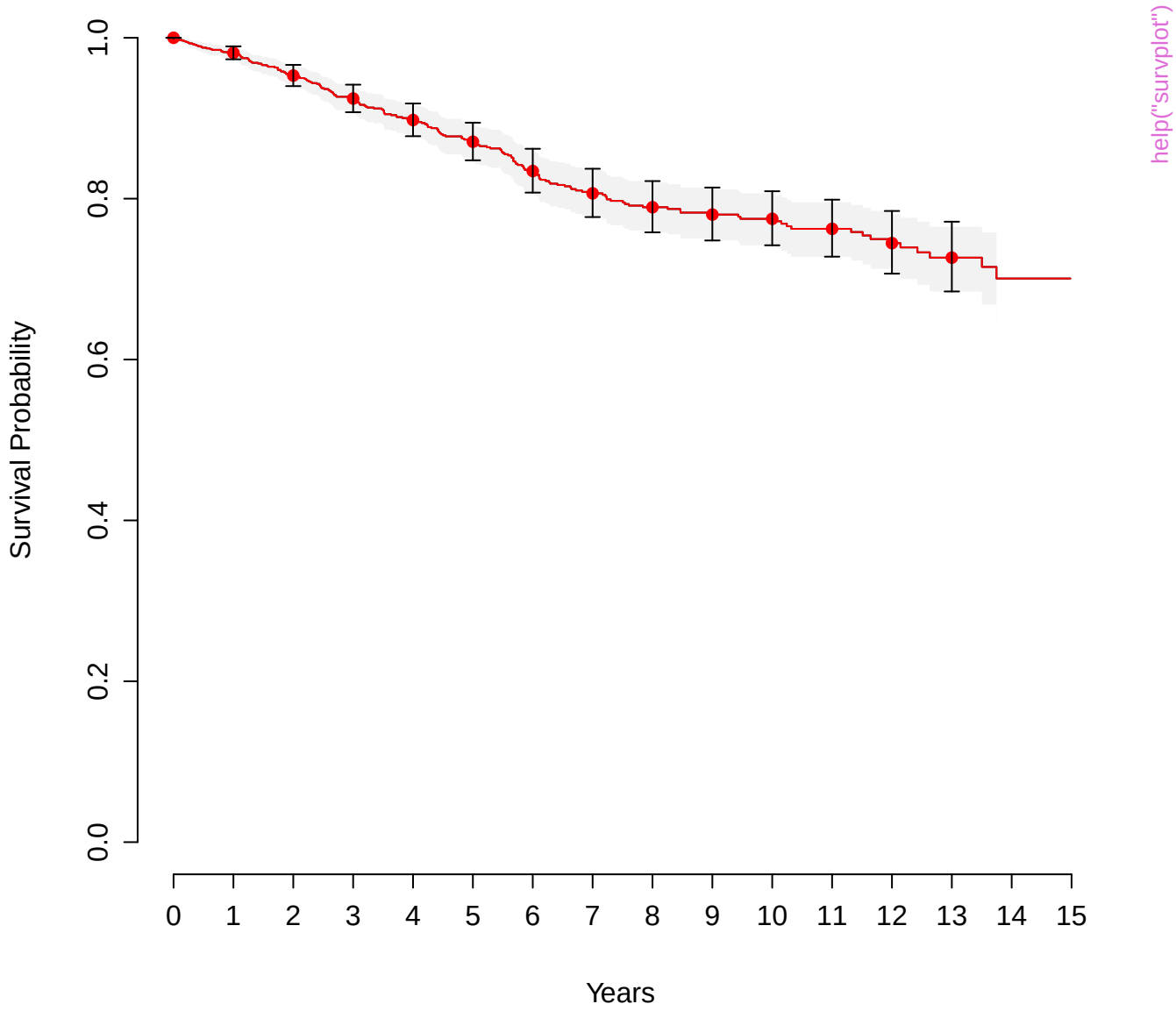

Odds Ratio for Y:U
1.0
1.5
2.0
2.5
3.0
1.0
1.5
2.0
2.5
3.0
Odds Ratio for X:U
Prevalence of U: 0.5
help("sensuc")

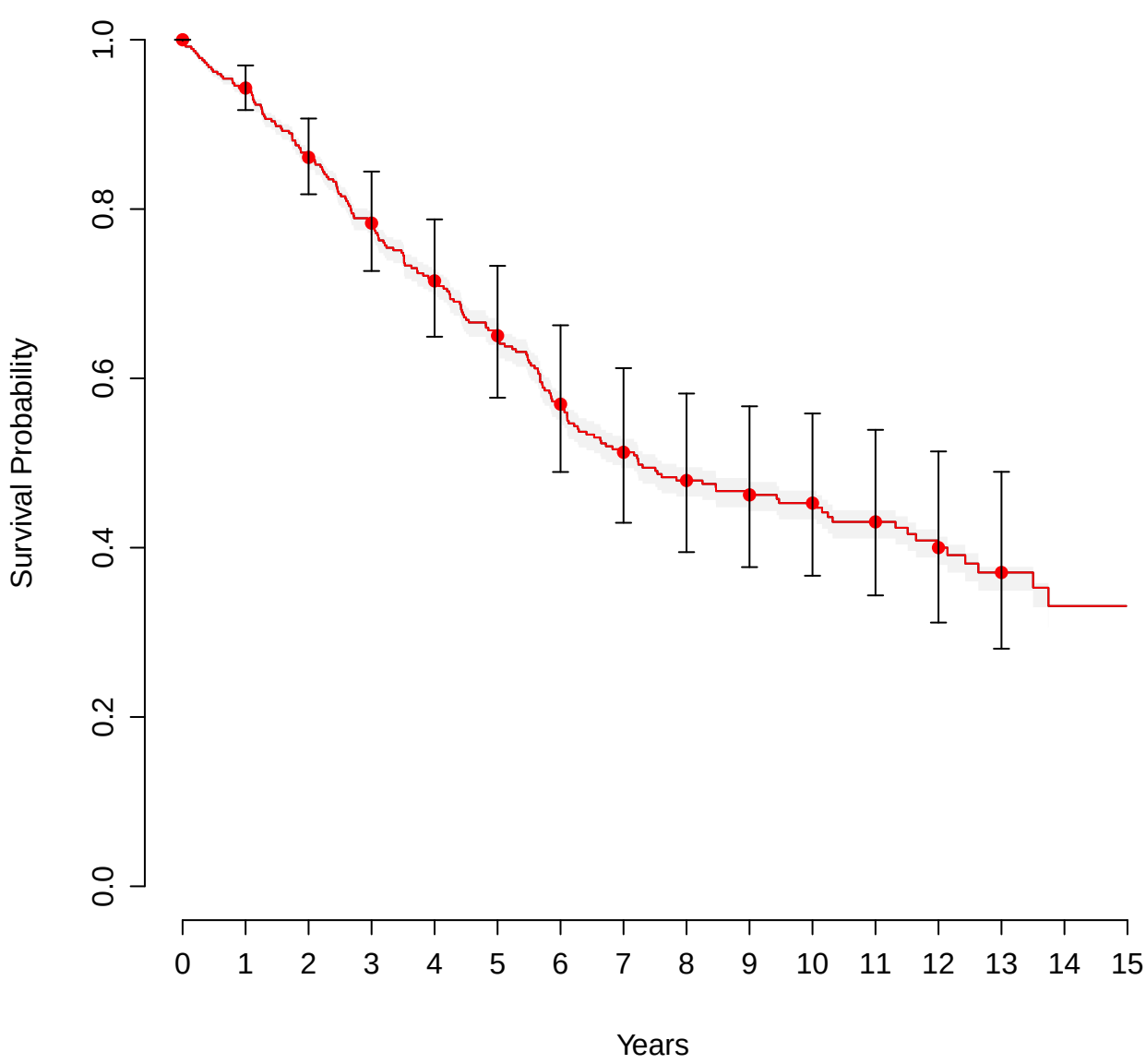

Odds Ratio
0.1
0.5
1.0
2.0
4.0
8.0
blood.pressure − 130.58:109.58
age − 70:50
cholesterol − 216.53:183.73
sex − male:female
0.99
0.9
0.7
0.8
0.95
help("summary.rms")
Adjusted to:sex=female age=60 cholesterol=200.48

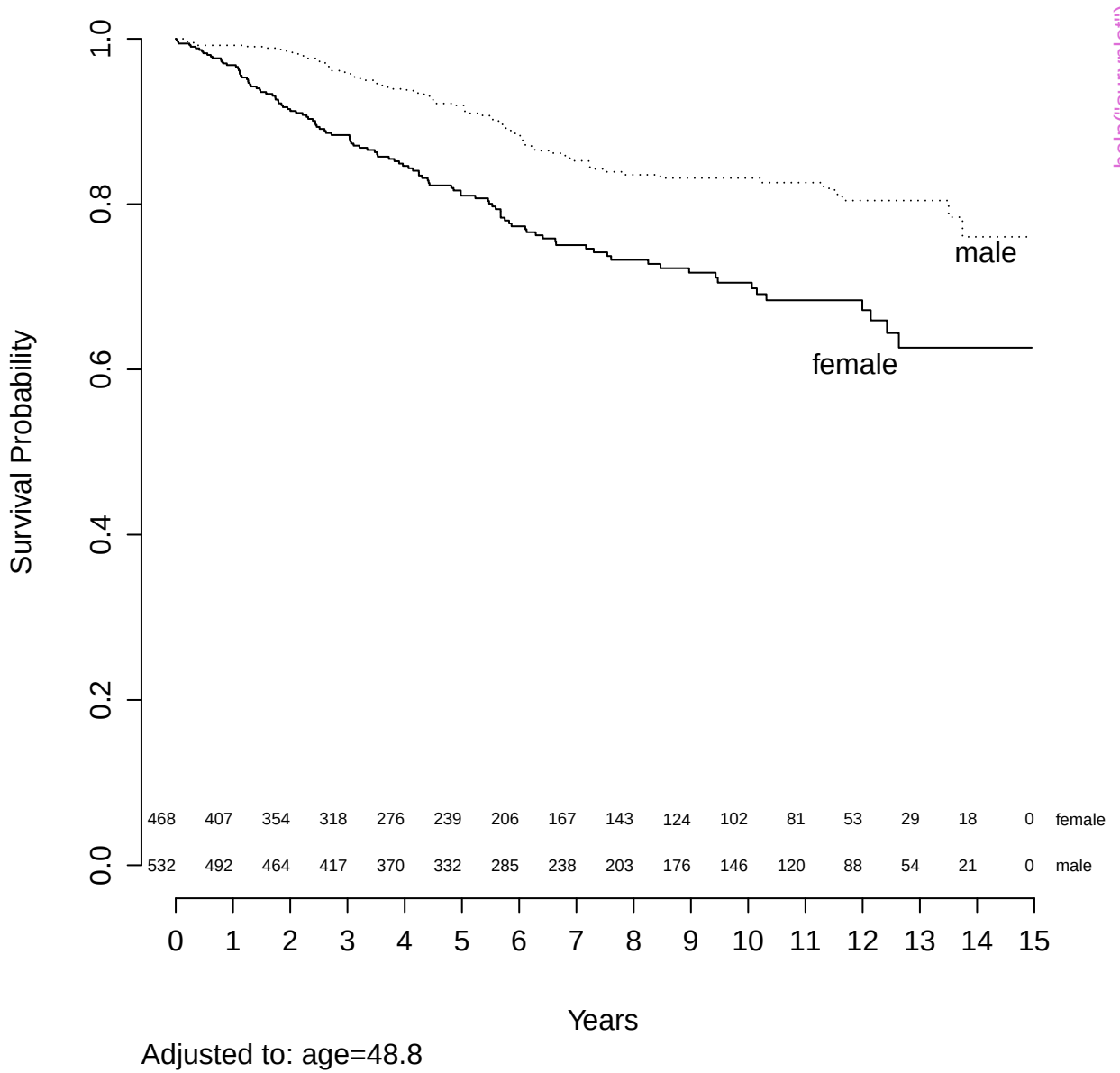

1.0
0.8
0.6
0.4
0.2
0.0
0
50
100
150
Maintained
Nonmaintained
help("survfit.formula")

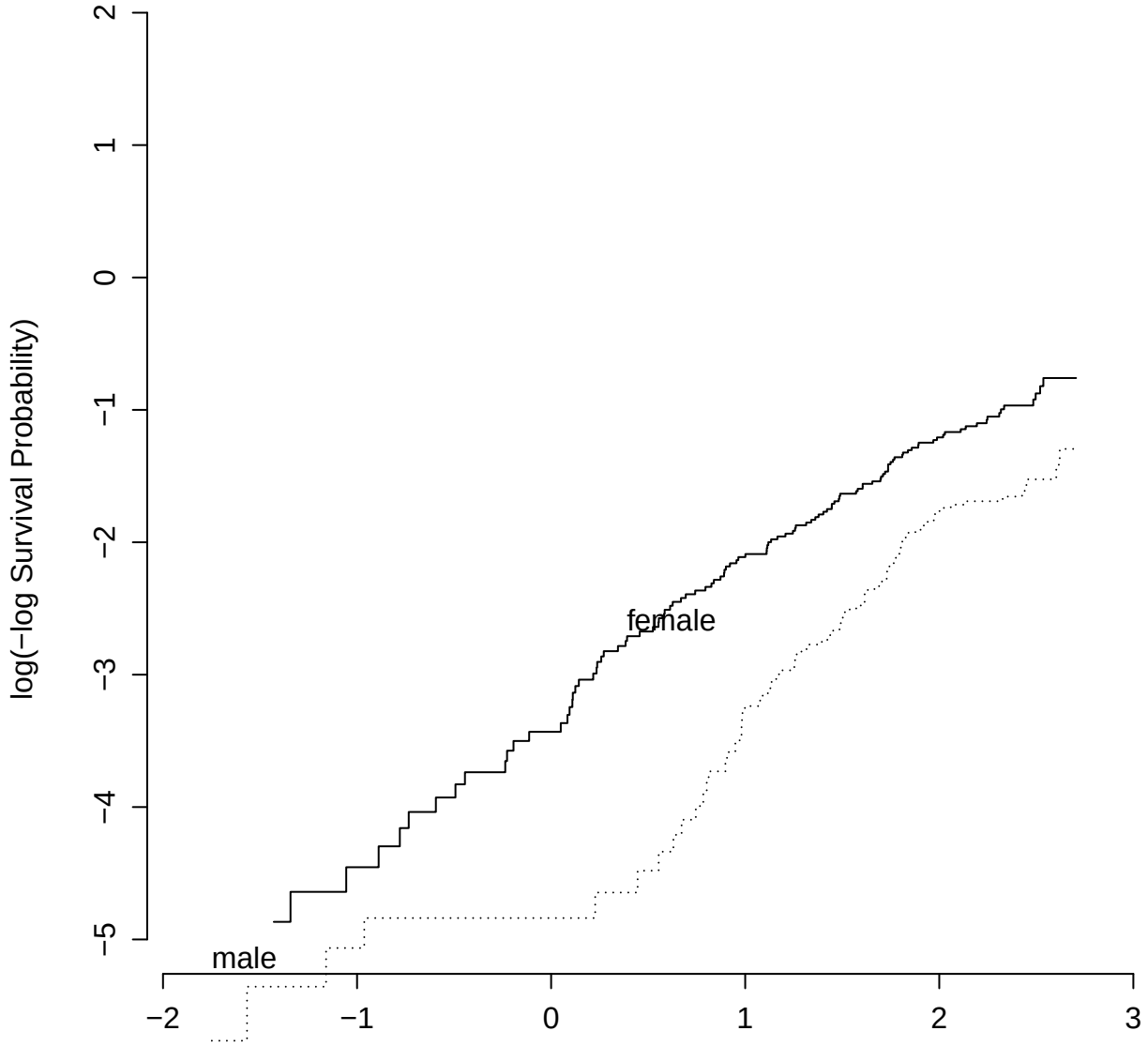

Survival
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Years
help("survfit.formula")

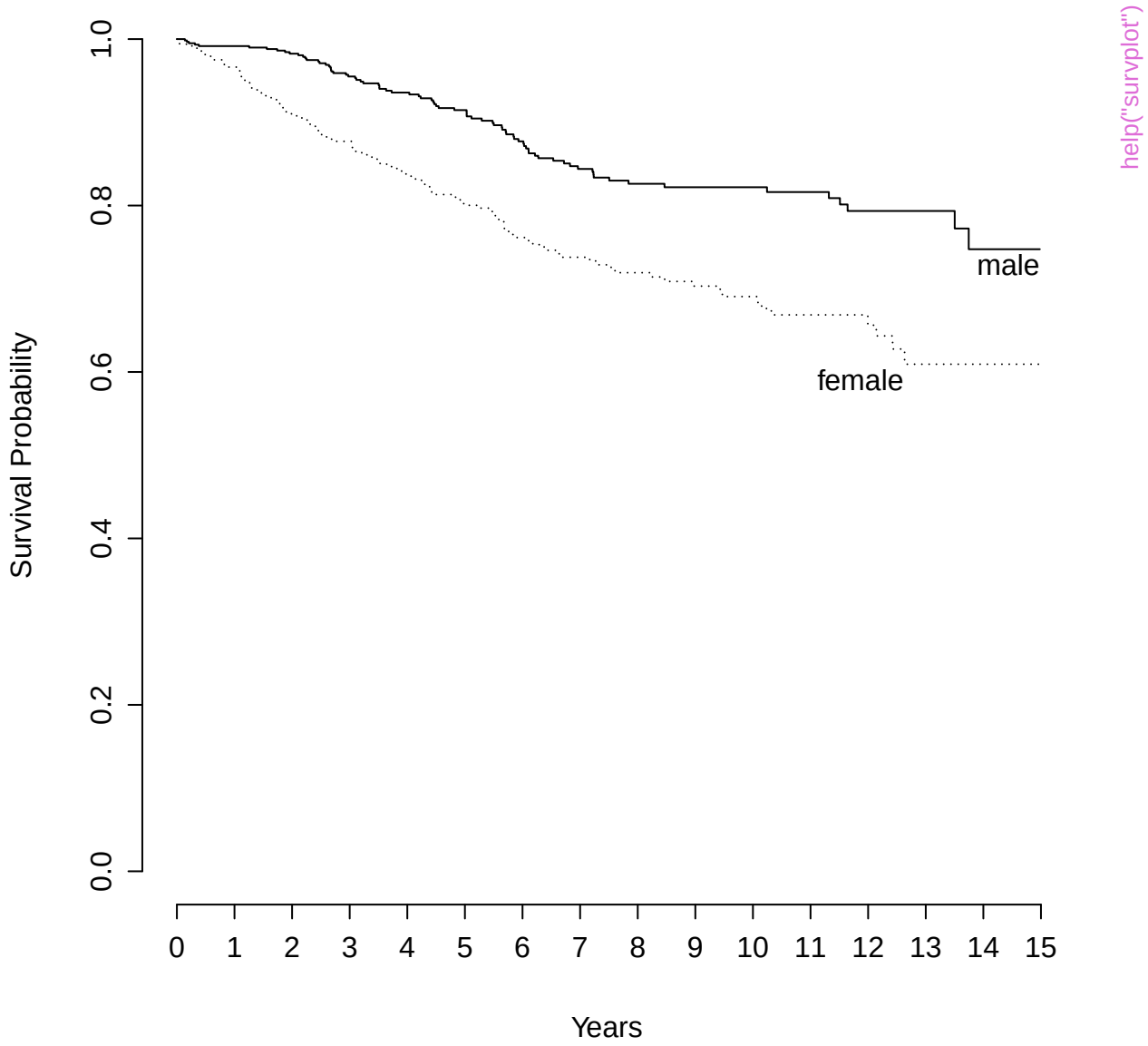

0.0
0.1
0.2
0.3
0.4
0.5
0
5
10
15
20
Years post diagnosis of MGUS
Competing Risk: death
KM:prog
Competing Risk: progression
help("survfit.formula")

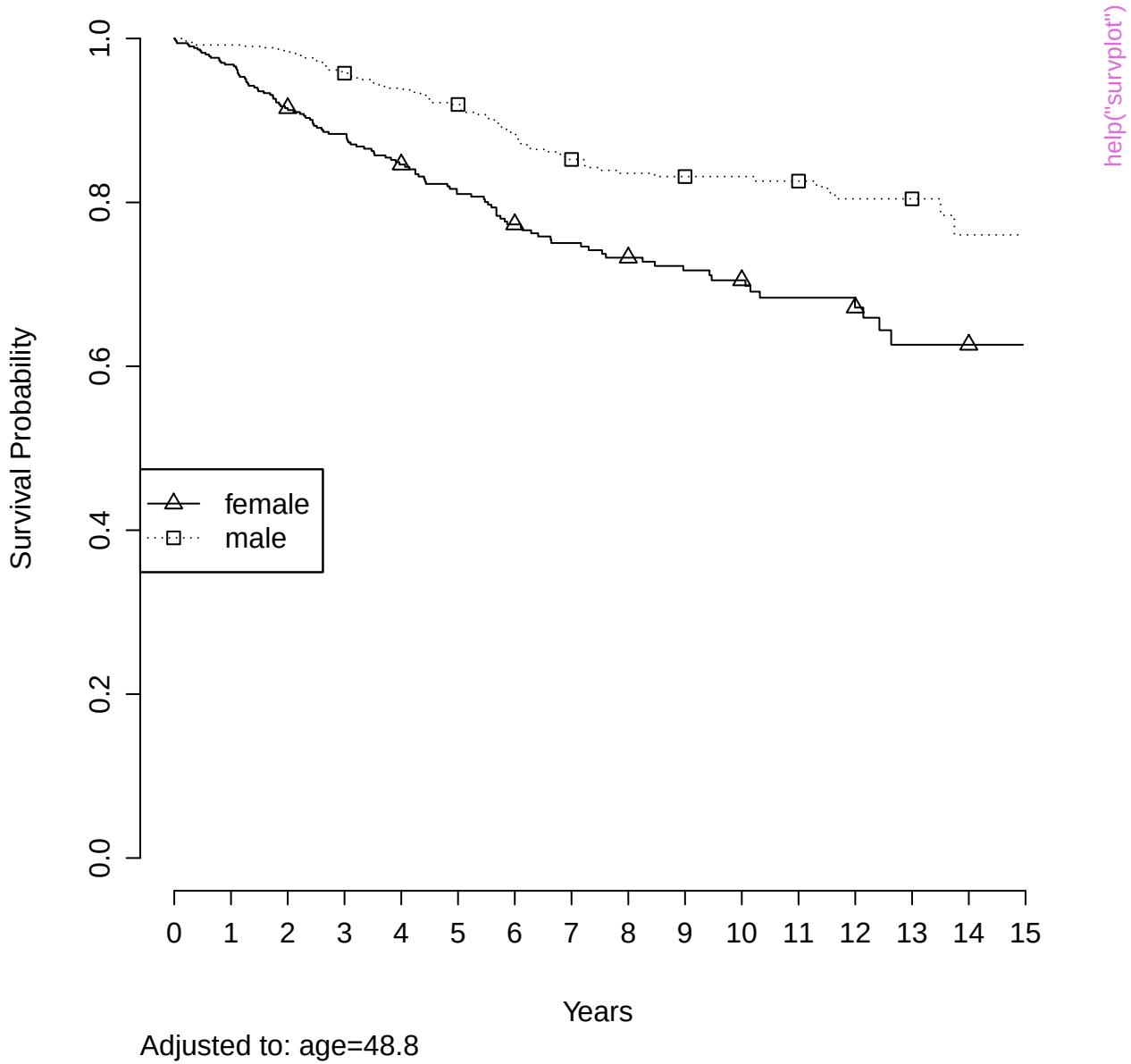

Survival Probability
0.0
0.2
0.4
0.6
0.8
1.0
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Years
help("survplot")

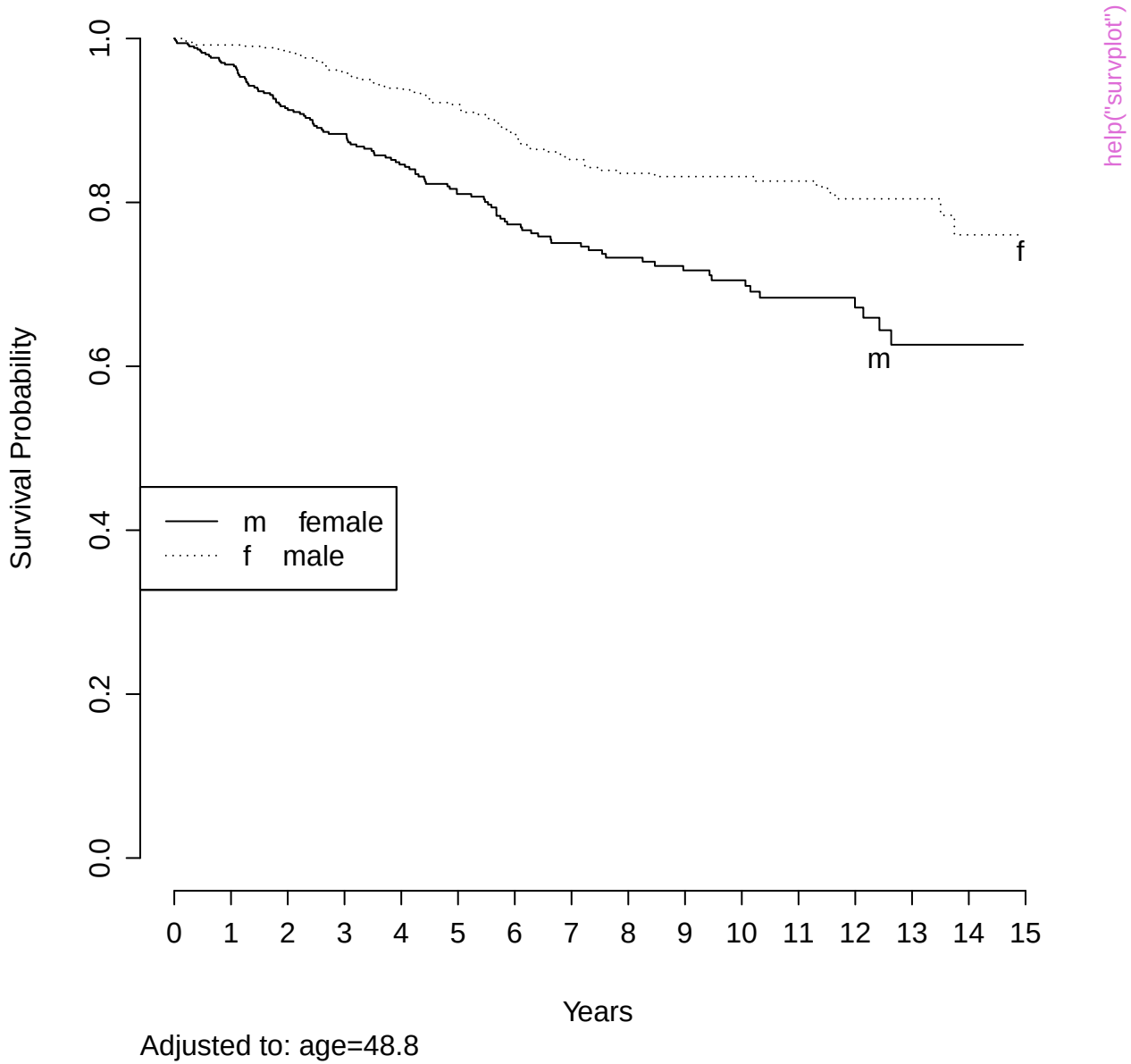

Survival Probability
0.0
0.2
0.4
0.6
0.8
1.0
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Years
help("survplot")

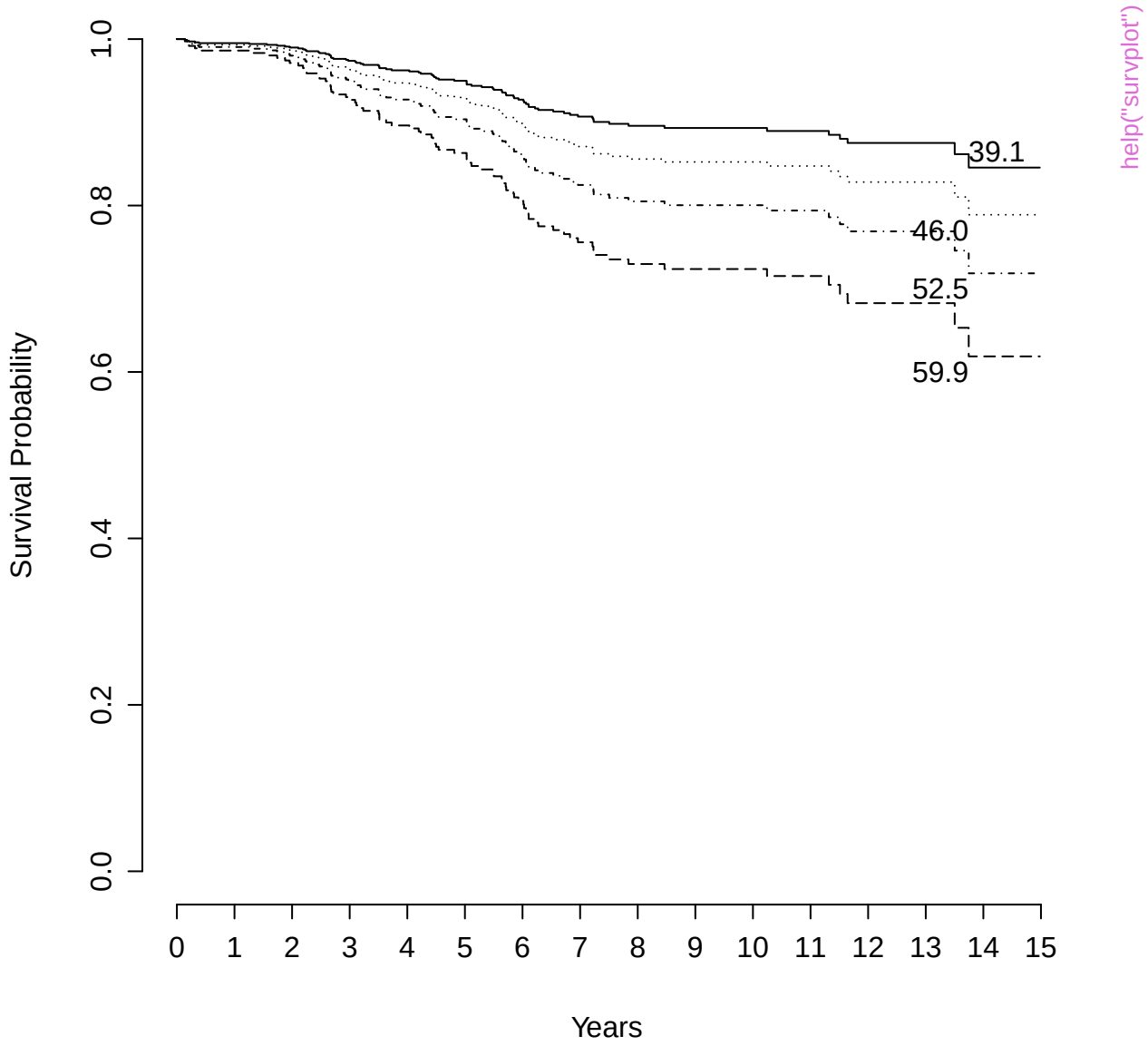

help("survplot")
male
female
Survival Probability
1.0
0.8
0.6
0.4
0.2
0.0
468 407 354 318 276 239 206 167 143 124 102 81 53 29 18 0 female
532 492 464 417 370 332 285 238 203 176 146 120 88 54 21 0 male
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Years
Adjusted to: age=48.8

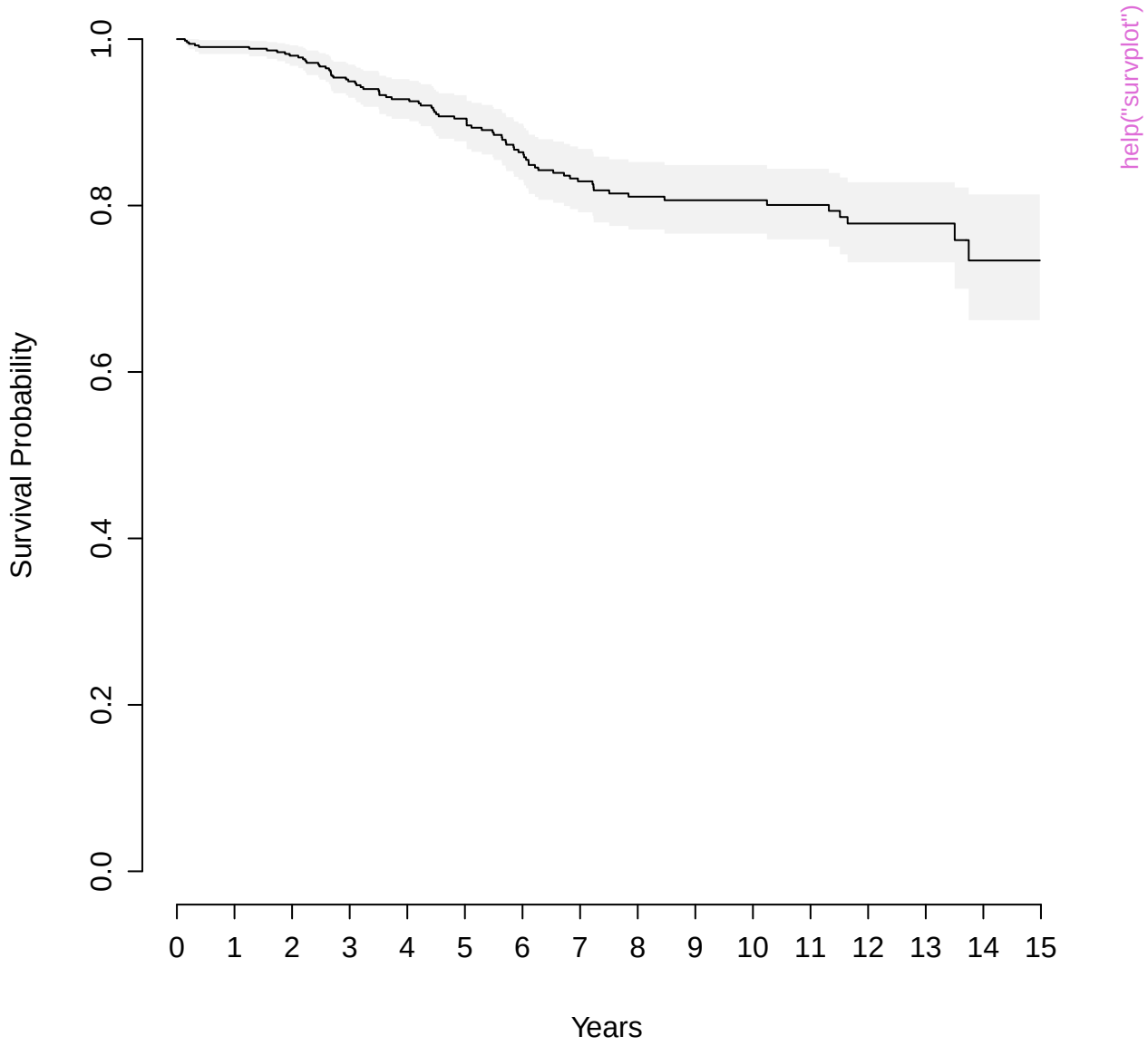

log(−log Survival Probability)
2
1
0
−1
−2
−3
−4
−5
female
male
−2
−1
0
1
2
3
log Survival Time in Years
Adjusted to: age=48.8
help("survplot")

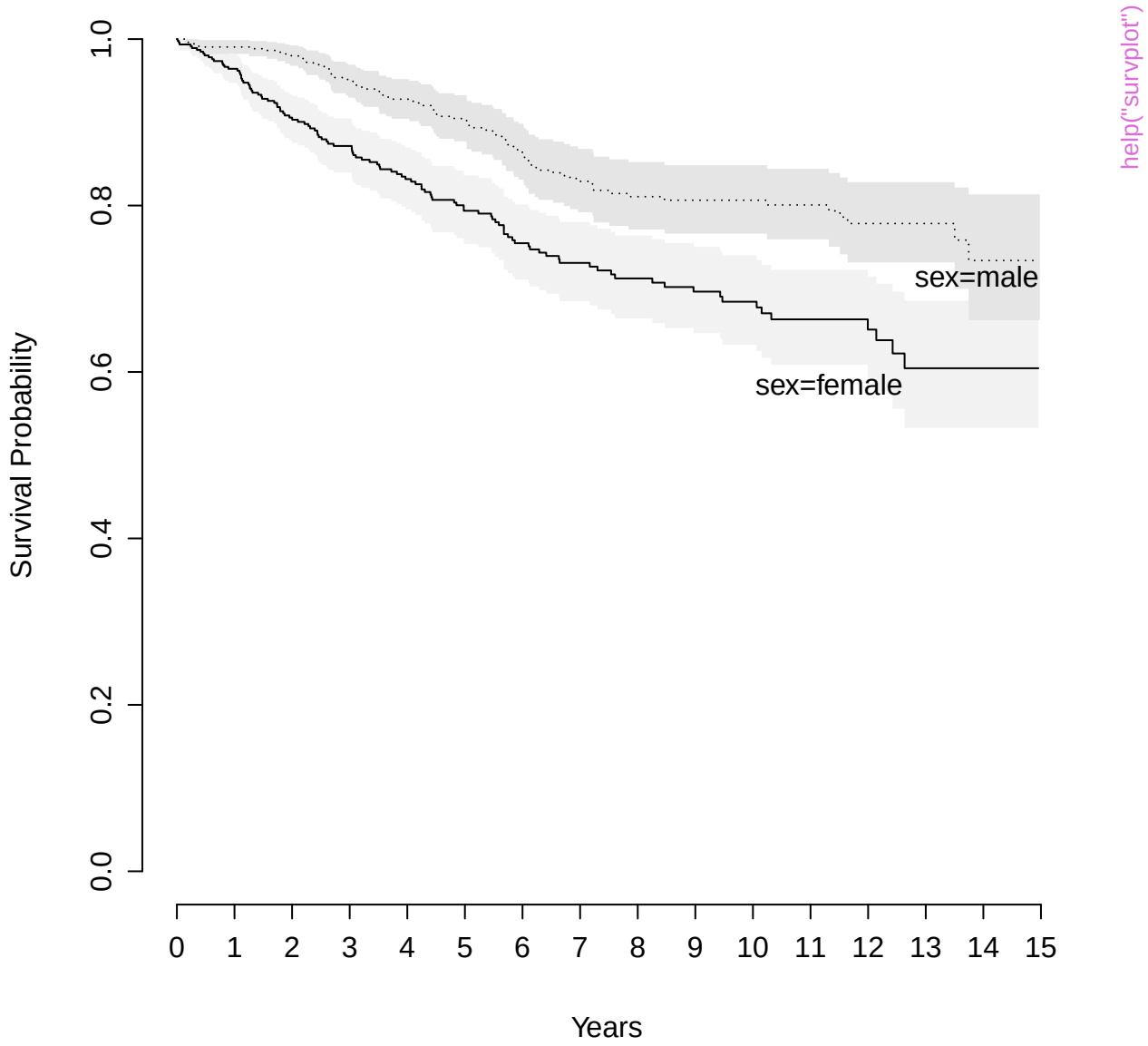

help("survplot")
Survival Probability
1.0
0.8
0.6
0.4
0.2
0.0
male
female
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Years

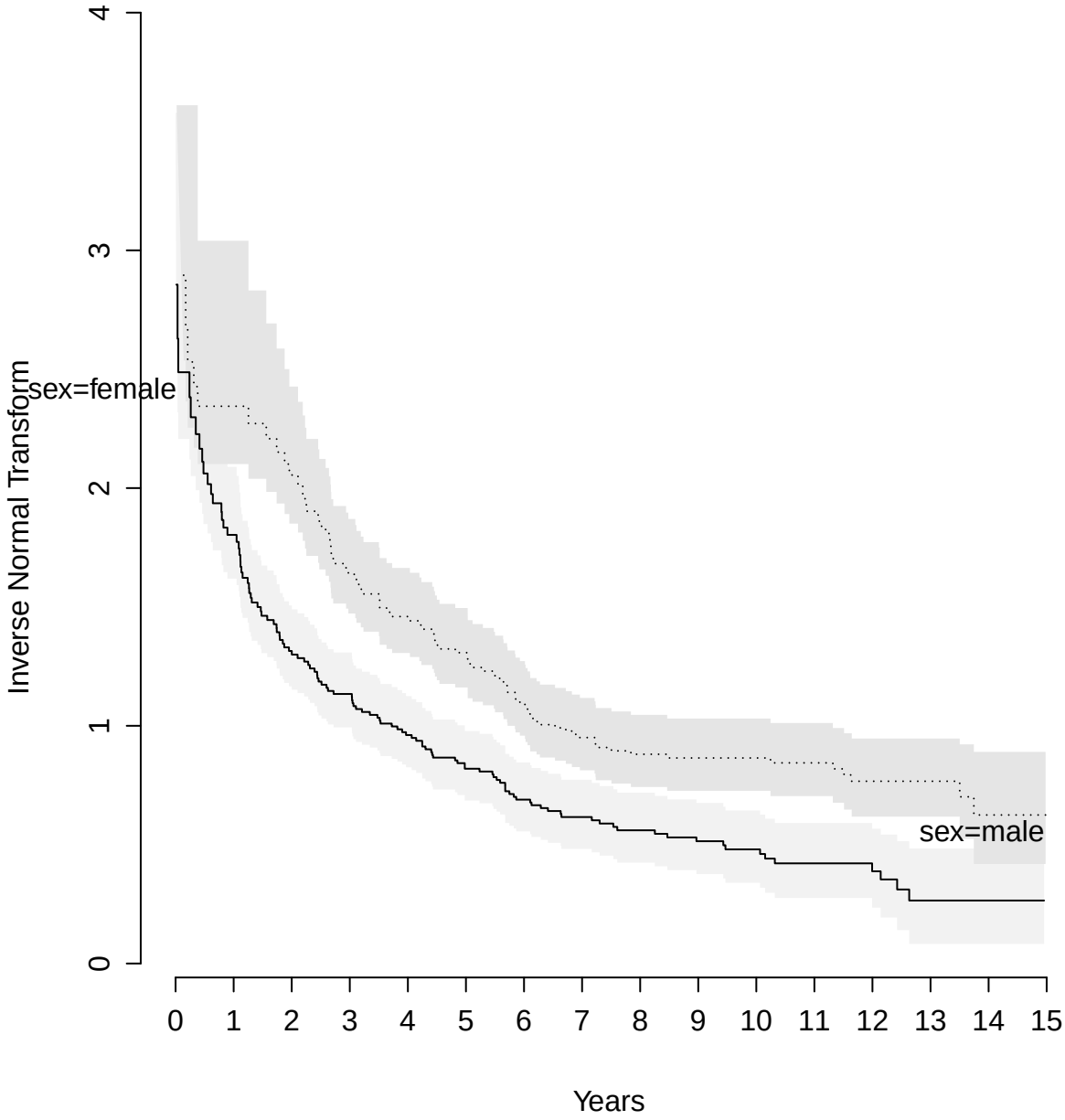

help("survplot")
Survival Probability
1.0
0.8
0.6
0.4
0.2
0.0
female
male
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Years
Adjusted to: age=48.8

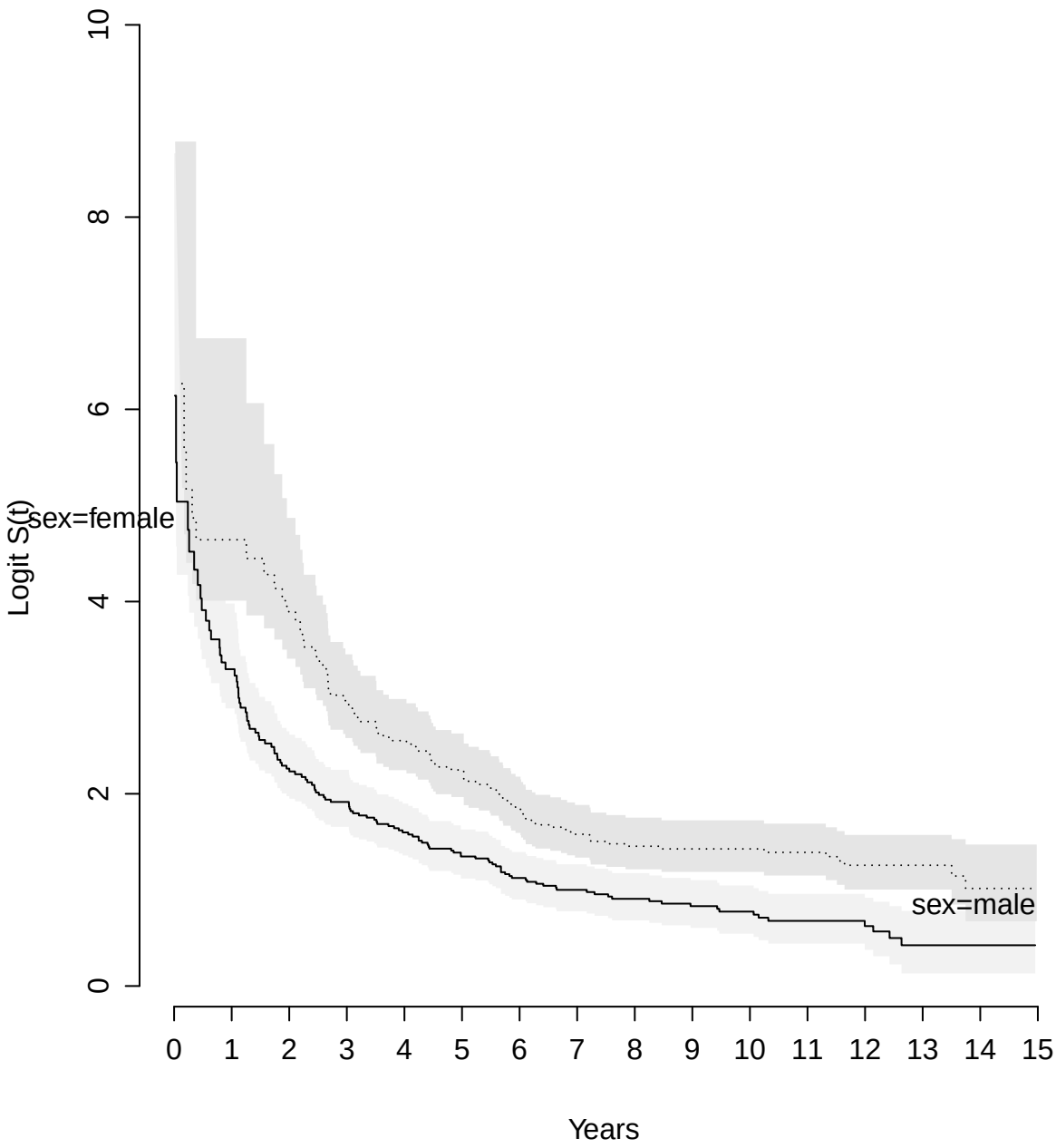

help("survplot")
Survival Probability
1.0
0.8
0.6
0.4
0.2
0.0
m female
f male
f
m
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Years
Adjusted to: age=48.8


help("survplot")
Survival Probability
1.0
0.8
0.6
0.4
0.2
0.0
39.1
46.0
52.5
59.9
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Years

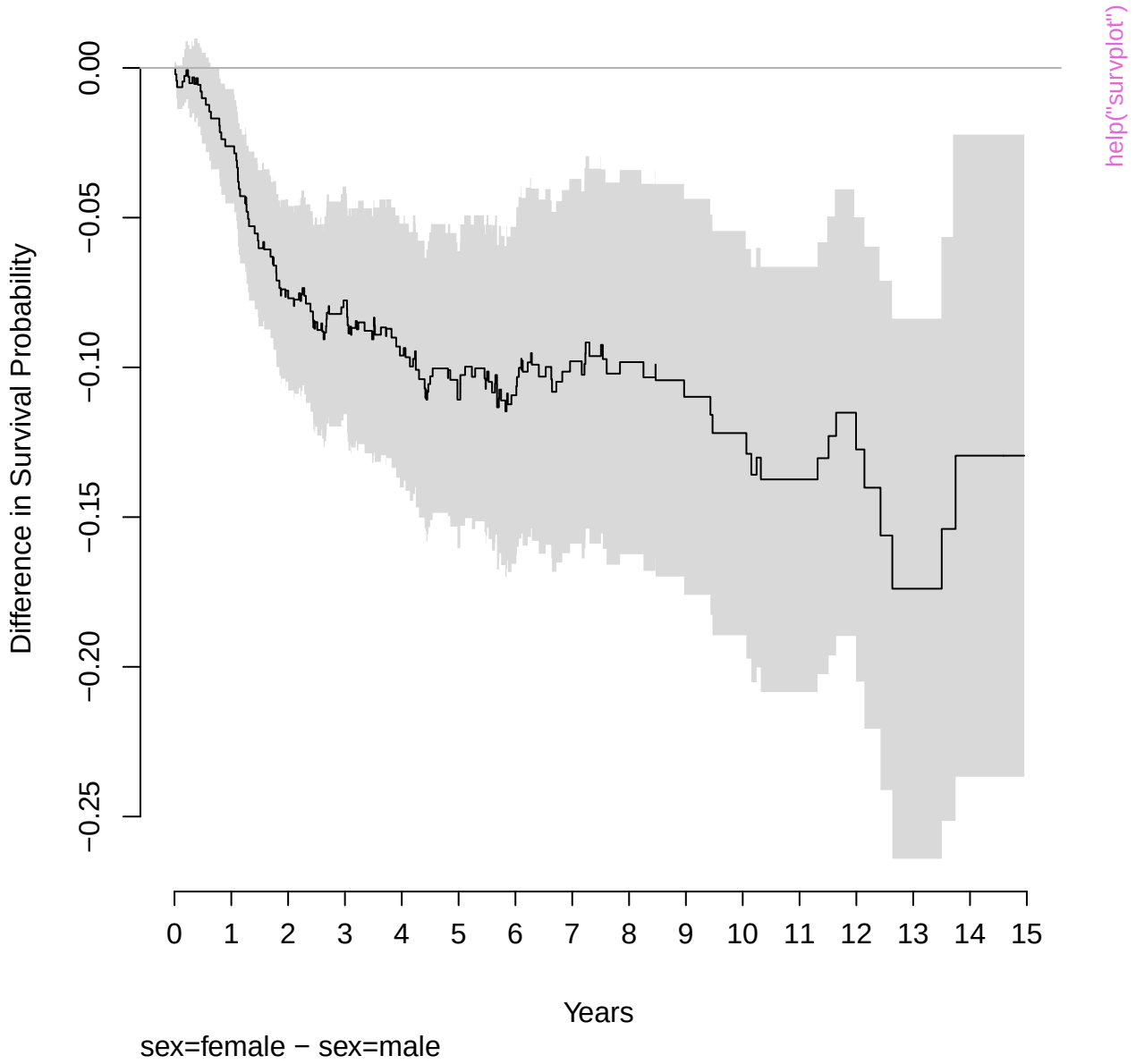

help("survplot")
Survival Probability
1.0
0.8
0.6
0.4
0.2
0.0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Years

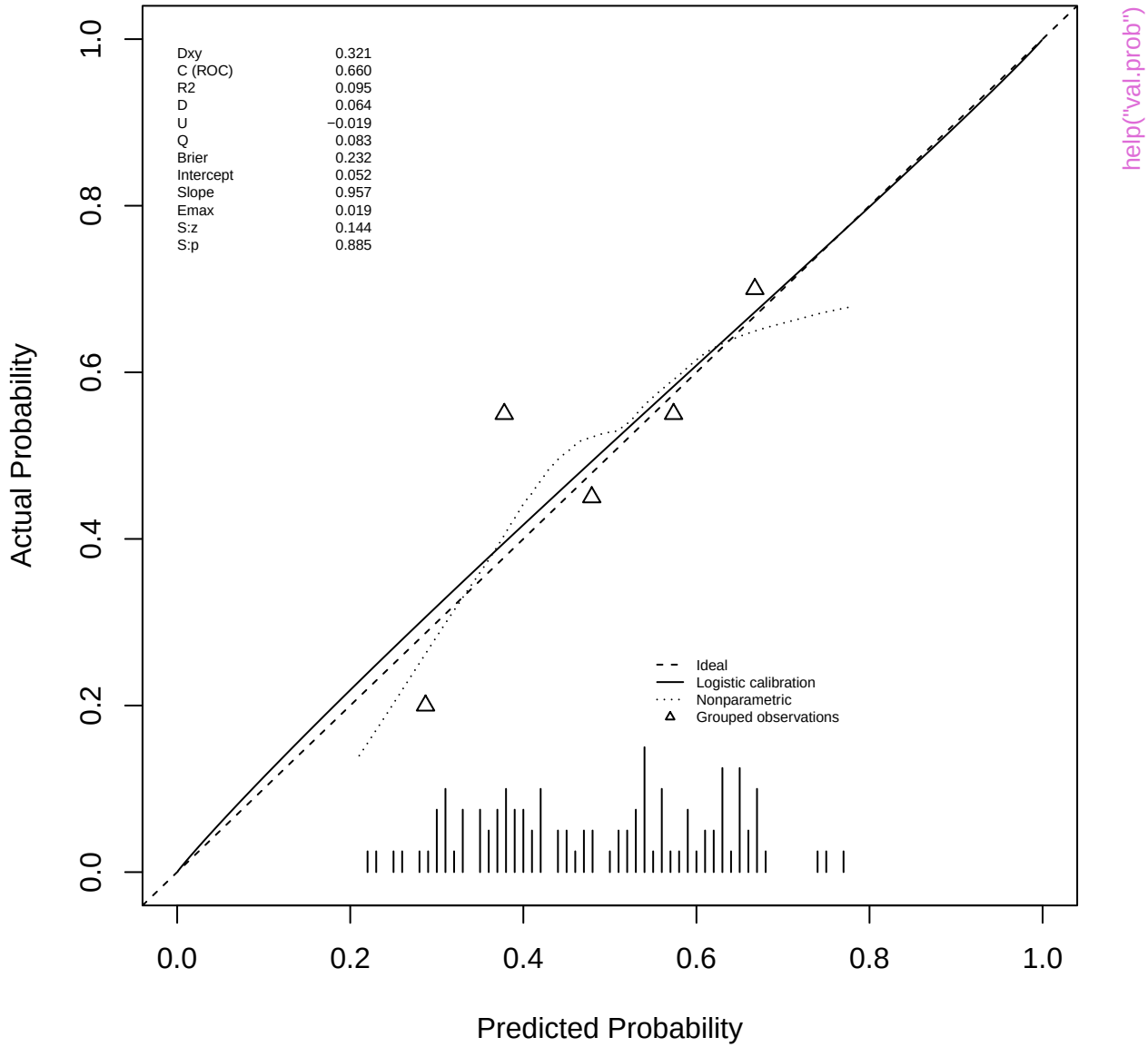

help("survplot")
Survival Probability
1.0
0.8
0.6
0.4
0.2
0.0
sex=male
sex=female
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Years

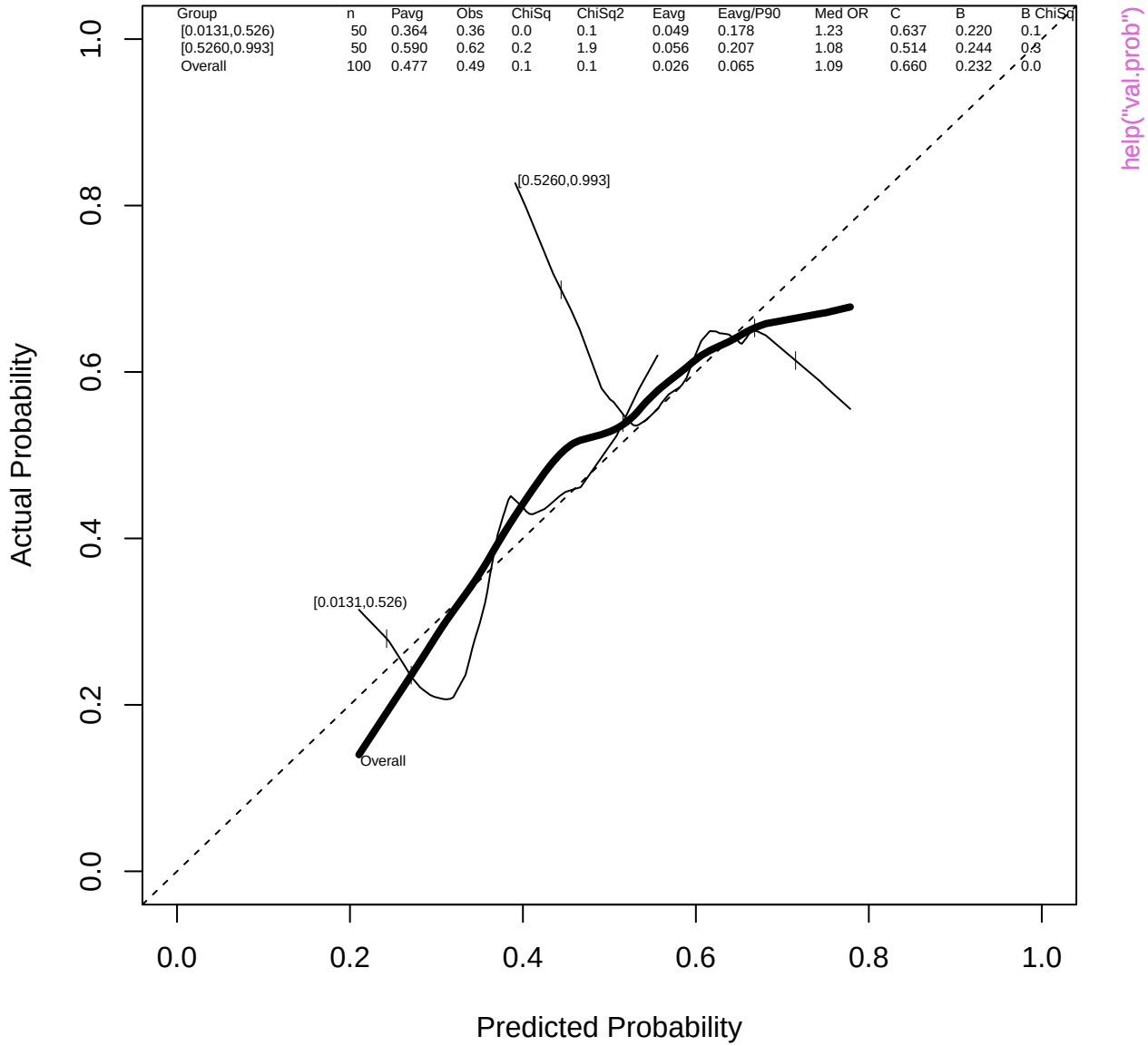

Inverse Normal Transform
0
1
2
3
4
sex=female
sex=male
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Years
help("survplot")

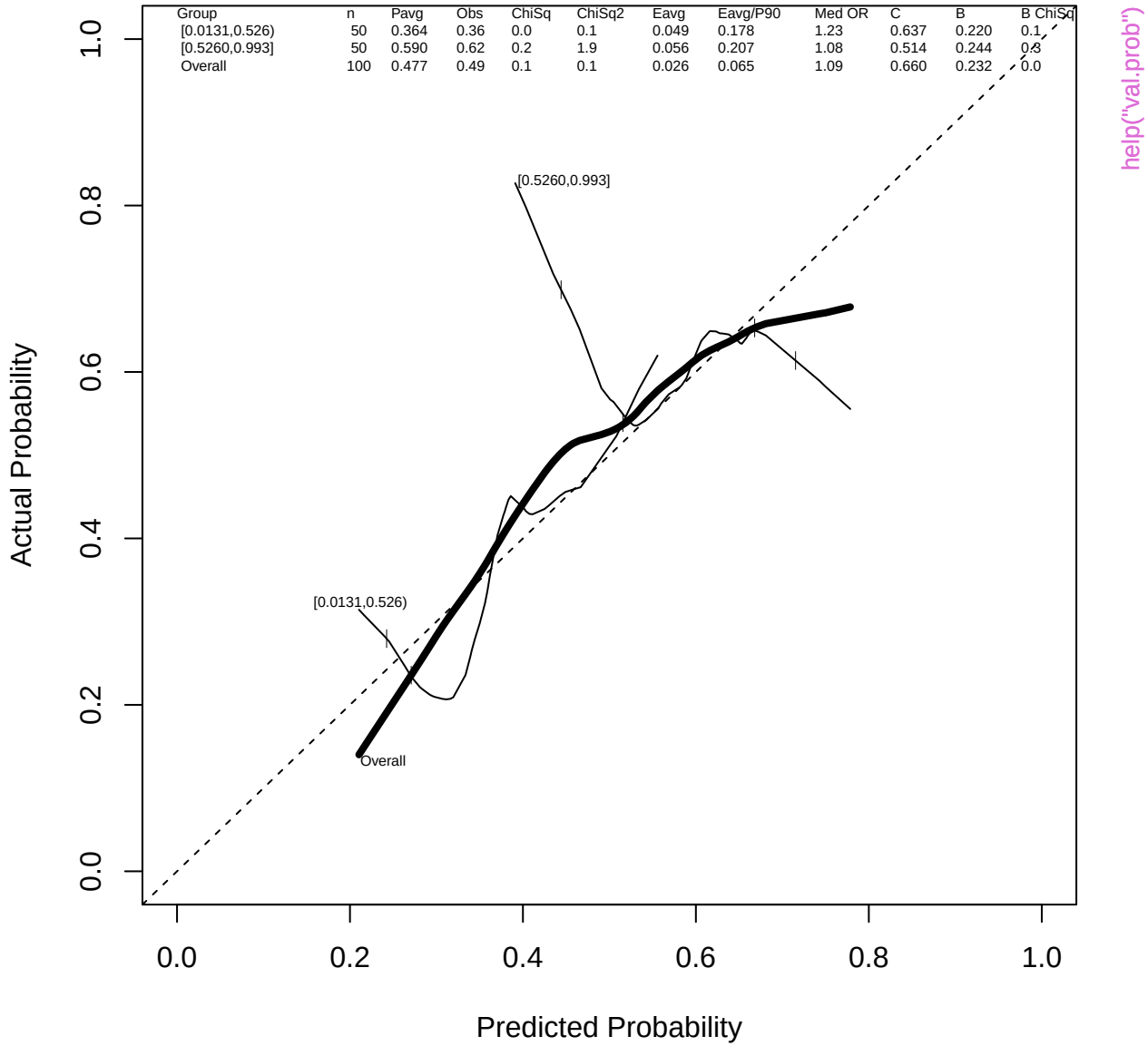


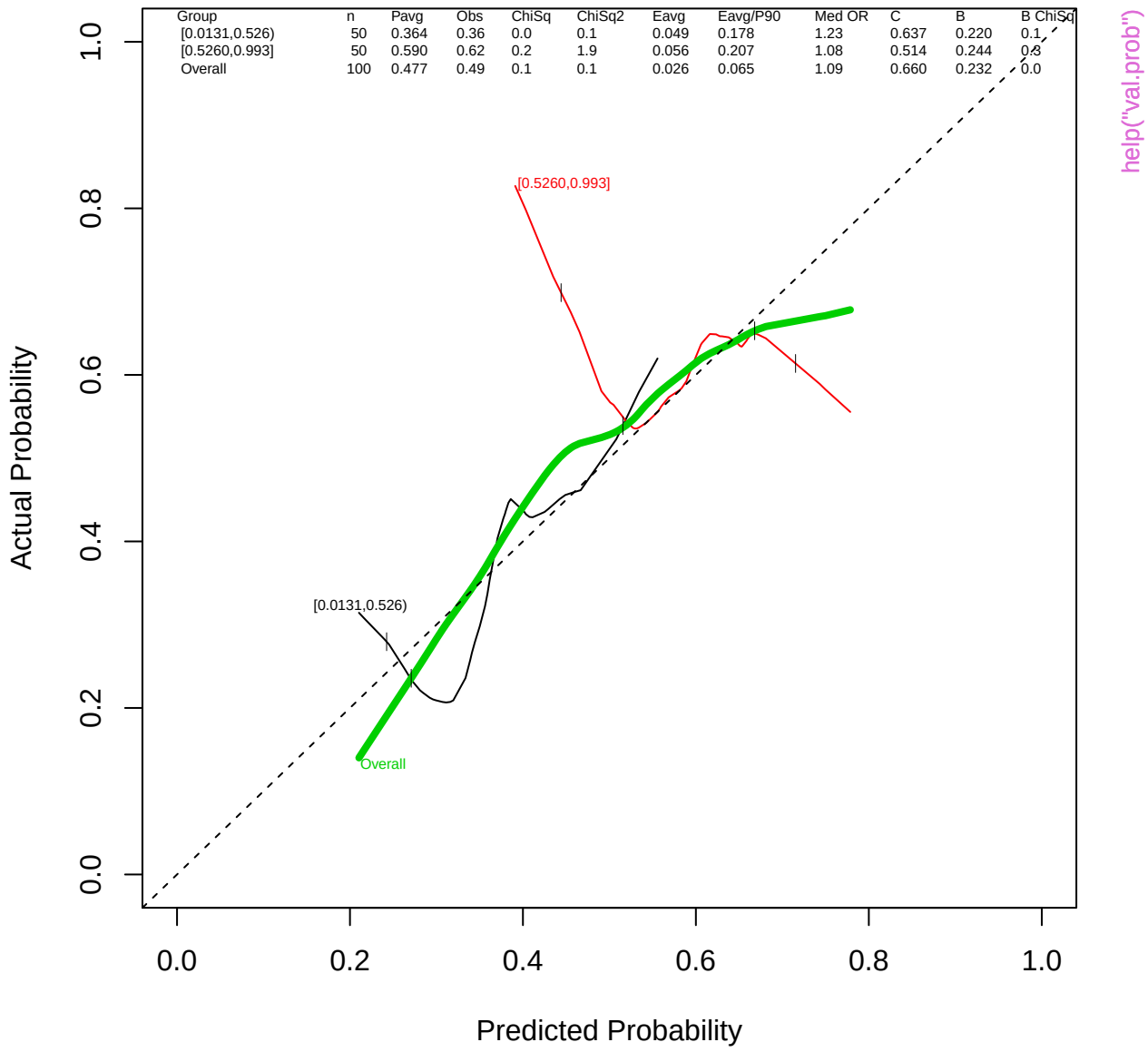
help("survplot")

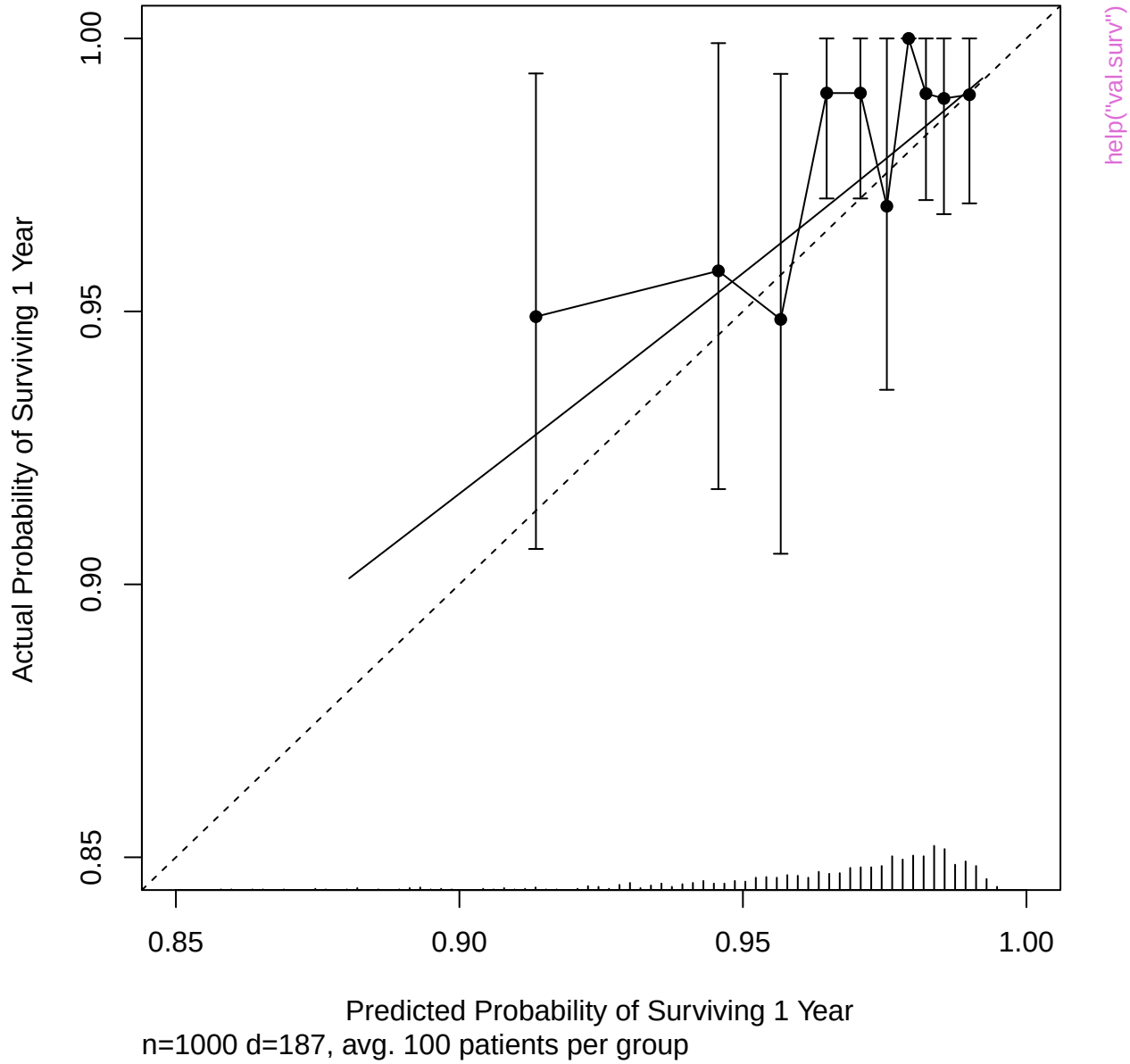

help("survplot")
Difference in Survival Probability
0.00
−0.05
−0.10
−0.15
−0.20
−0.25
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Years
sex=female − sex=male

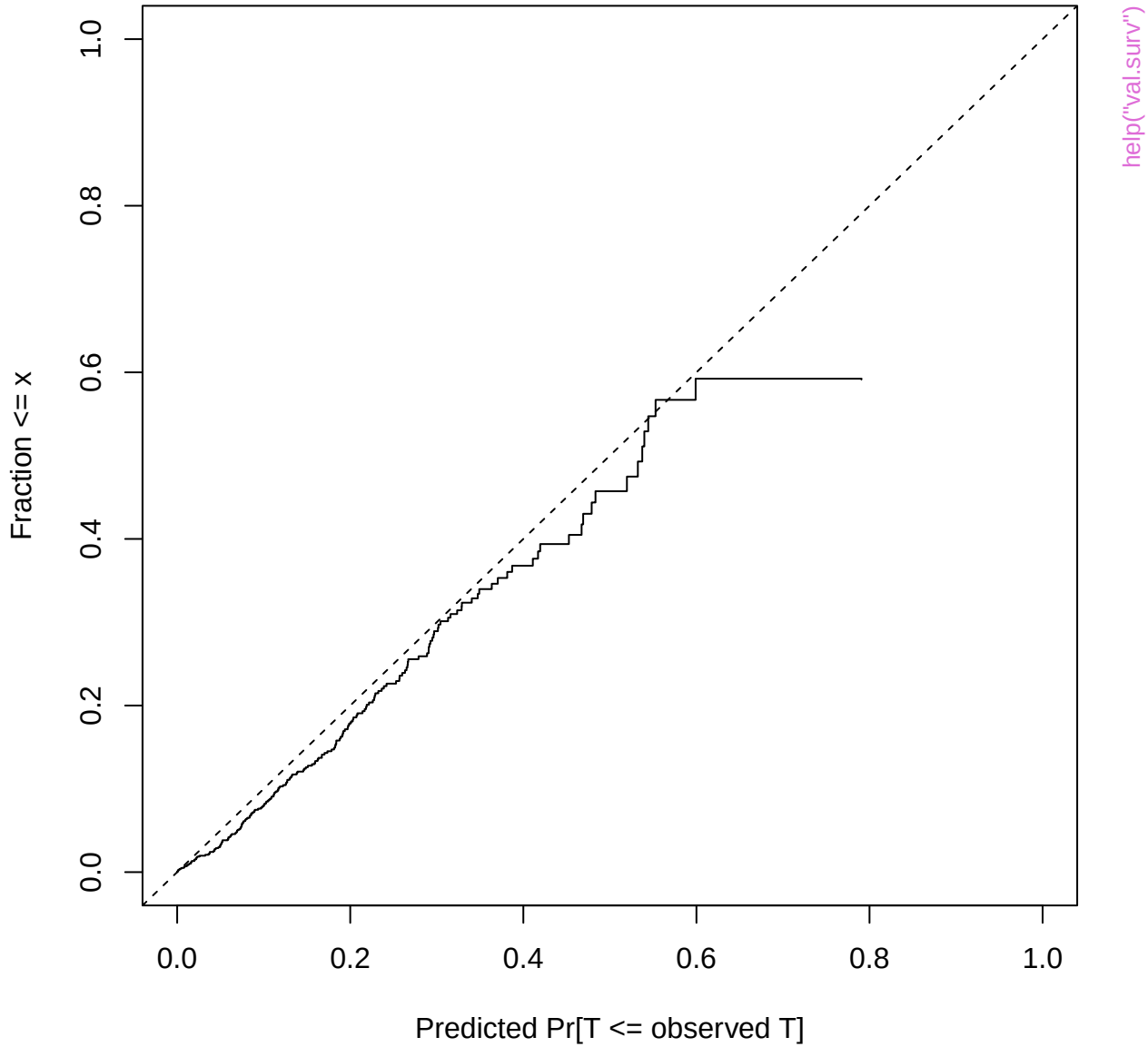

Dxy 0.321
C (ROC) 0.660
R2 0.095
D 0.064
U −0.019
Q 0.083
Brier 0.232
Intercept 0.052
Slope 0.957
Emax 0.019
S:z 0.144
S:p 0.885
Ideal
Logistic calibration
Nonparametric
Grouped observations
Actual Probability
Predicted Probability
0.0
0.2
0.4
0.6
0.8
1.0
help("val.prob")

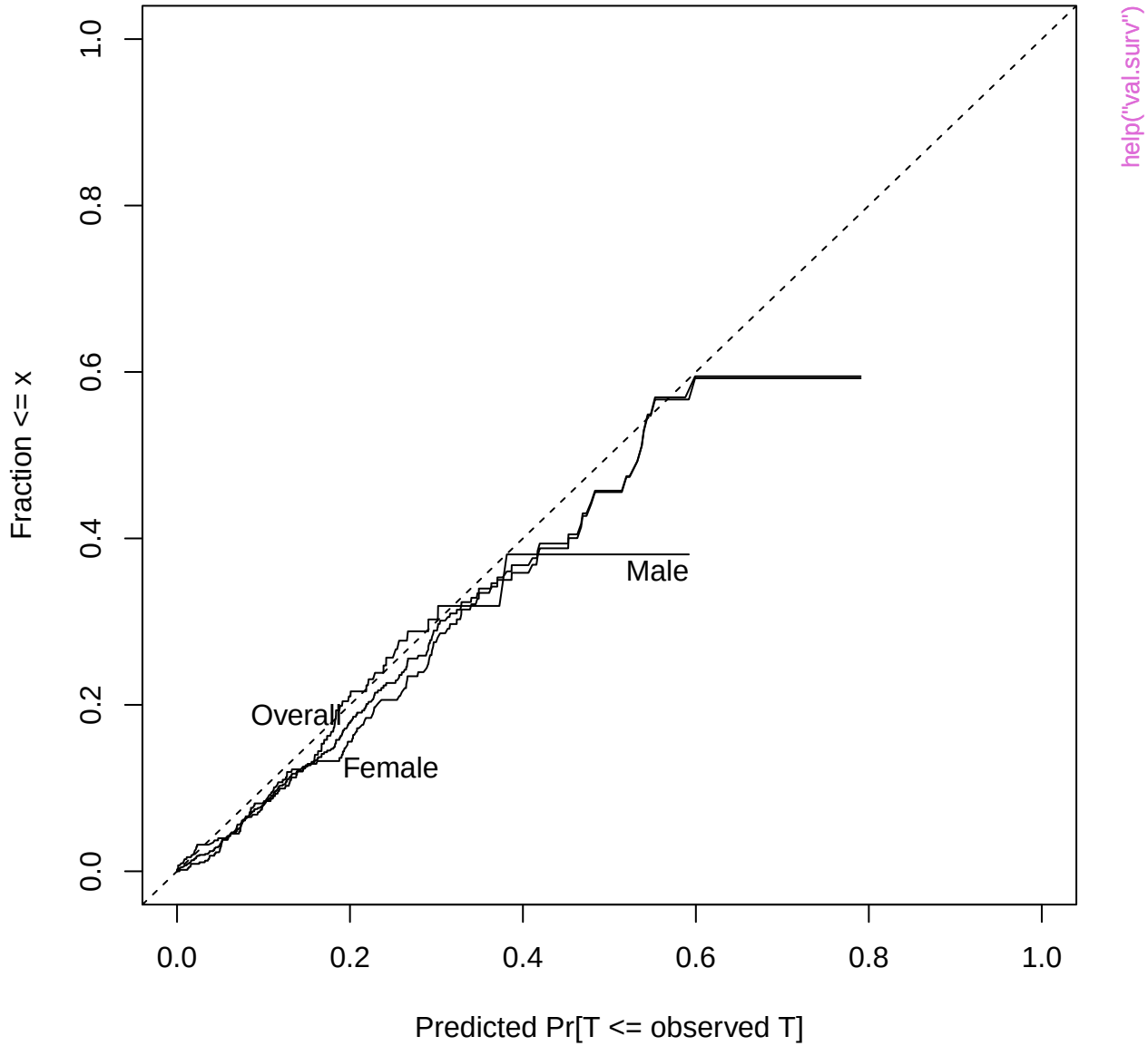

Group n Pavg Obs ChiSq ChiSq2 Eavg Eavg/P90 Med OR C B B ChiSq
[0.0131,0.526) 50 0.364 0.36 0.0 0.1 0.049 0.178 1.23 0.637 0.220 0.1
[0.5260,0.993] 50 0.590 0.62 0.2 1.9 0.056 0.207 1.08 0.514 0.244 0.3
Overall 100 0.477 0.49 0.1 0.1 0.026 0.065 1.09 0.660 0.232 0.0
[0.5260,0.993]
[0.0131,0.526)
Overall
Actual Probability
Predicted Probability
0.0
0.2
0.4
0.6
0.8
1.0
help("val.prob")

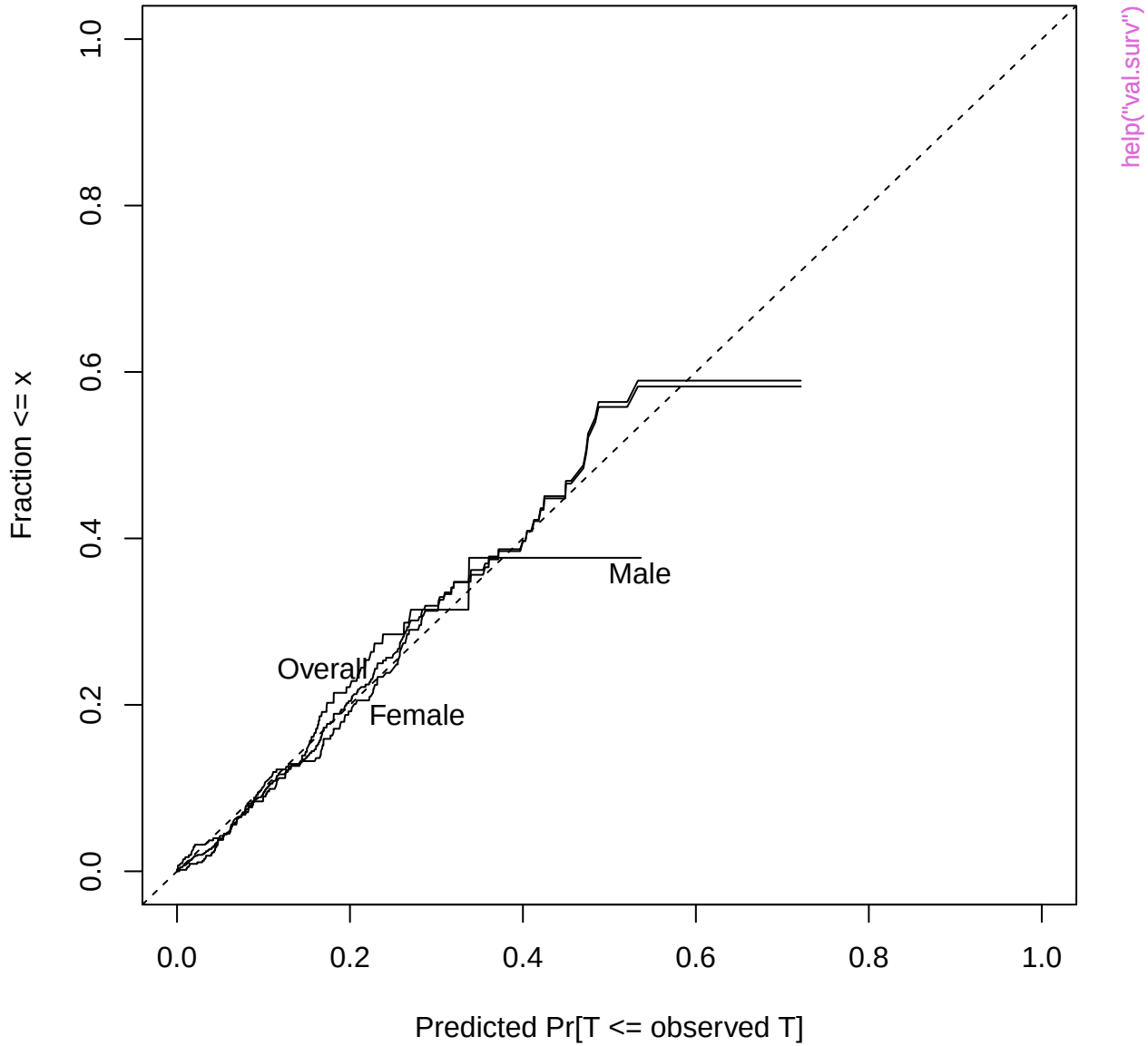

Group n Pavg Obs ChiSq ChiSq2 Eavg Eavg/P90 Med OR C B B ChiSq
[0.0131,0.526) 50 0.364 0.36 0.0 0.1 0.049 0.178 1.23 0.637 0.220 0.1
[0.5260,0.993] 50 0.590 0.62 0.2 1.9 0.056 0.207 1.08 0.514 0.244 0.3
Overall 100 0.477 0.49 0.1 0.1 0.026 0.065 1.09 0.660 0.232 0.0
[0.5260,0.993]
[0.0131,0.526)
Overall
Actual Probability
Predicted Probability
0.0
0.2
0.4
0.6
0.8
1.0
help("val.prob")

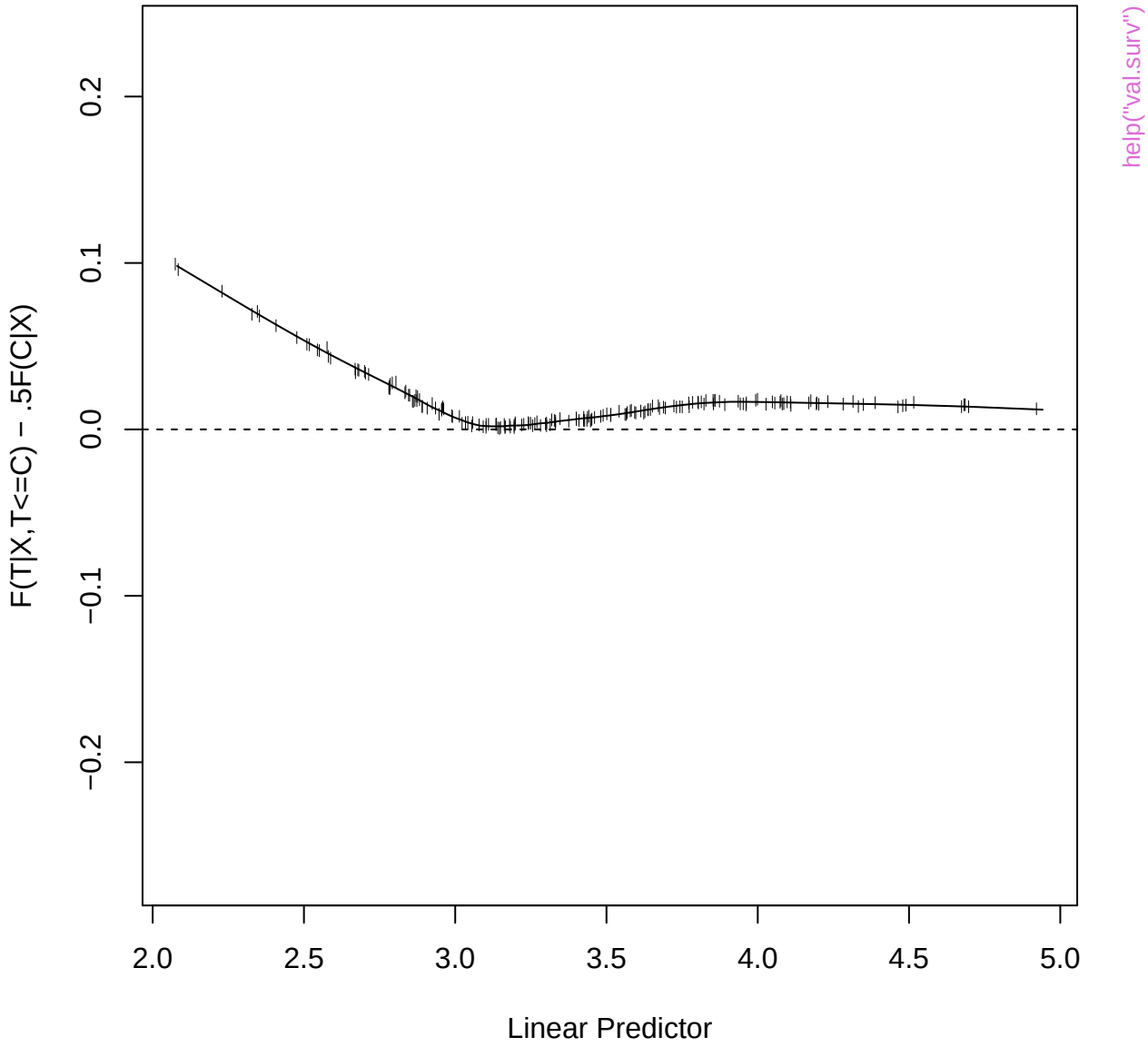

Group n Pavg Obs ChiSq ChiSq2 Eavg Eavg/P90 Med OR C B B ChiSq
[0.0131,0.526) 50 0.364 0.36 0.0 0.1 0.049 0.178 1.23 0.637 0.220 0.1
[0.5260,0.993] 50 0.590 0.62 0.2 1.9 0.056 0.207 1.08 0.514 0.244 0.3
Overall 100 0.477 0.49 0.1 0.1 0.026 0.065 1.09 0.660 0.232 0.0
[0.5260,0.993]
[0.0131,0.526)
Overall
Actual Probability
Predicted Probability
0.0
0.2
0.4
0.6
0.8
1.0
help("val.prob")

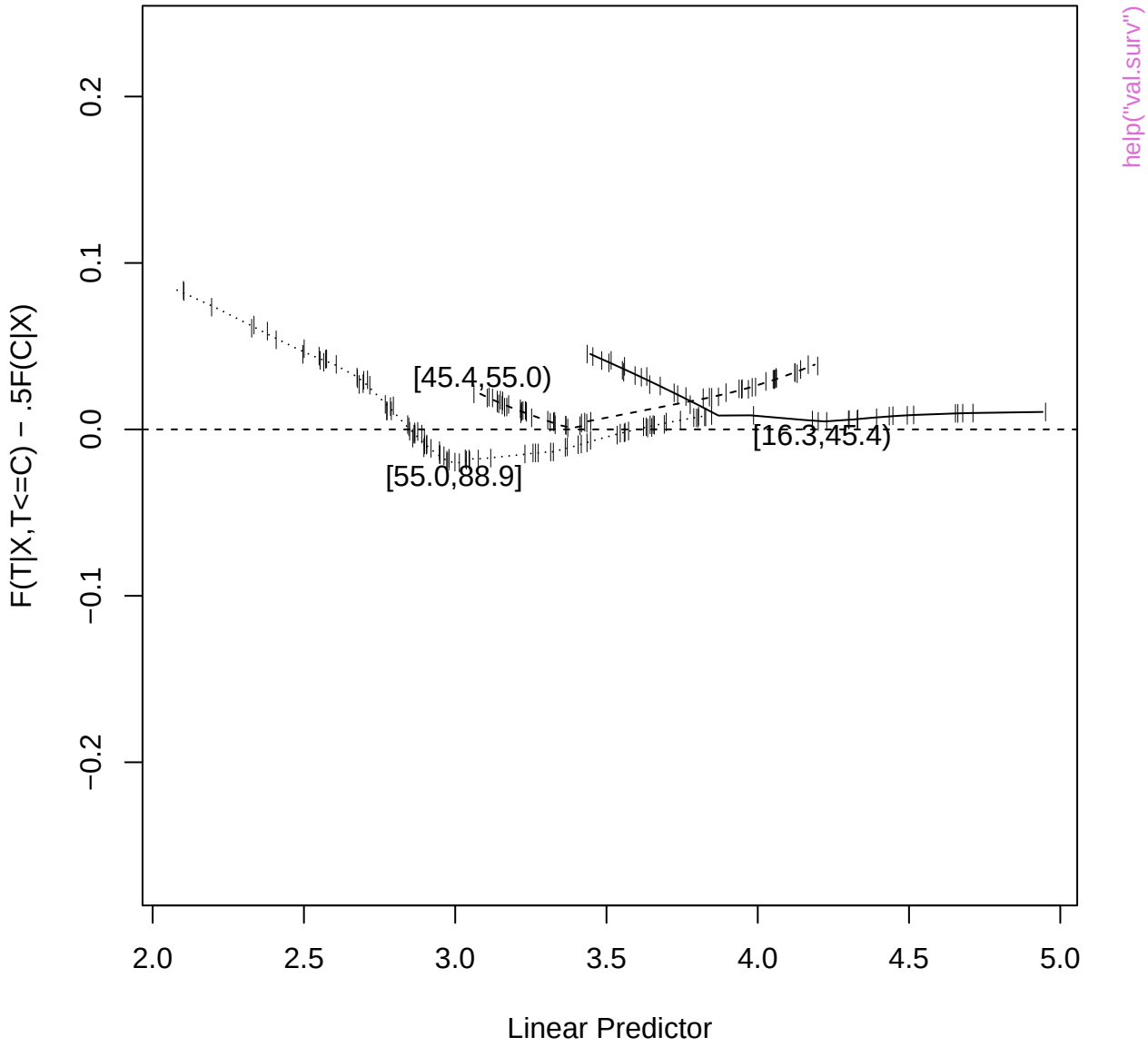

Actual Probability of Surviving 1 Year
1.00
0.95
0.90
0.85
0.85
0.90
0.95
1.00
Predicted Probability of Surviving 1 Year
n=1000 d=187, avg. 100 patients per group
help("val.surv")

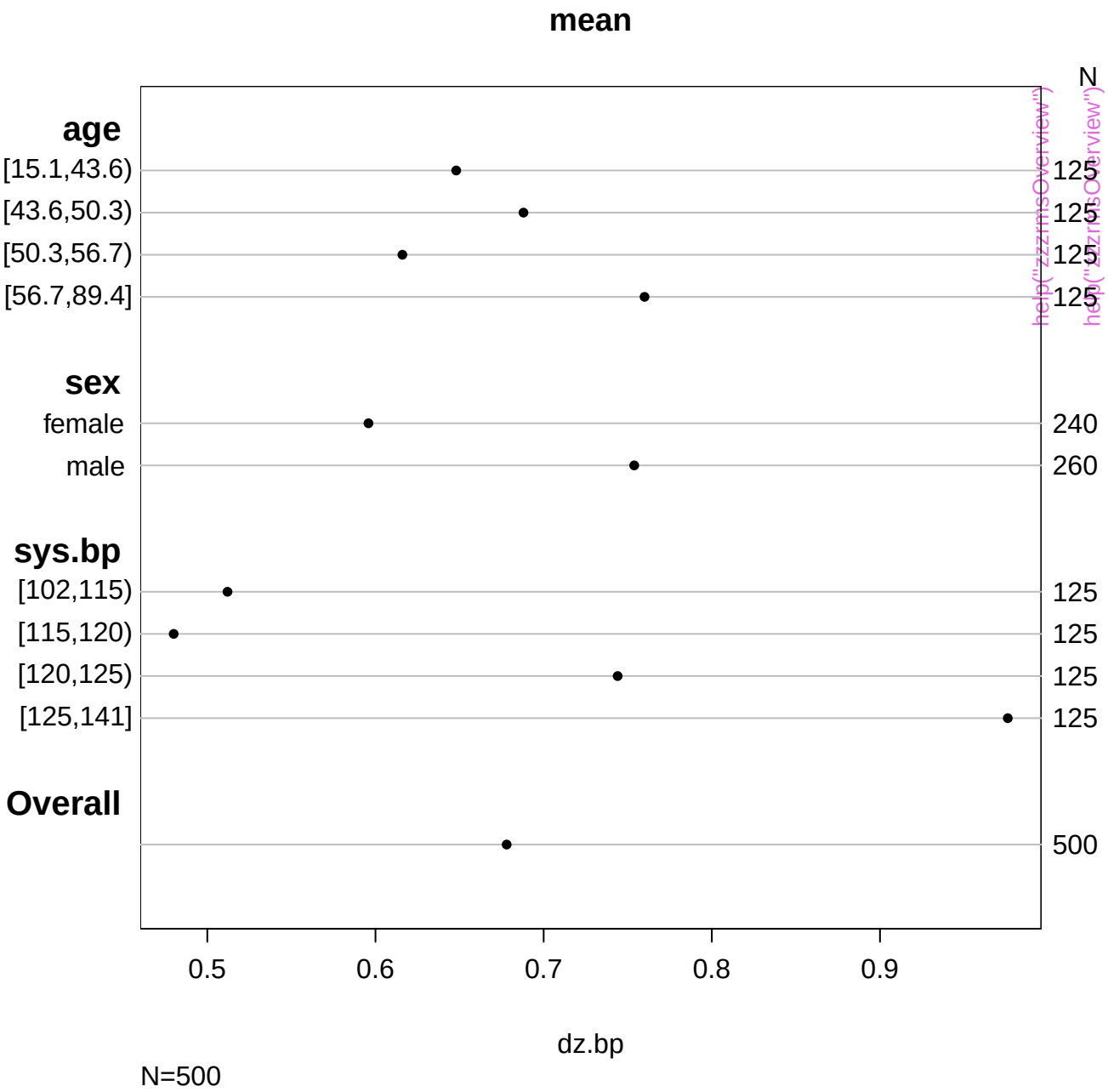

Fraction <= x
0.0
0.2
0.4
0.6
0.8
1.0
Predicted Pr[T <= observed T]
0.0
0.2
0.4
0.6
0.8
1.0
help("val.surv")

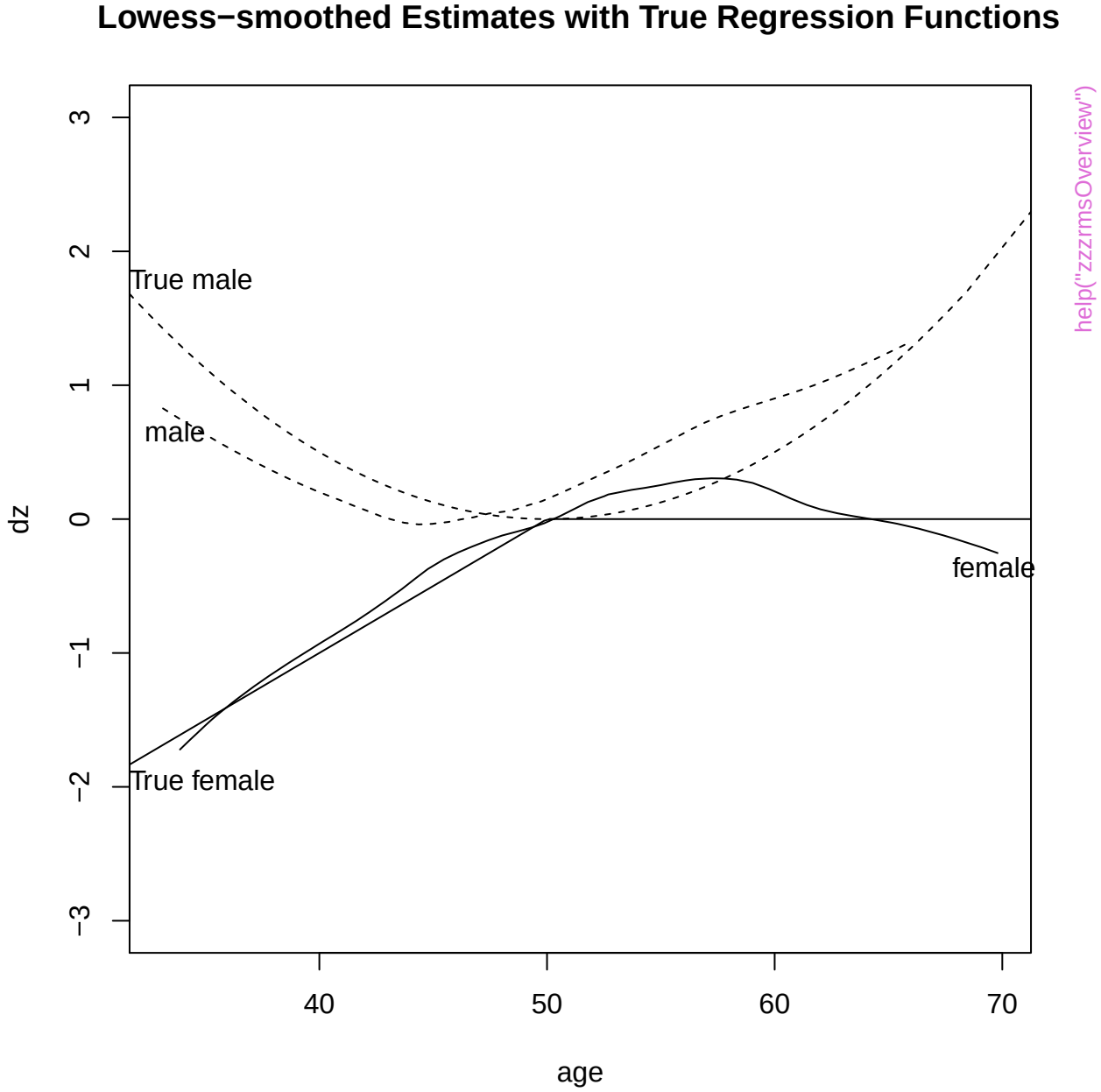

Fraction <= x
0.0
0.2
0.4
0.6
0.8
1.0
Predicted Pr[T <= observed T]
Overall
Female
Male
help("val.surv")

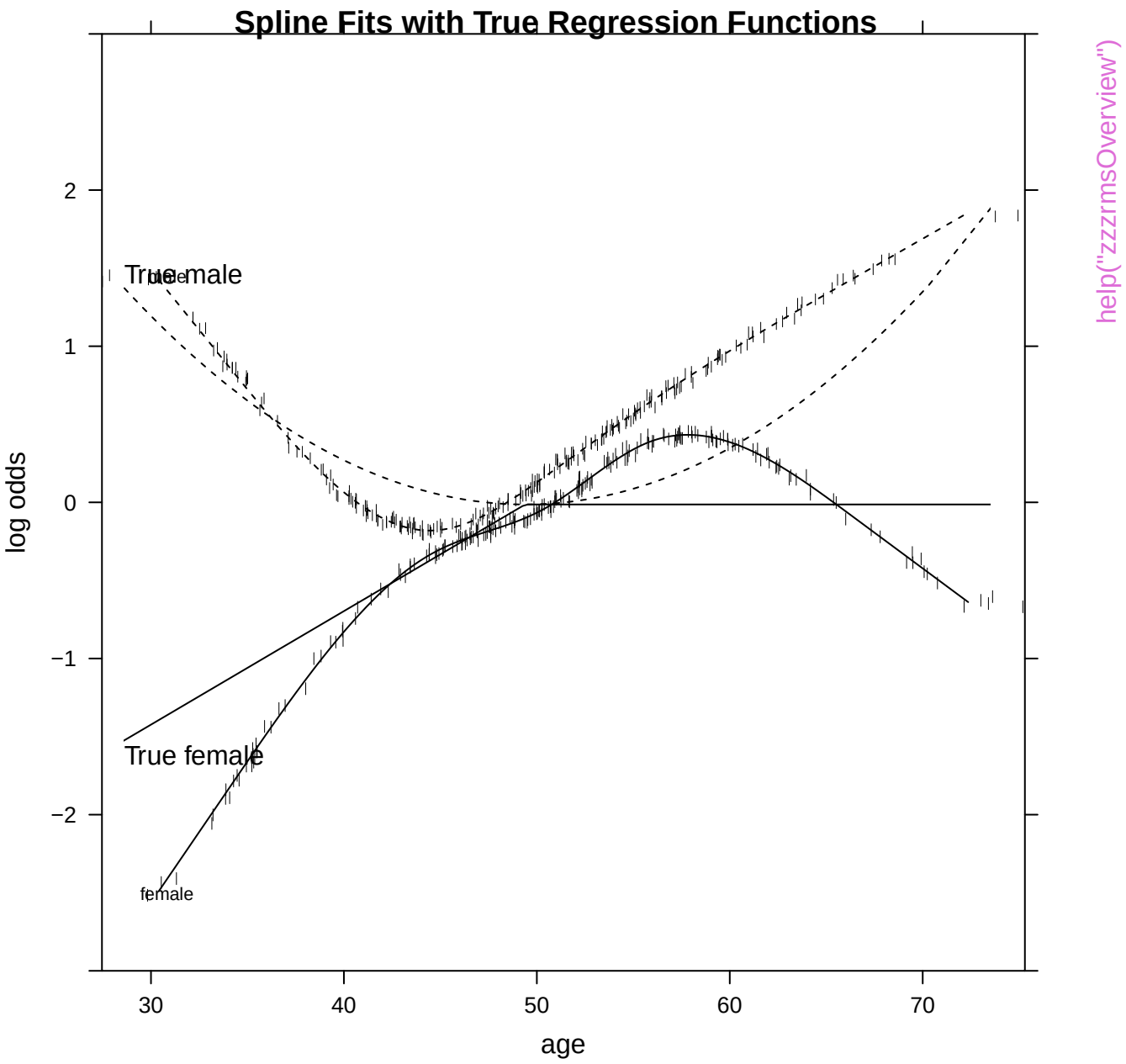

Fraction <= x
0.0
0.2
0.4
0.6
0.8
1.0
Predicted Pr[T <= observed T]
Overall
Female
Male
help("val.surv")


F(T|X,T<=C) − .5F(C|X)
0.2
0.1
0.0
−0.1
−0.2
2.0
2.5
3.0
3.5
4.0
4.5
5.0
Linear Predictor
help('val.surv')

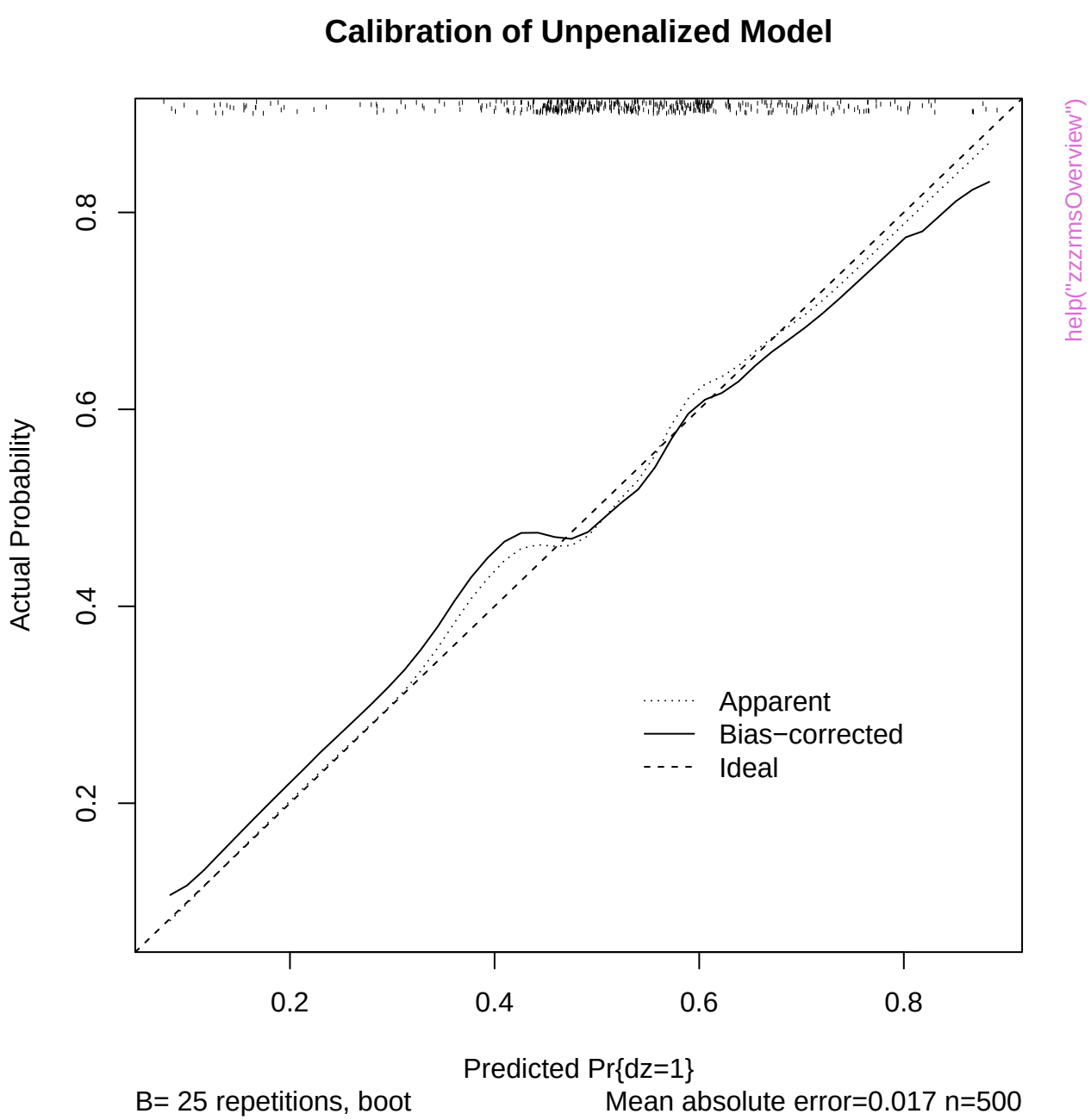

F(T|X,T<=C) − .5F(C|X)
0.2
0.1
0.0
−0.1
−0.2
[45.4,55.0)
[55.0,88.9]
[16.3,45.4)
2.0
2.5
3.0
3.5
4.0
4.5
5.0
Linear Predictor
help("val.surv")

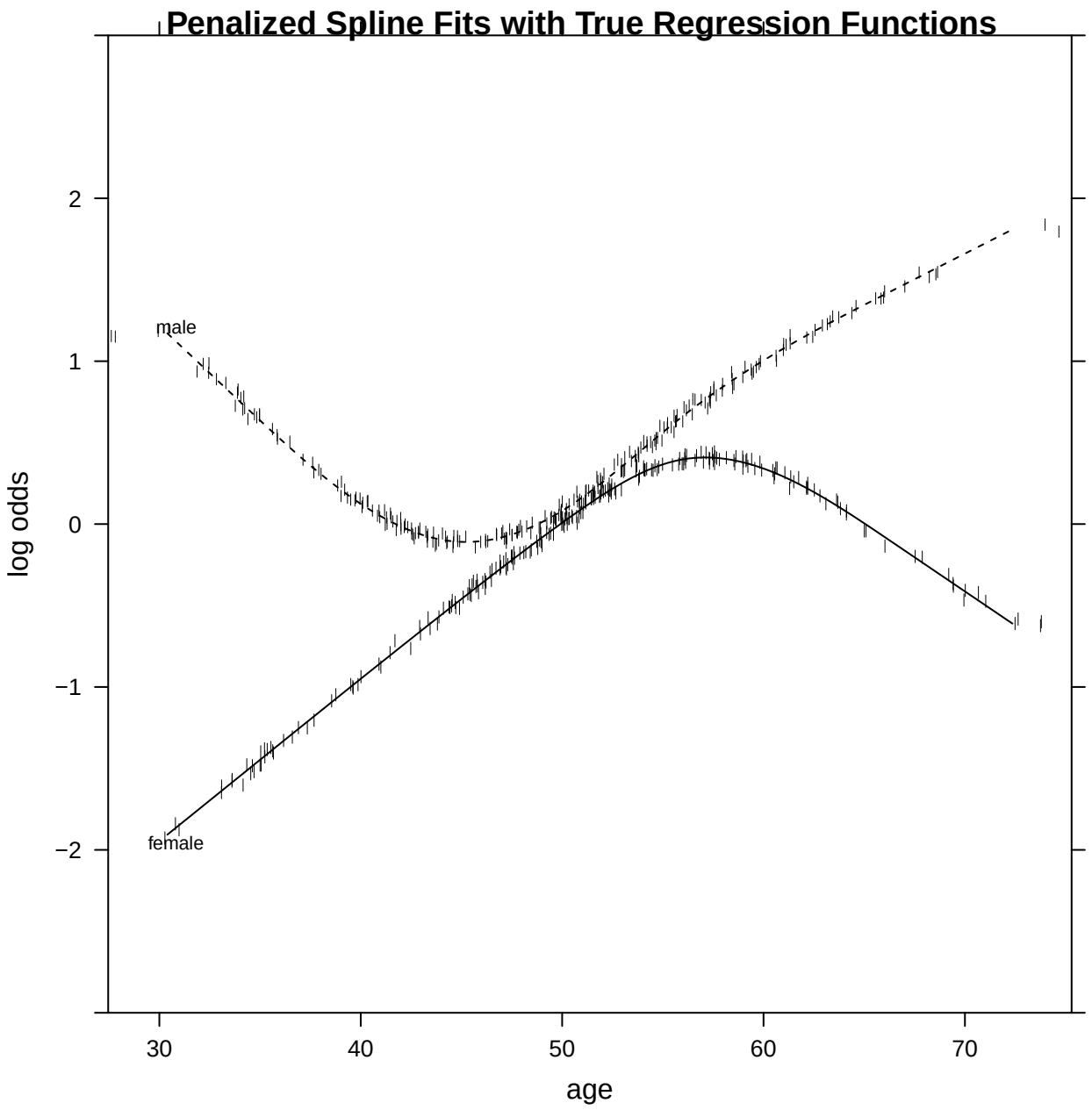

mean
N
age
[15.1,43.6)
[43.6,50.3)
[50.3,56.7)
[56.7,89.4]
125
125
125
125
sex
female
male
240
260
sys.bp
[102,115)
[115,120)
[120,125)
[125,141]
125
125
125
125
Overall
500
0.5
0.6
0.7
0.8
0.9
dz.bp
N=500
help("zzrmsOverview")
help("zzrmsOverview")


Lowess−smoothed Estimates with True Regression Functions
dz
age
True male
male
female
True female
3
2
1
0
−1
−2
−3
40
50
60
70
help("zzrmsOverview")

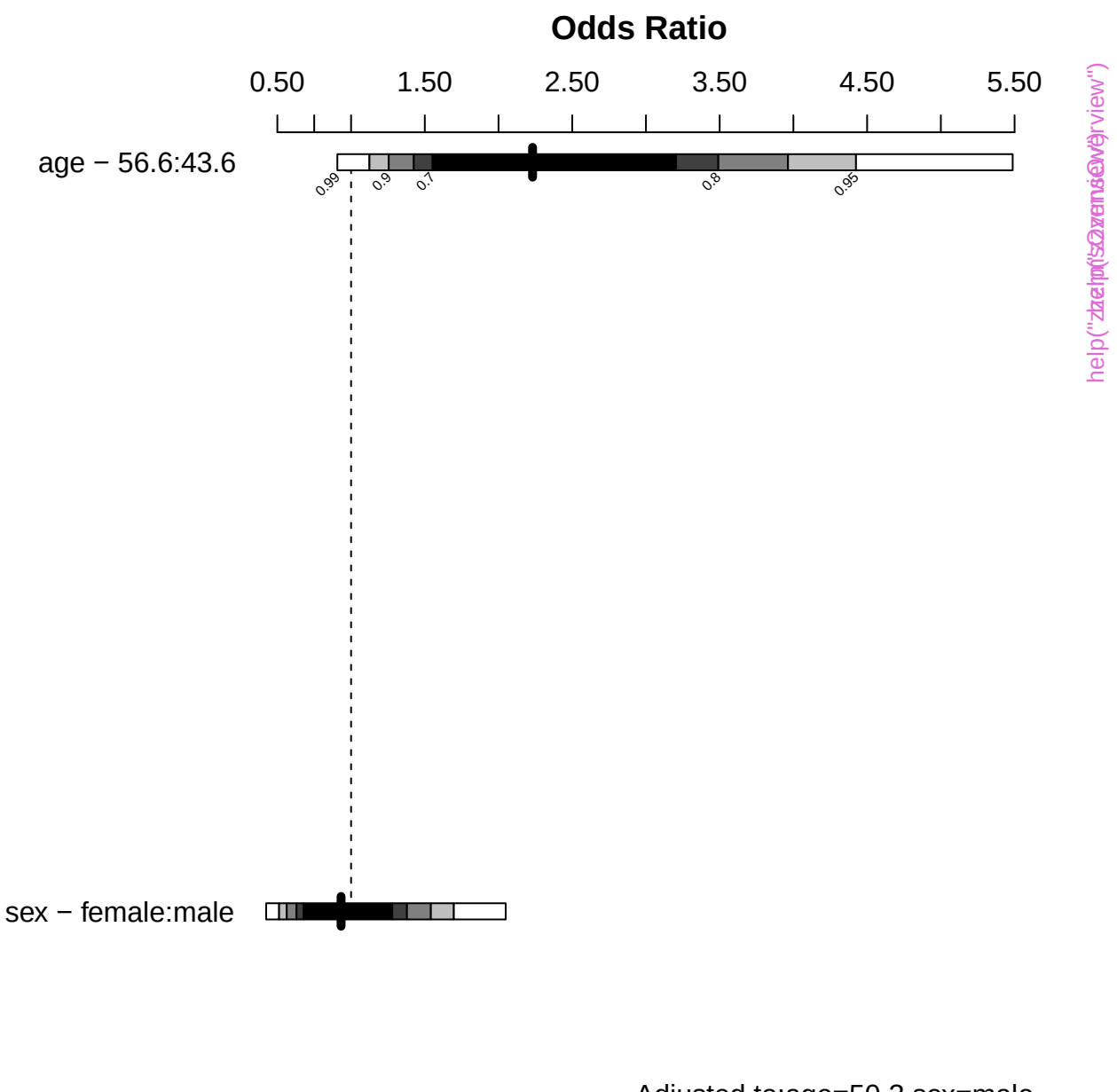


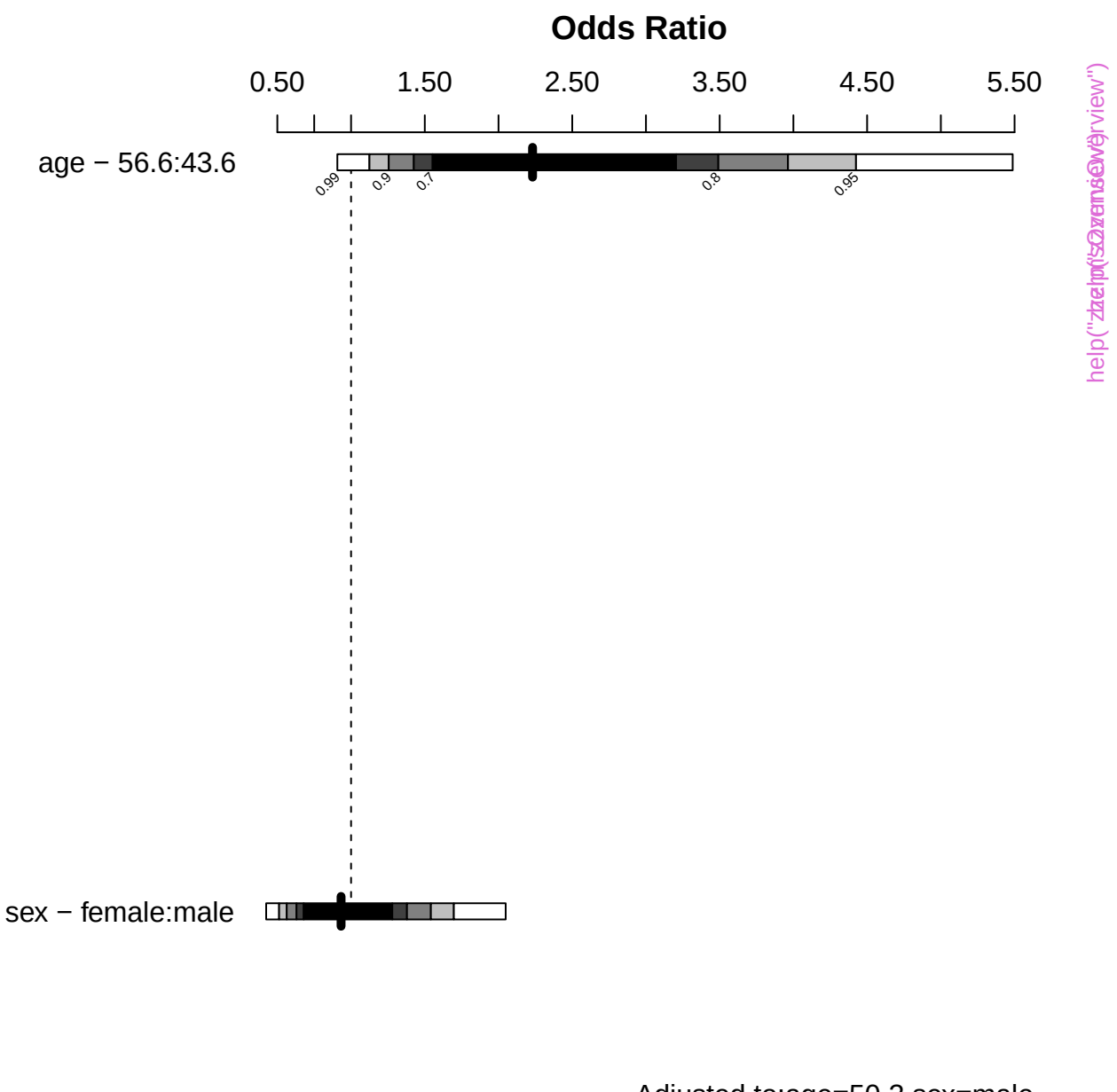
help("zzzrmsOverview")

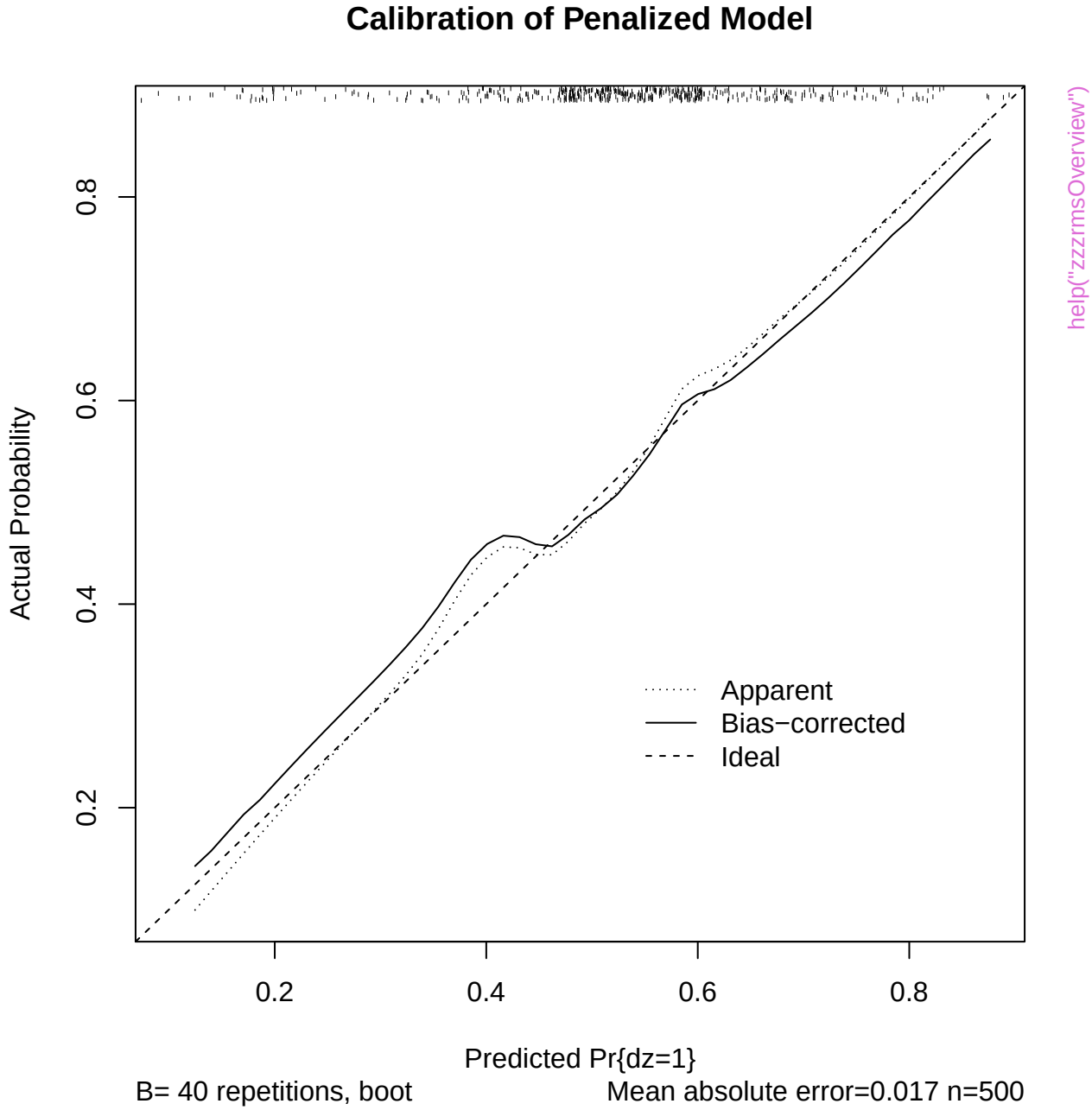

Calibration of Unpenalized Model
Actual Probability
0.2
0.4
0.6
0.8
Apparent
Bias−corrected
Ideal
0.2
0.4
0.6
0.8
Predicted Pr{dz=1}
B= 25 repetitions, boot
Mean absolute error=0.017 n=500
help("zzrmsOverview")

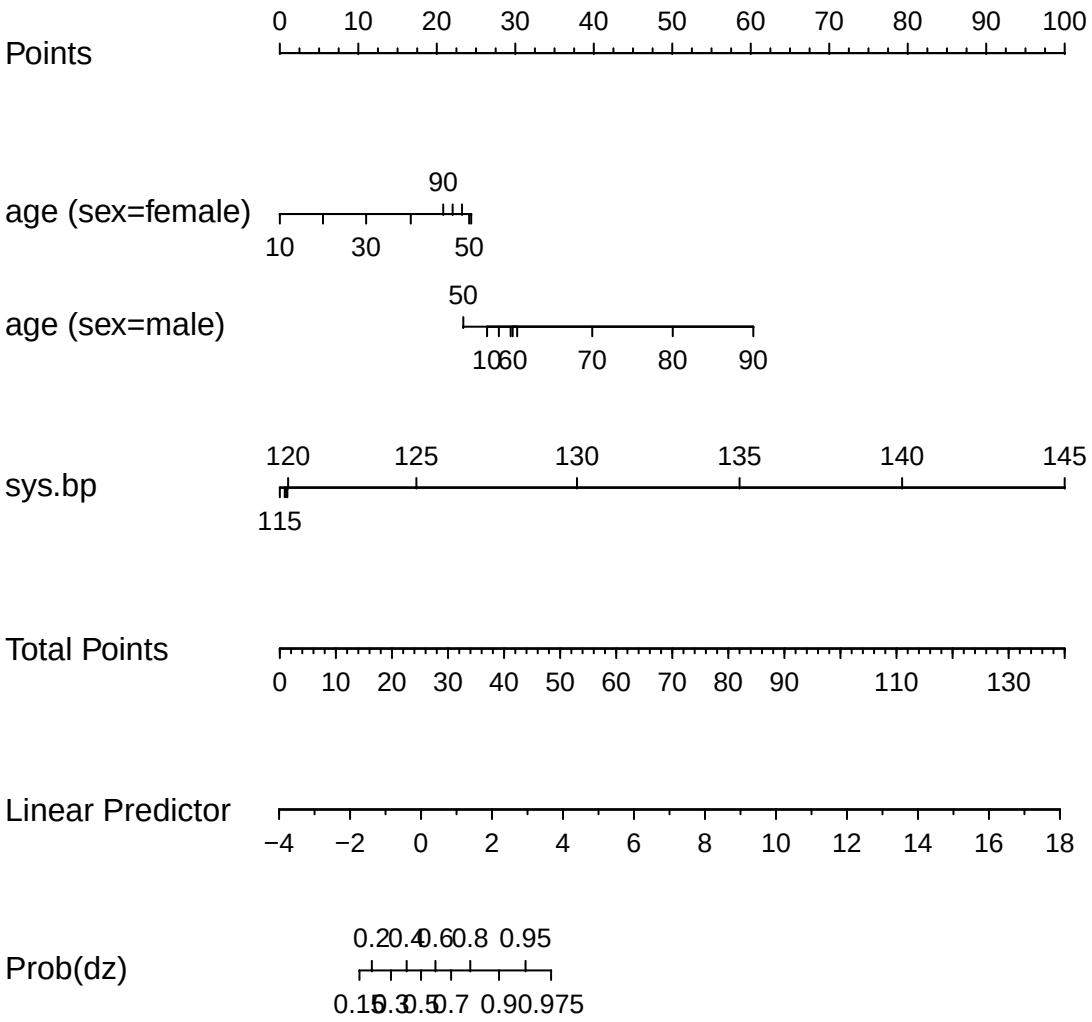


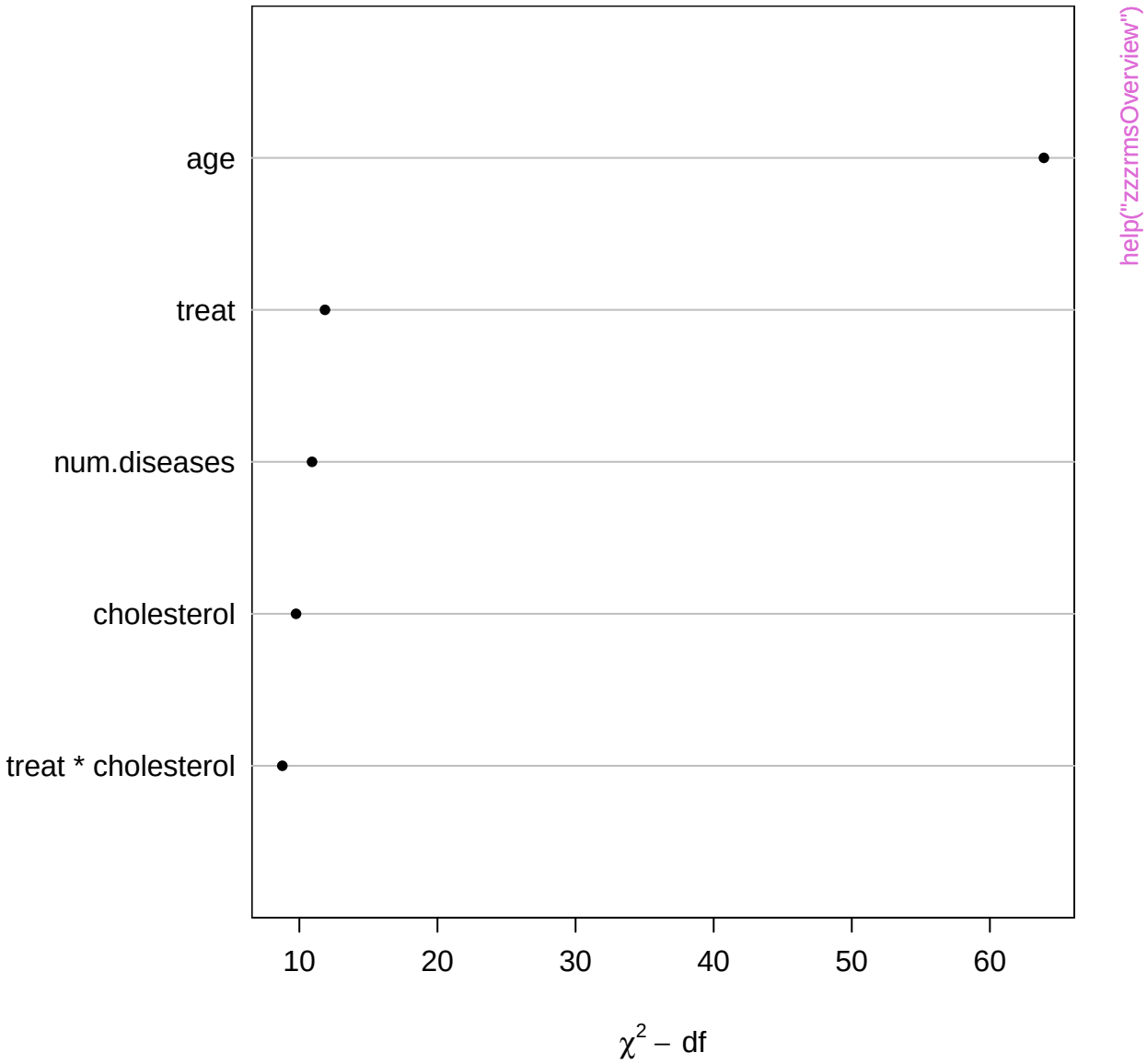
help("zzzrmsOverview")

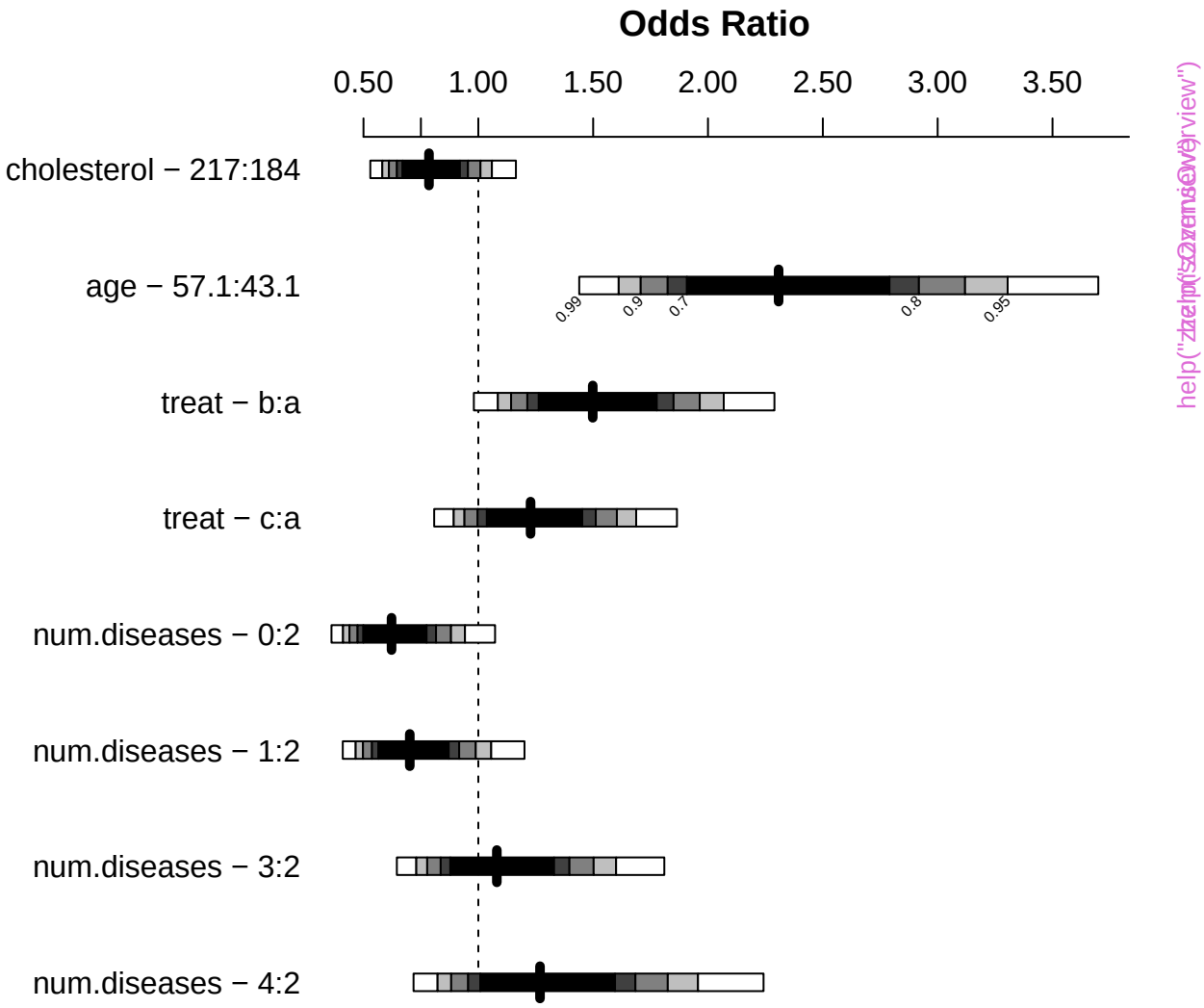

Odds Ratio
0.50
1.50
2.50
3.50
4.50
5.50
age − 56.6:43.6
0.99
0.9
0.7
0.8
0.95
sex − female:male
Adjusted to:age=50.3 sex=male

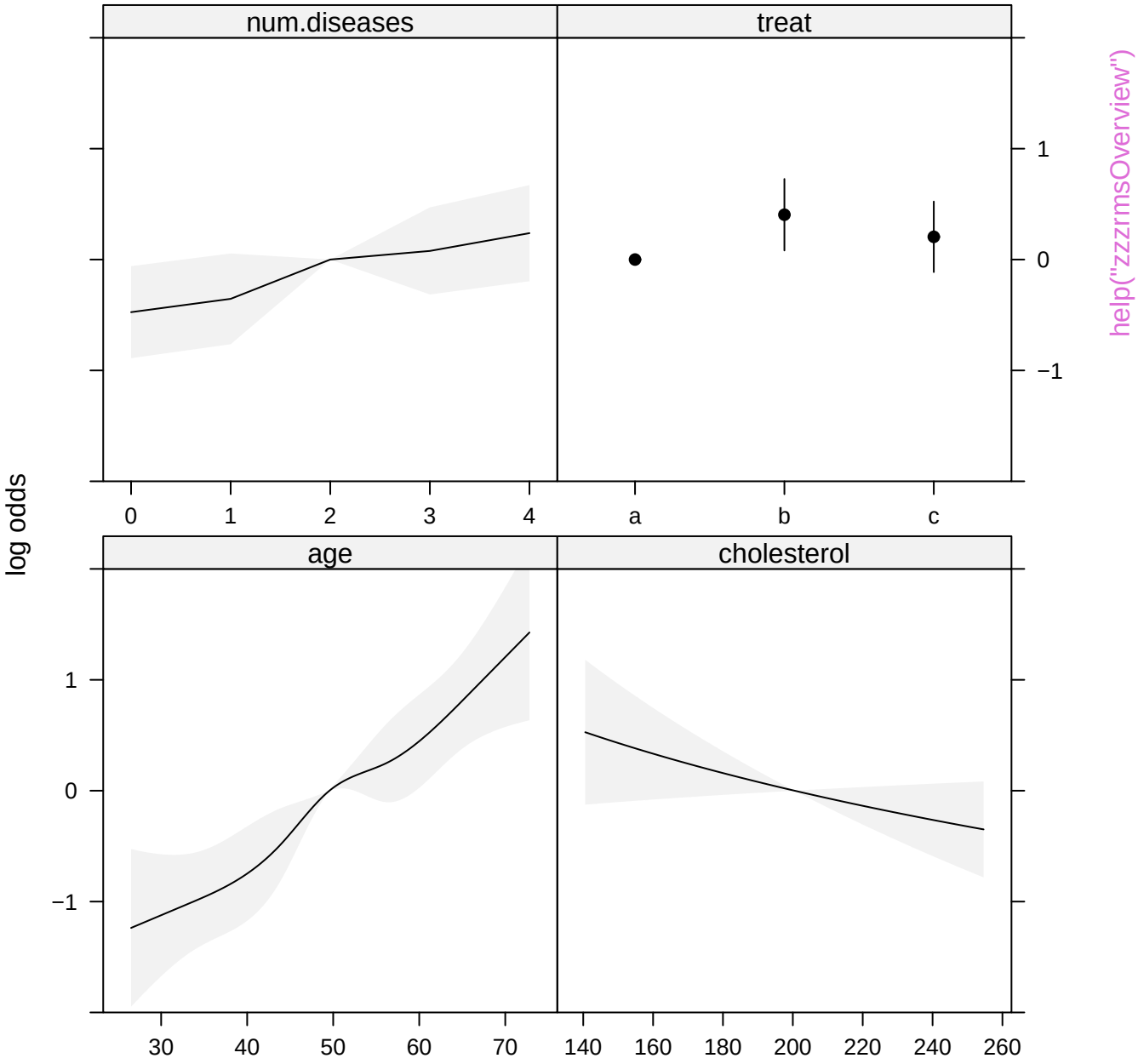

Odds Ratio
0.50
1.50
2.50
3.50
4.50
5.50
age − 56.6:43.6
0.99
0.9
0.7
0.8
0.95
sex − female:male
Adjusted to:age=50.3 sex=male

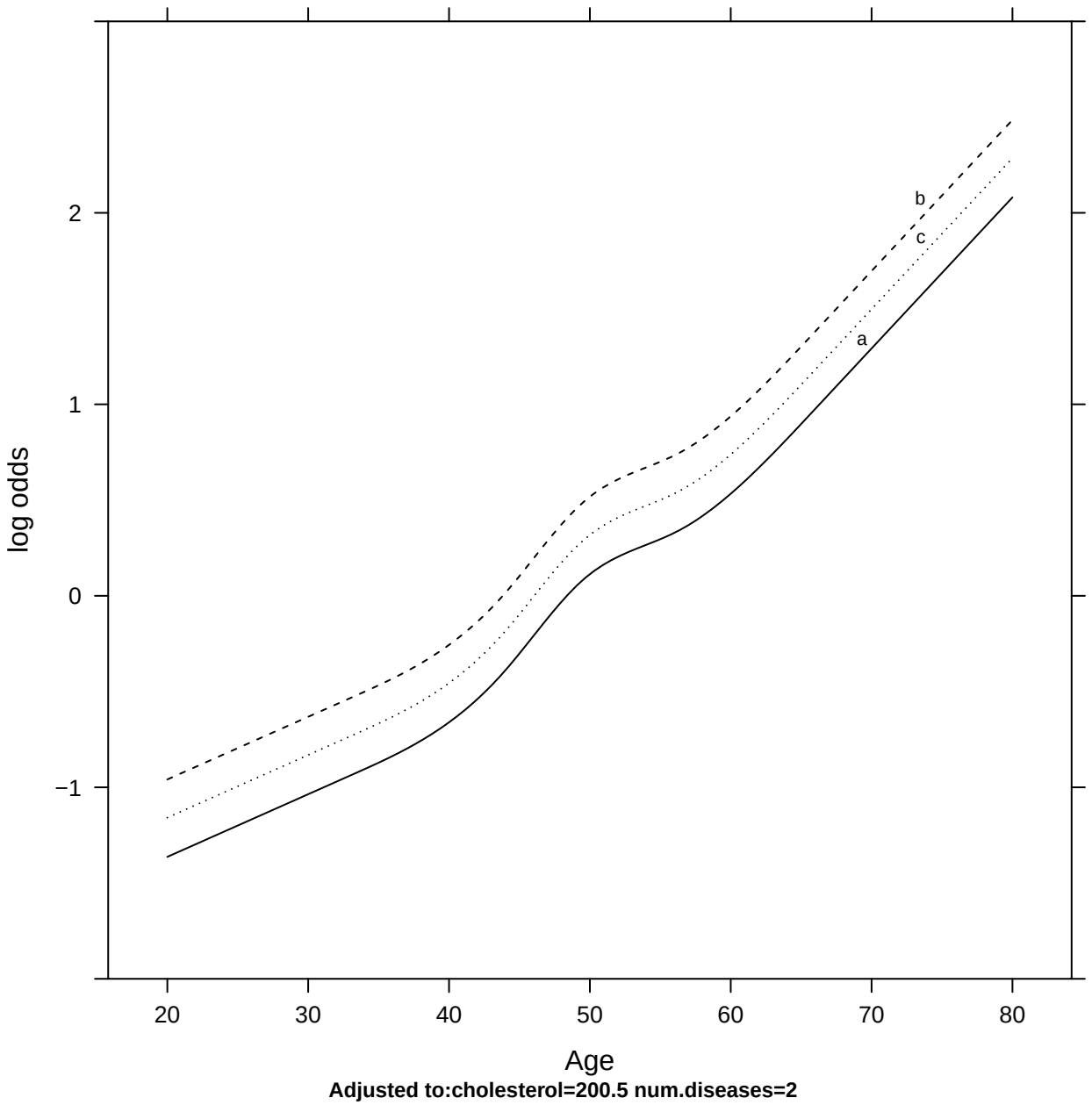

Calibration of Penalized Model
Actual Probability
0.2
0.4
0.6
0.8
Apparent
Bias−corrected
Ideal
Predicted Pr{dz=1}
B= 40 repetitions, boot
Mean absolute error=0.017 n=500
help("zzrmsOverview")


Points
0 10 20 30 40 50 60 70 80 90 100
age (sex=female)
90
10 30 50
age (sex=male)
50
10 60 70 80 90
sys.bp
120 125 130 135 140 145
115
Total Points
0 10 20 30 40 50 60 70 80 90 110 130
Linear Predictor
−4 −2 0 2 4 6 8 10 12 14 16 18
Prob(dz)
0.2 0.4 0.6 0.8 0.95
0.1 0.3 0.5 0.7 0.9 0.975
help("zzrmsOverview")

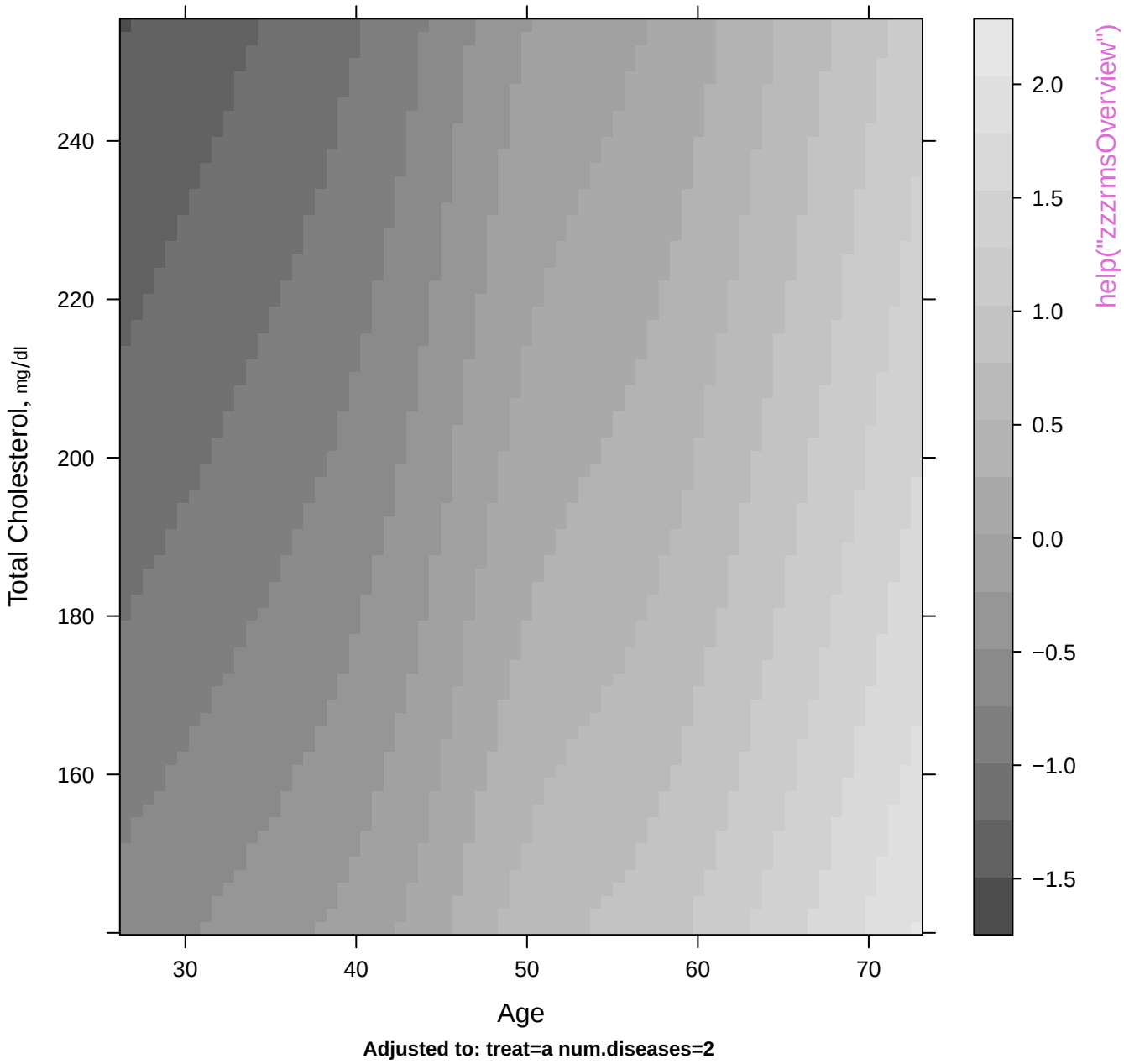

age
treat
num.diseases
cholesterol
treat * cholesterol
10
20
30
40
50
60
χ^2 – df
help("zzrmsOverview")

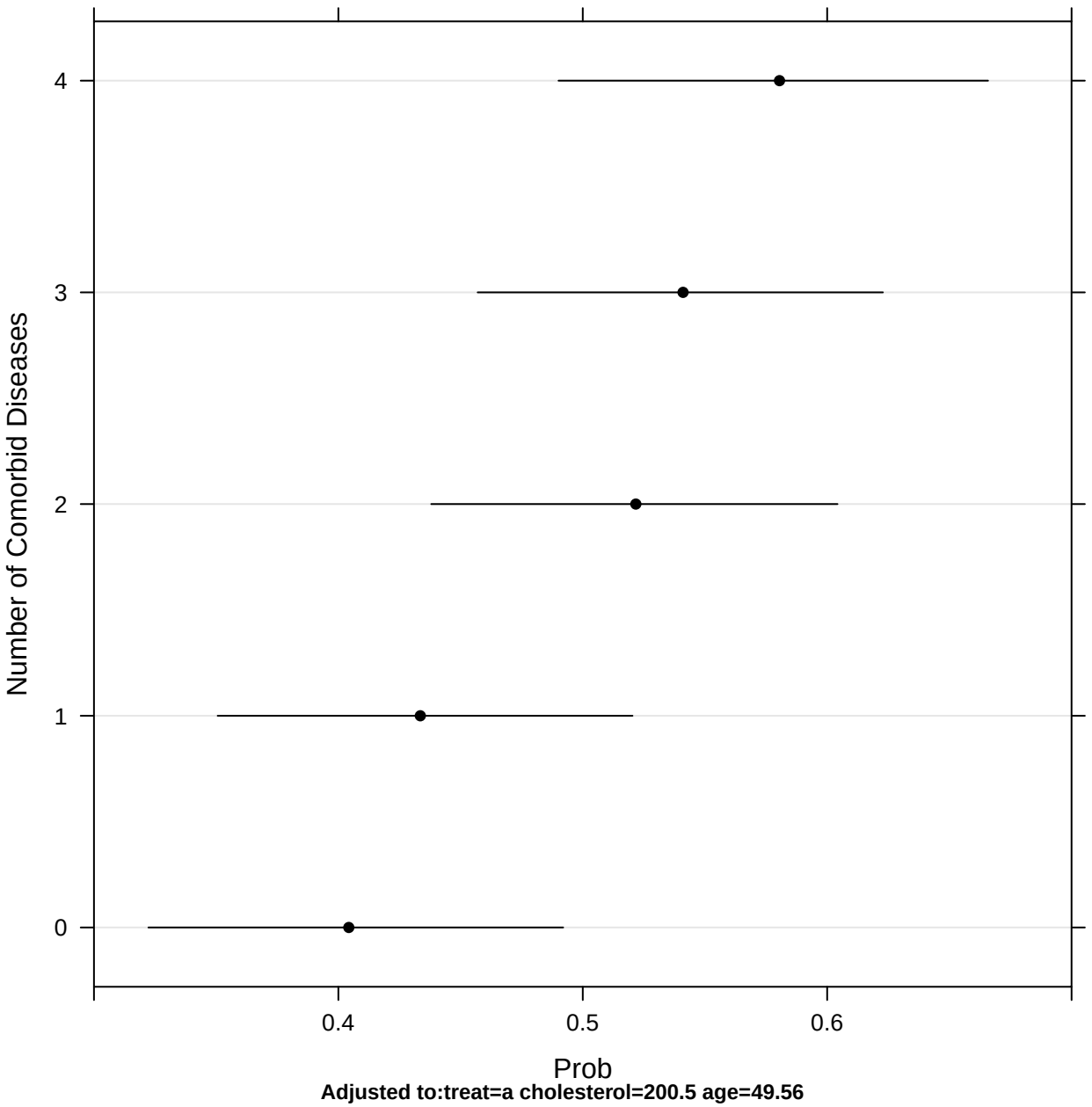

Odds Ratio
0.50
1.00
1.50
2.00
2.50
3.00
3.50
cholesterol − 217:184
age − 57.1:43.1
0.99
0.9
0.7
0.8
0.95
treat − b:a
treat − c:a
num.diseases − 0:2
num.diseases − 1:2
num.diseases − 3:2
num.diseases − 4:2
Adjusted to:treat=a cholesterol=200

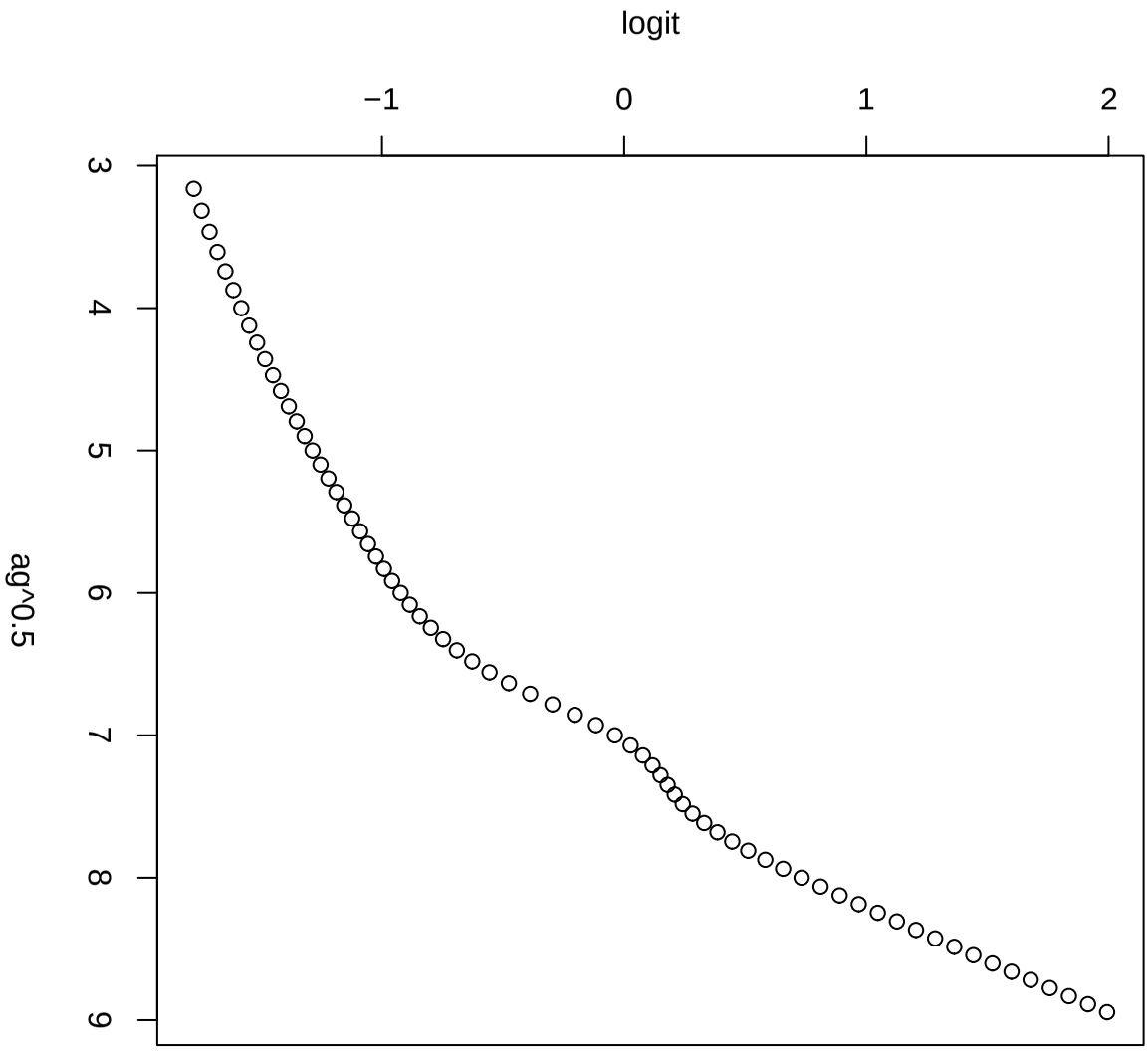

num.diseases
treat
age
cholesterol
log odds
help("zzzrmsOverview")
0
1
2
3
4
a
b
c
30
40
50
60
70
140
160
180
200
220
240
260
1
0
−1



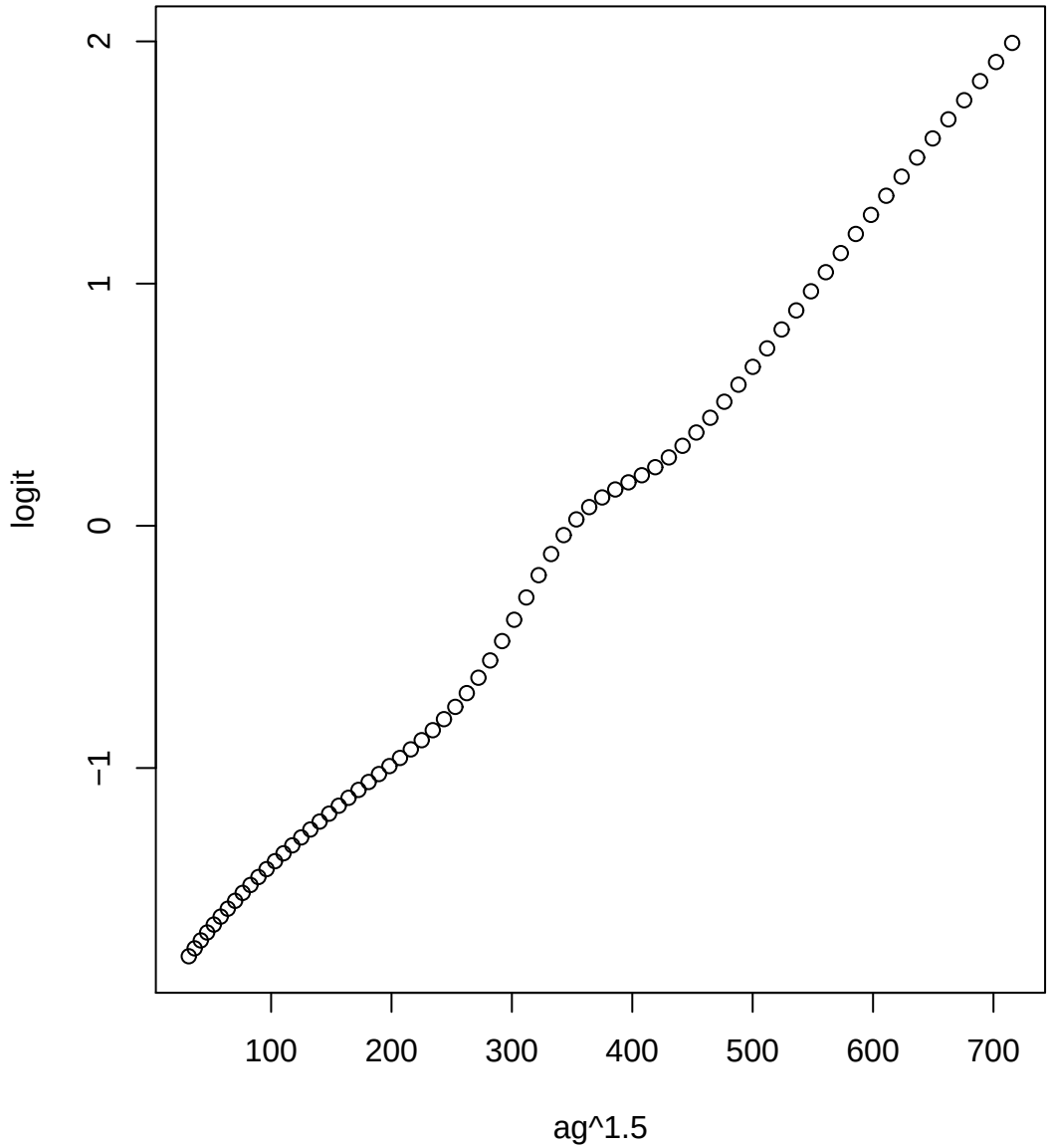
help("zzzrmsOverview")


Total Cholesterol, mg/dl
240
220
200
180
160
30
40
50
60
70
Age
Adjusted to: treat=a num.diseases=2
2.0
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
help("zzzrmsOverview")

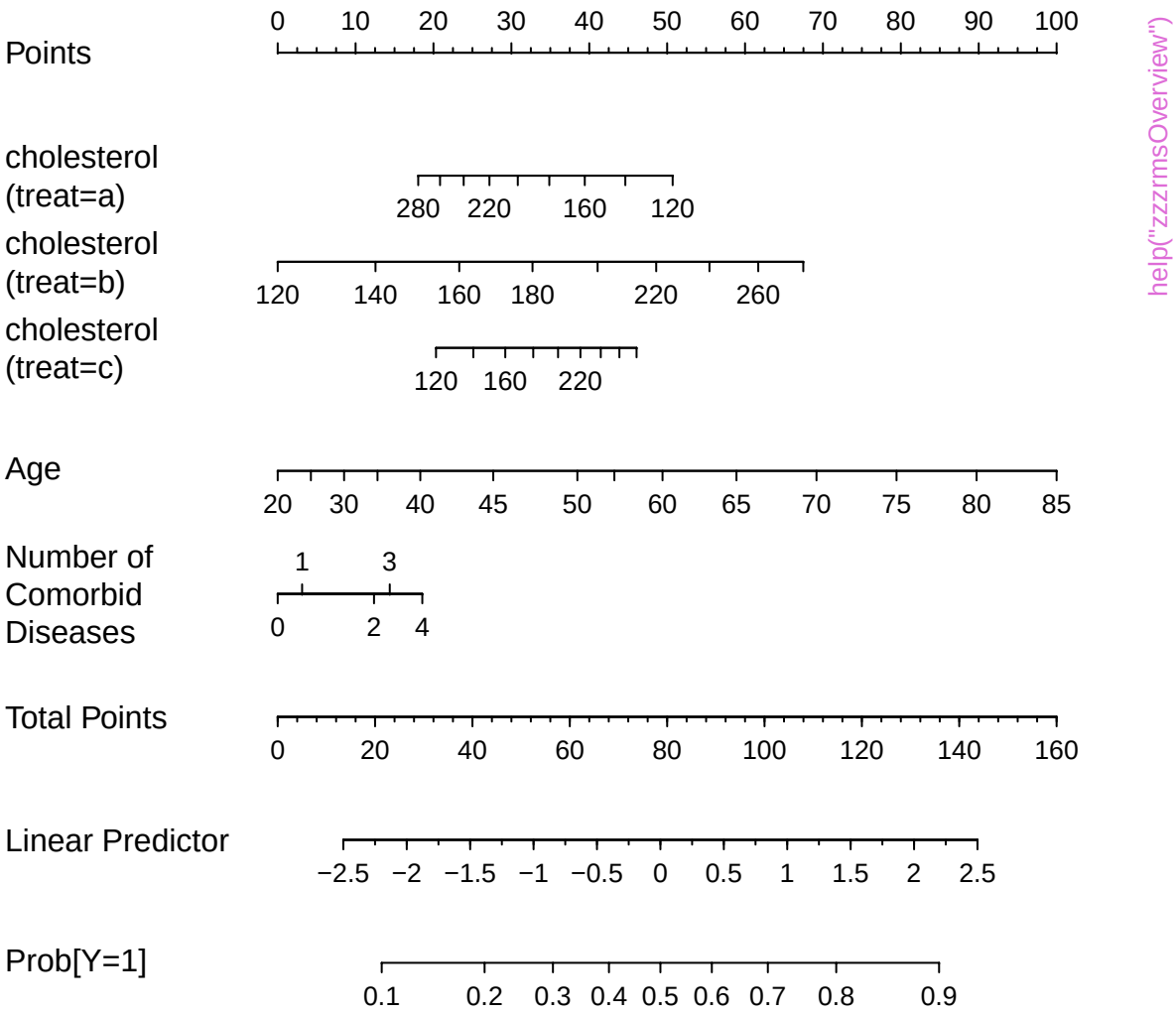

Number of Comorbid Diseases
4
3
2
1
0
0.4
0.5
0.6
Prob
Adjusted to:treat=a cholesterol=200.5 age=49.56
help("zzzrmsOverview")

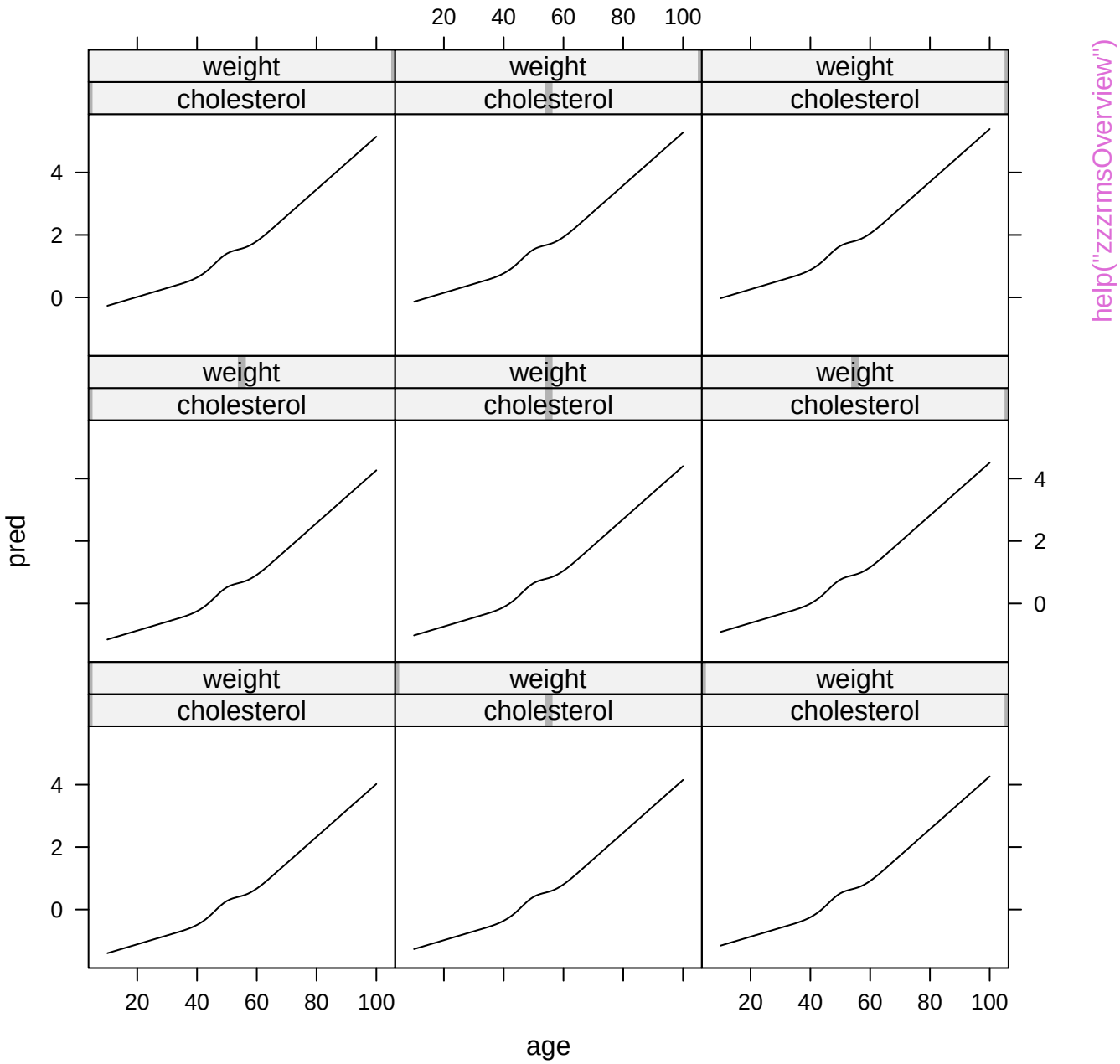


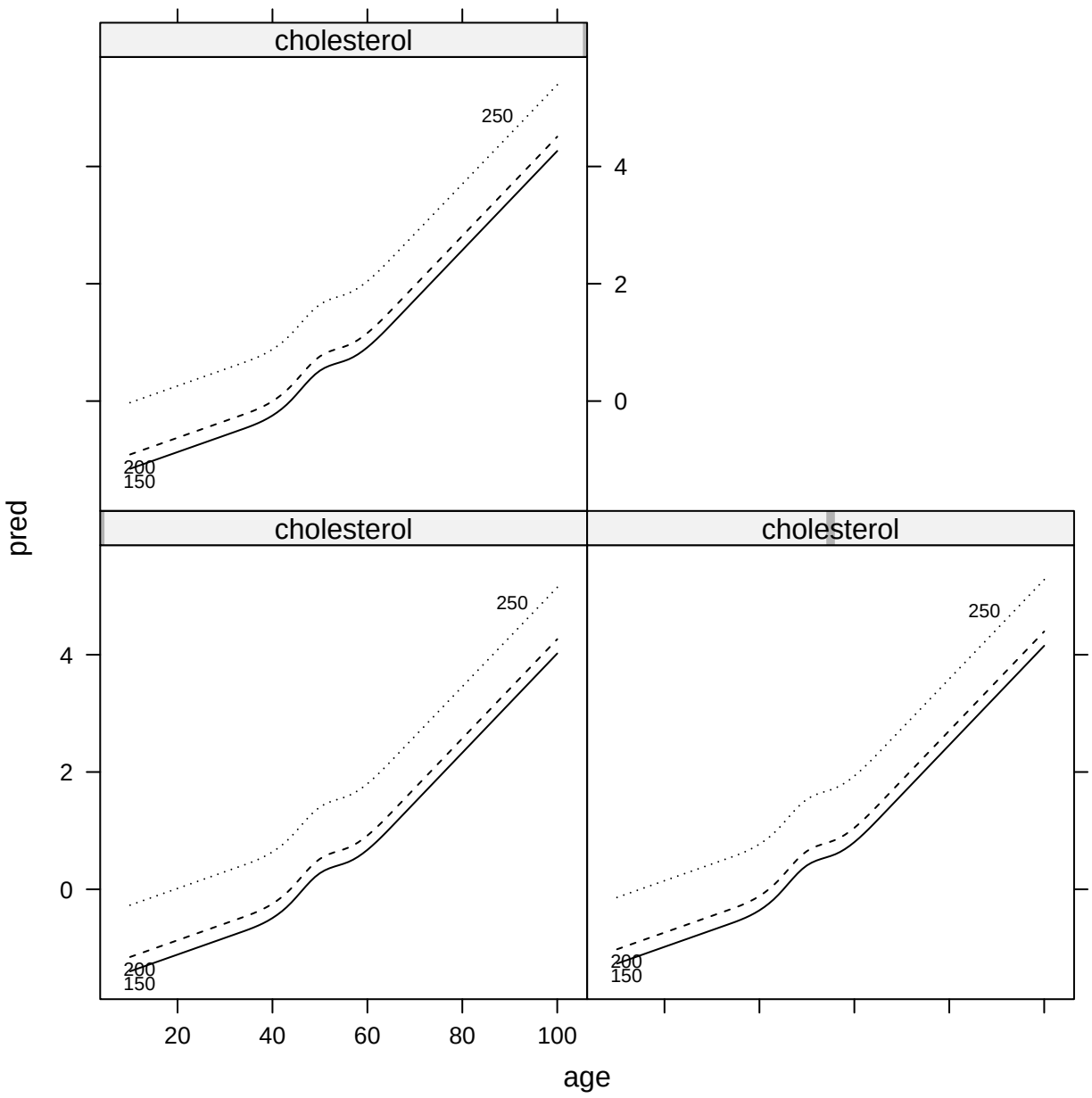
help("zzzrmsOverview")

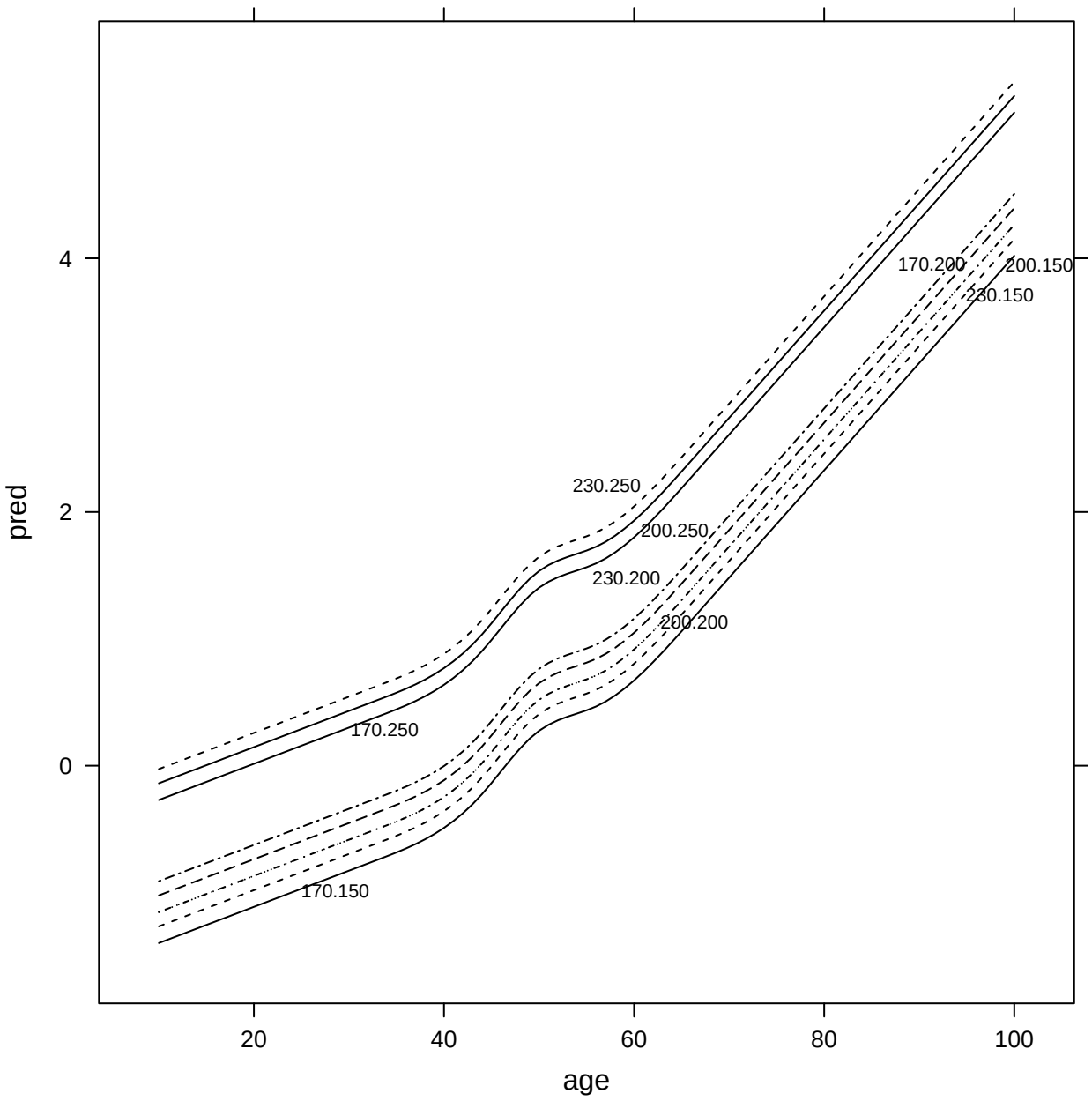


help("zzzrmsOverview")

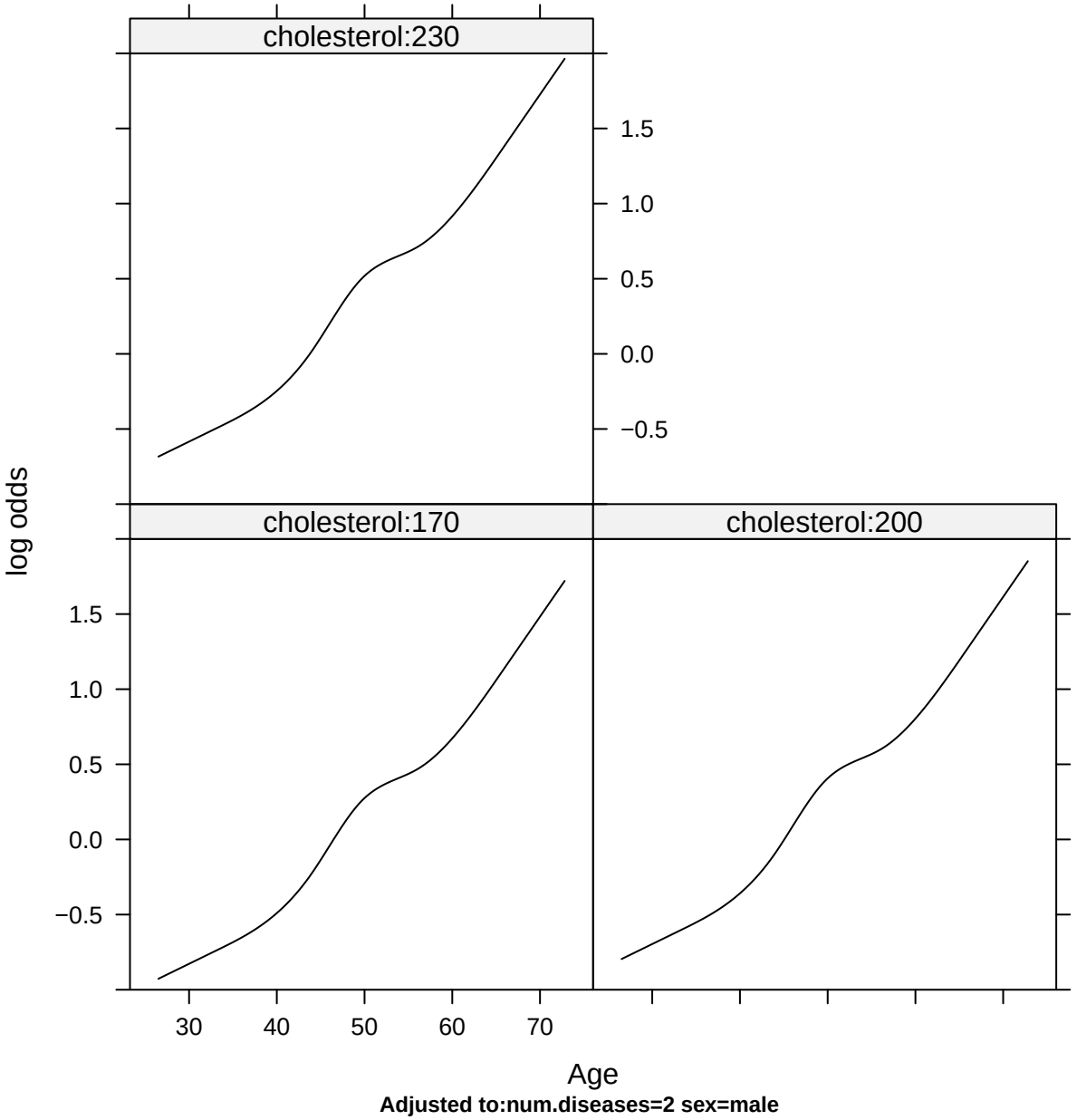

Points
0 10 20 30 40 50 60 70 80 90 100
cholesterol (treat=a)
280 220 160 120
cholesterol (treat=b)
120 140 160 180 220 260
cholesterol (treat=c)
120 160 220
Age
20 30 40 45 50 60 65 70 75 80 85
Number of Comorbid Diseases
1 3
0 2 4
Total Points
0 20 40 60 80 100 120 140 160
Linear Predictor
−2.5 −2 −1.5 −1 −0.5 0 0.5 1 1.5 2 2.5
Prob[Y=1]
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9
help("zzrmsOverview")

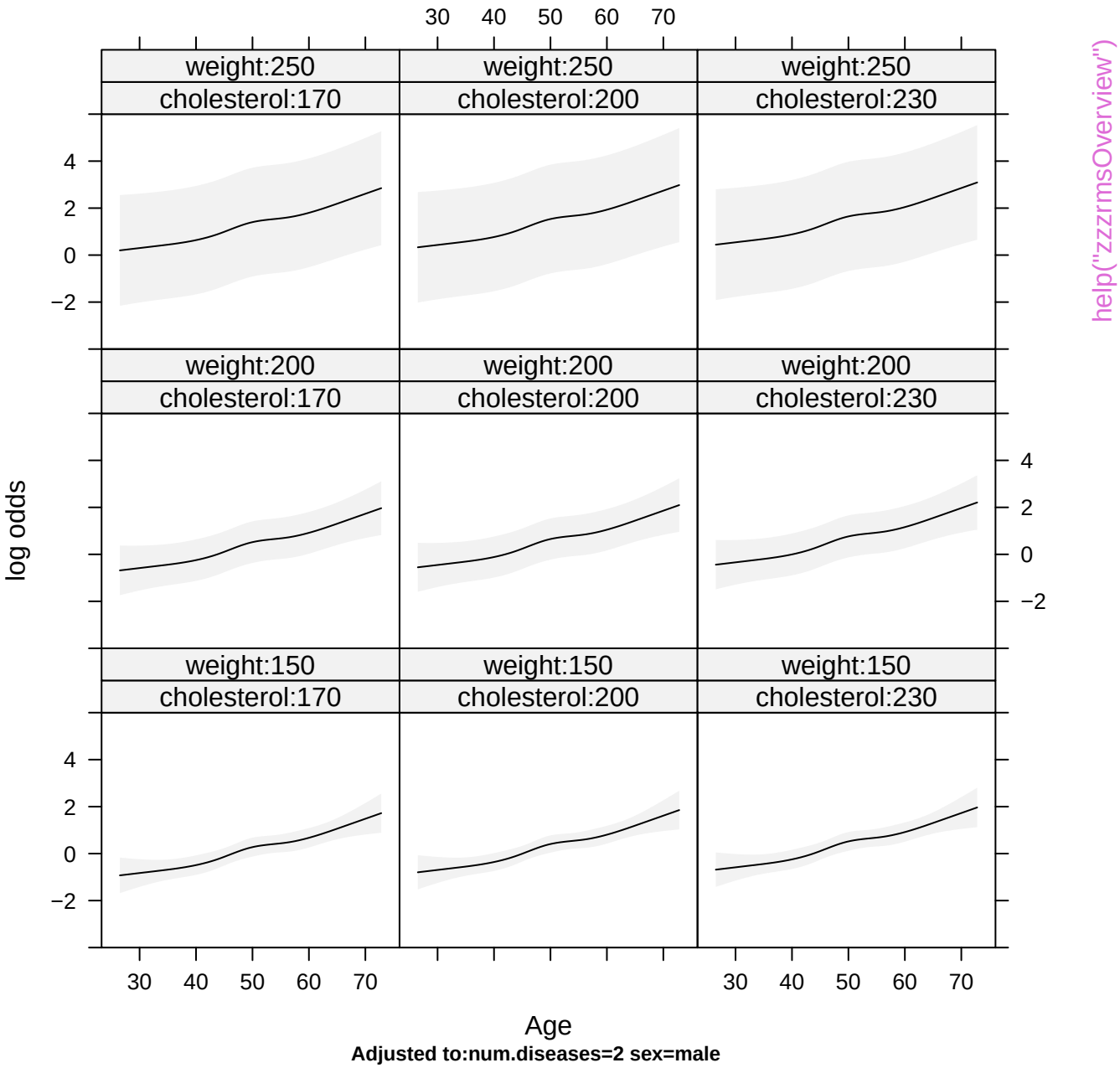

weight
cholesterol
pred
age
20
40
60
80
100
0
2
4
help("zzzrmsOverview")

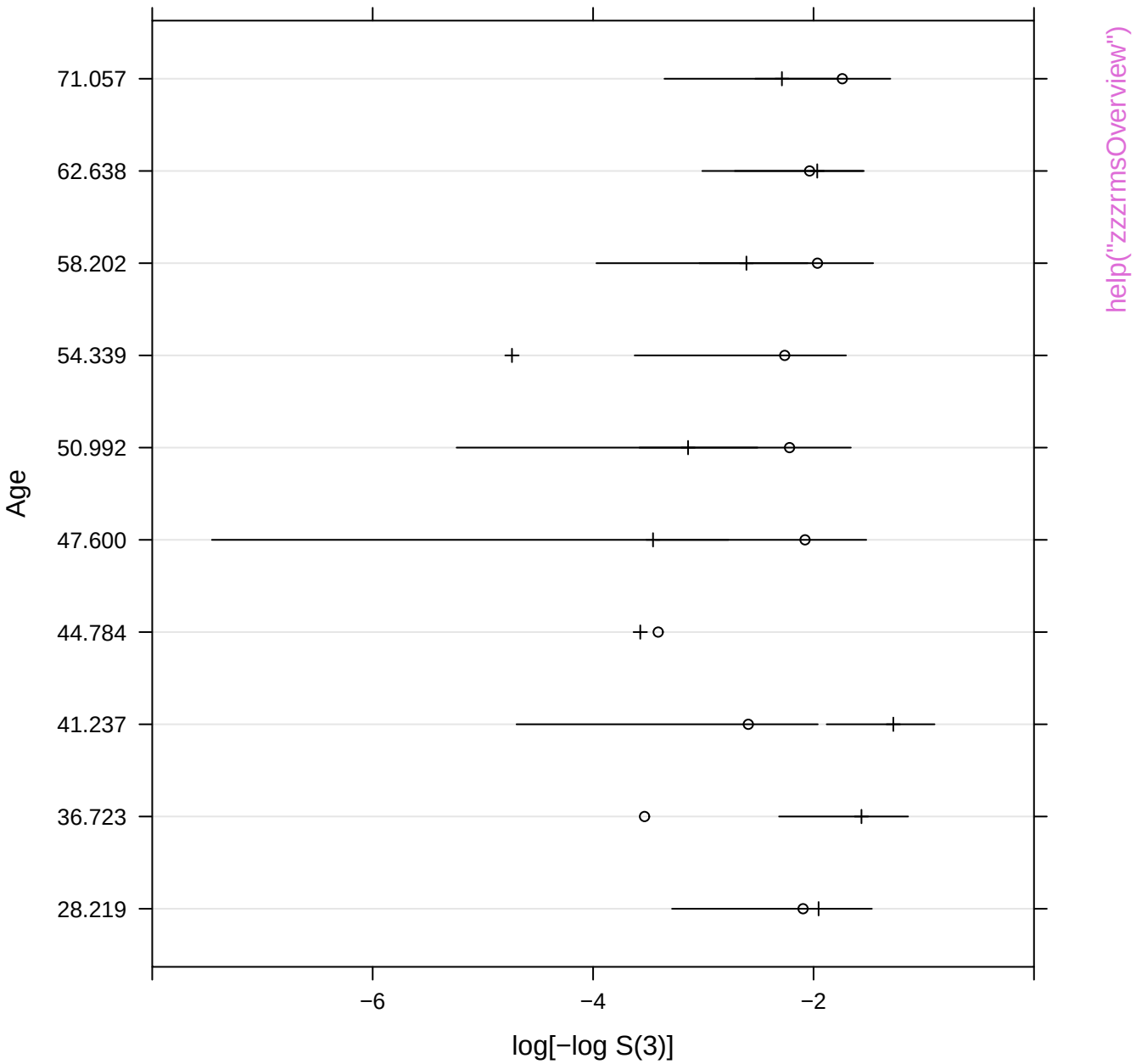


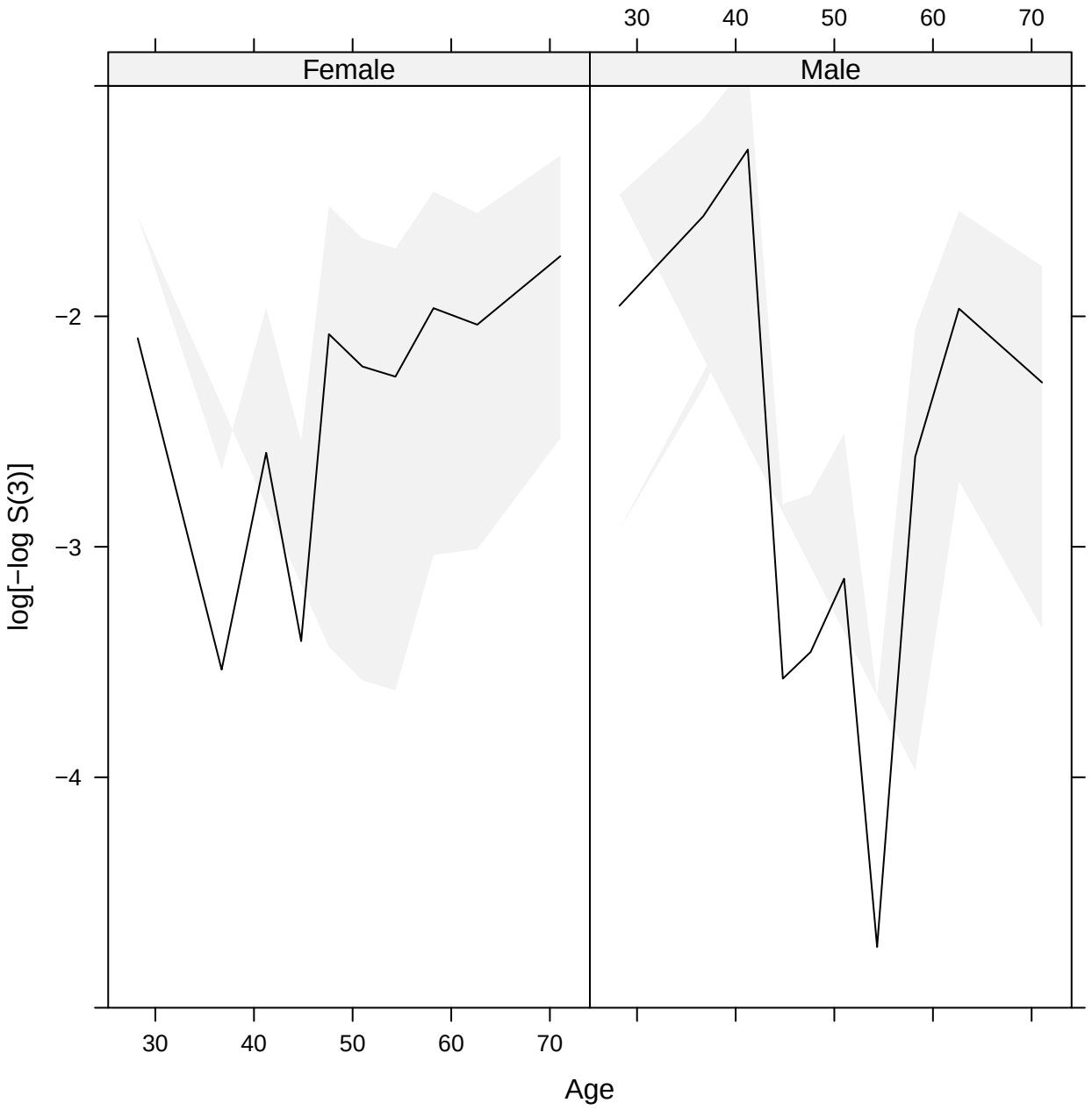


help("zzzrmsOverview")

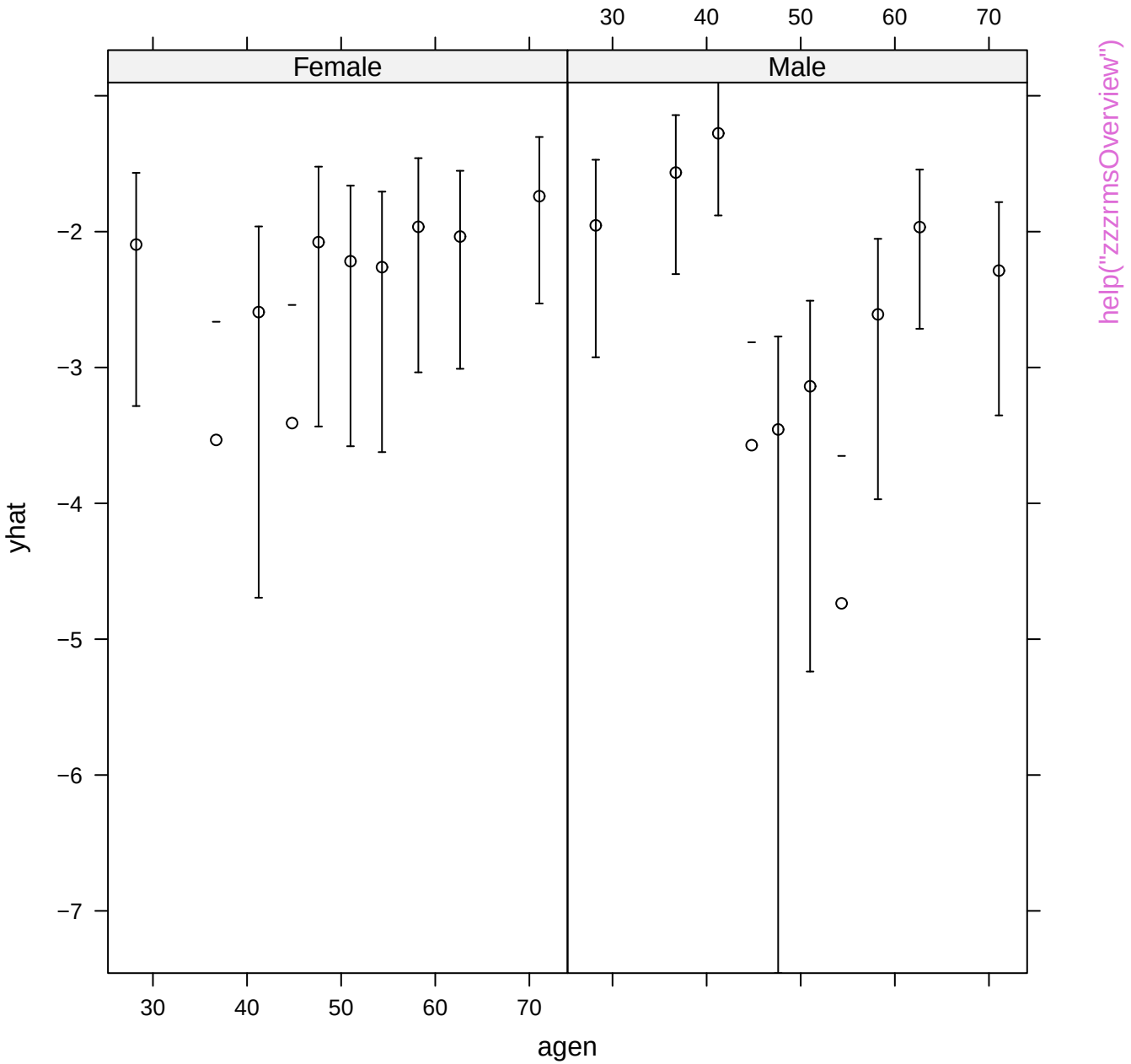


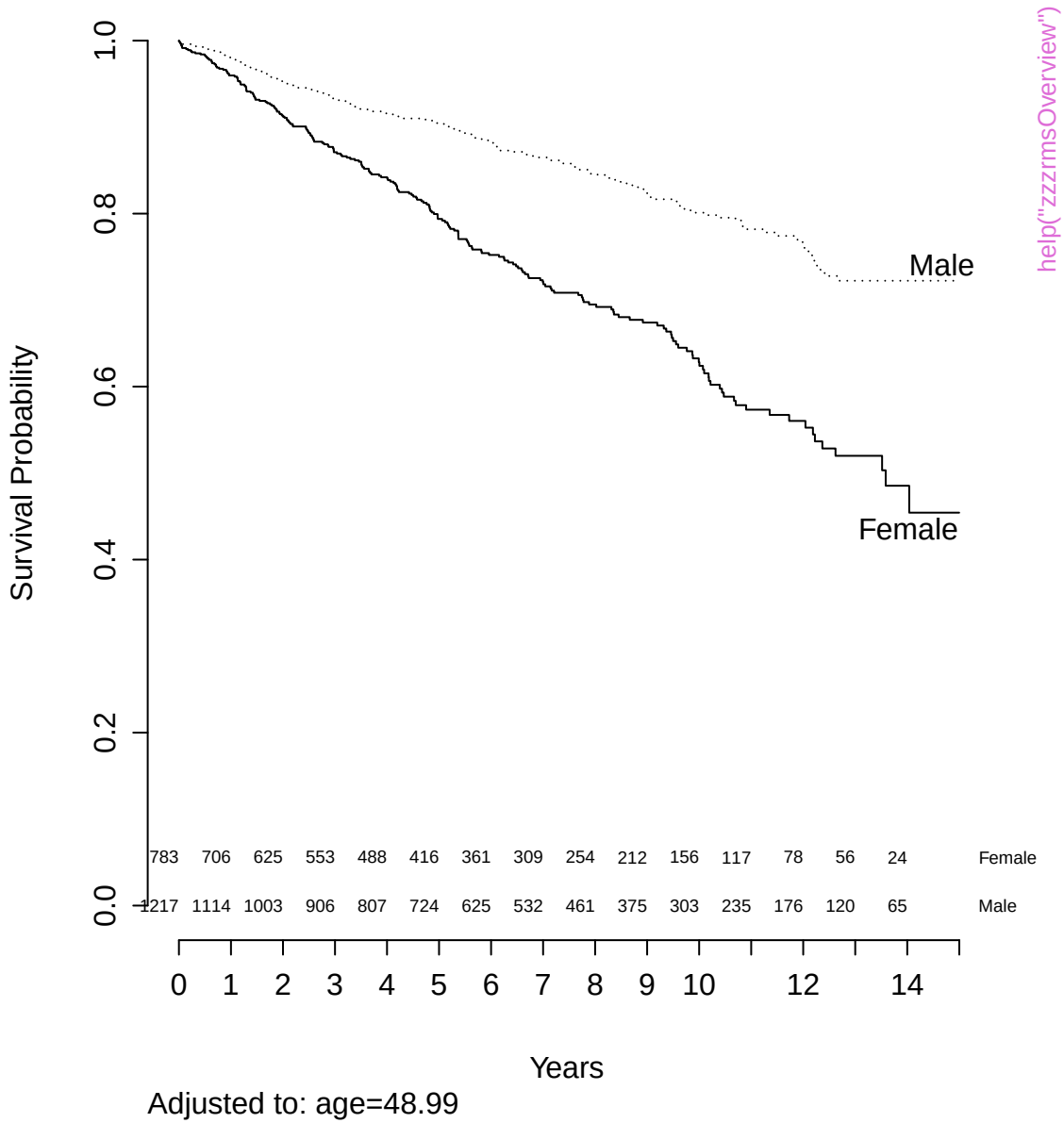

weight:250
cholesterol:170
weight:250
cholesterol:200
weight:250
cholesterol:230
weight:200
cholesterol:170
weight:200
cholesterol:200
weight:200
cholesterol:230
weight:150
cholesterol:170
weight:150
cholesterol:200
weight:150
cholesterol:230
log odds
Age
Adjusted to:num.diseases=2 sex=male
help("zzzrmsOverview")

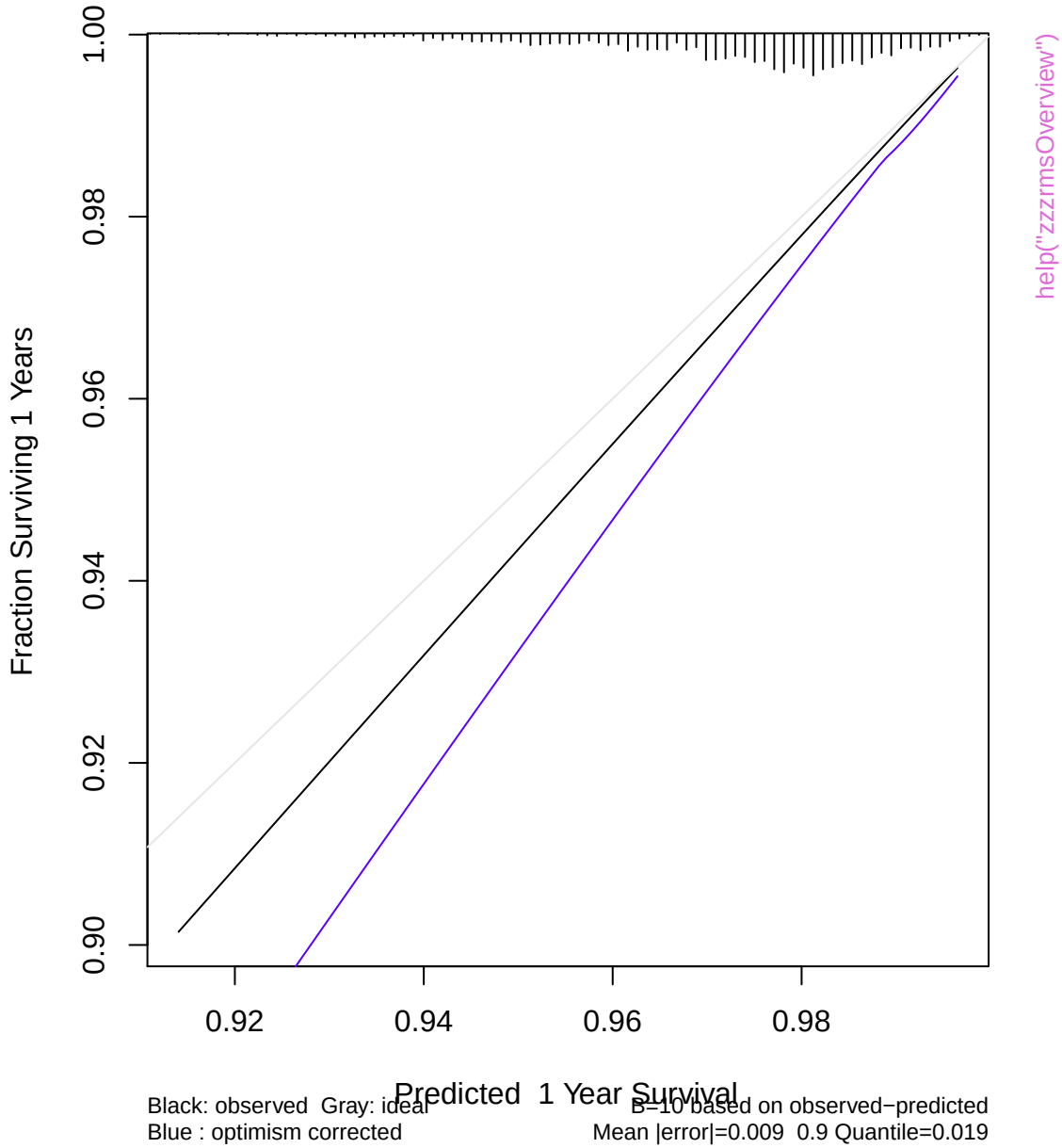

71.057
62.638
58.202
54.339
50.992
47.600
44.784
41.237
36.723
28.219
Age
−6
−4
−2
log[−log S(3)]
help("zzzrmsOverview")

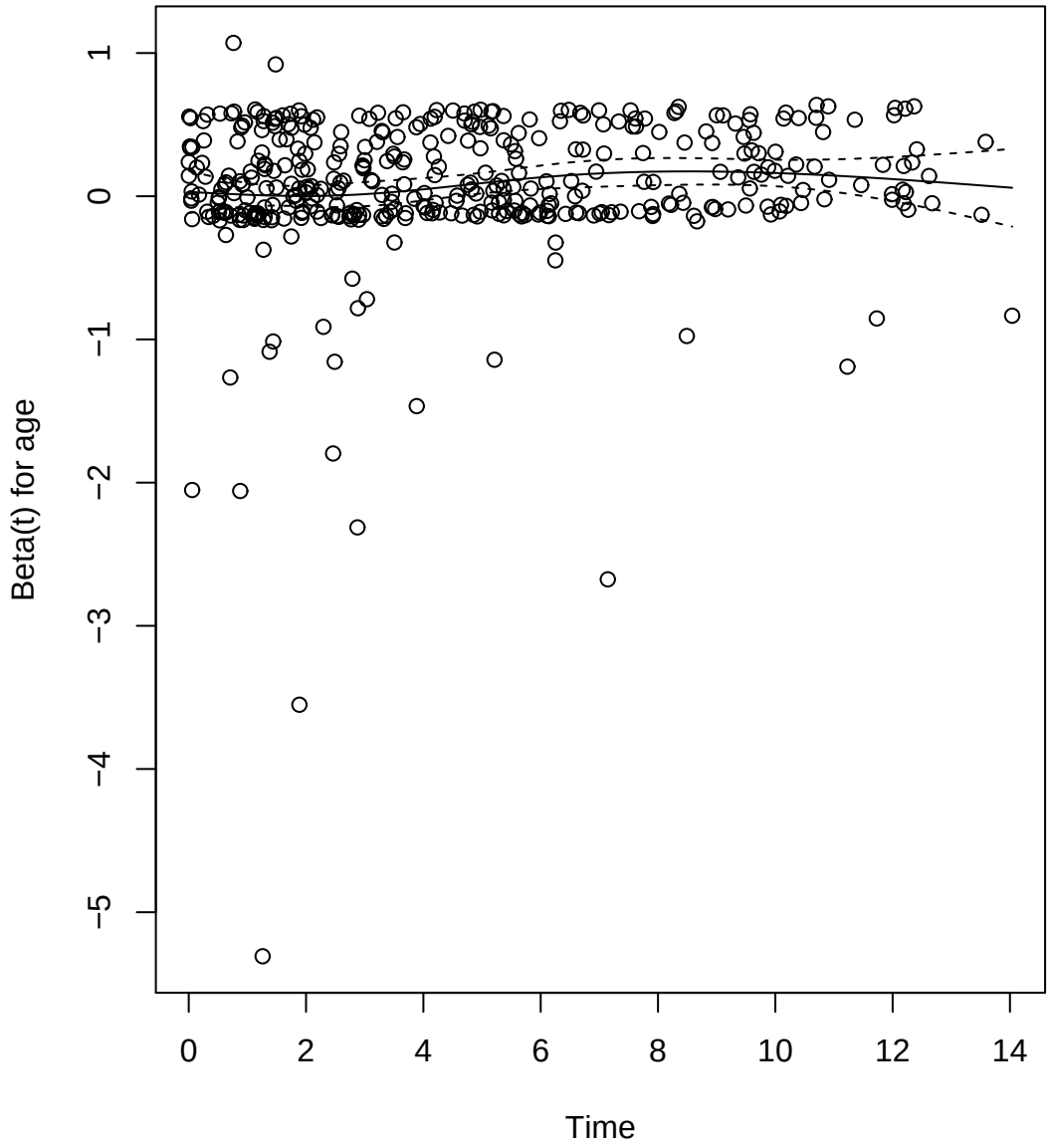


help("zzzrmsOverview")

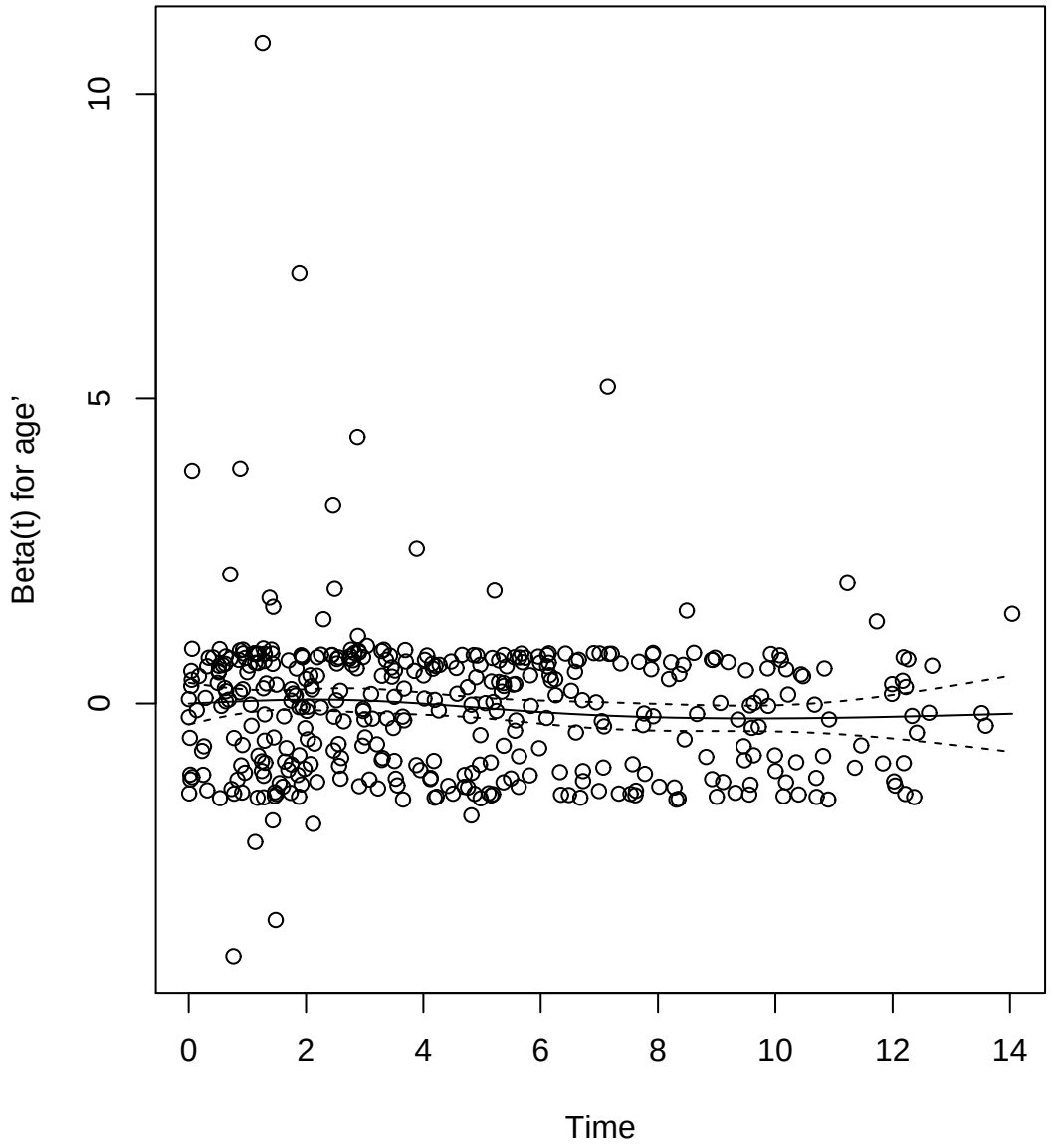

Female
Male
30
40
50
60
70
−2
−3
−4
−5
−6
−7
yhat
agen
help("zzzrmsOverview")


help("zzrmsOverview")
Survival Probability
1.0
0.8
0.6
0.4
0.2
0.0
Male
Female
783 706 625 553 488 416 361 309 254 212 156 117 78 56 24 Female
1217 1114 1003 906 807 724 625 532 461 375 303 235 176 120 65 Male
0 1 2 3 4 5 6 7 8 9 10 12 14
Years
Adjusted to: age=48.99

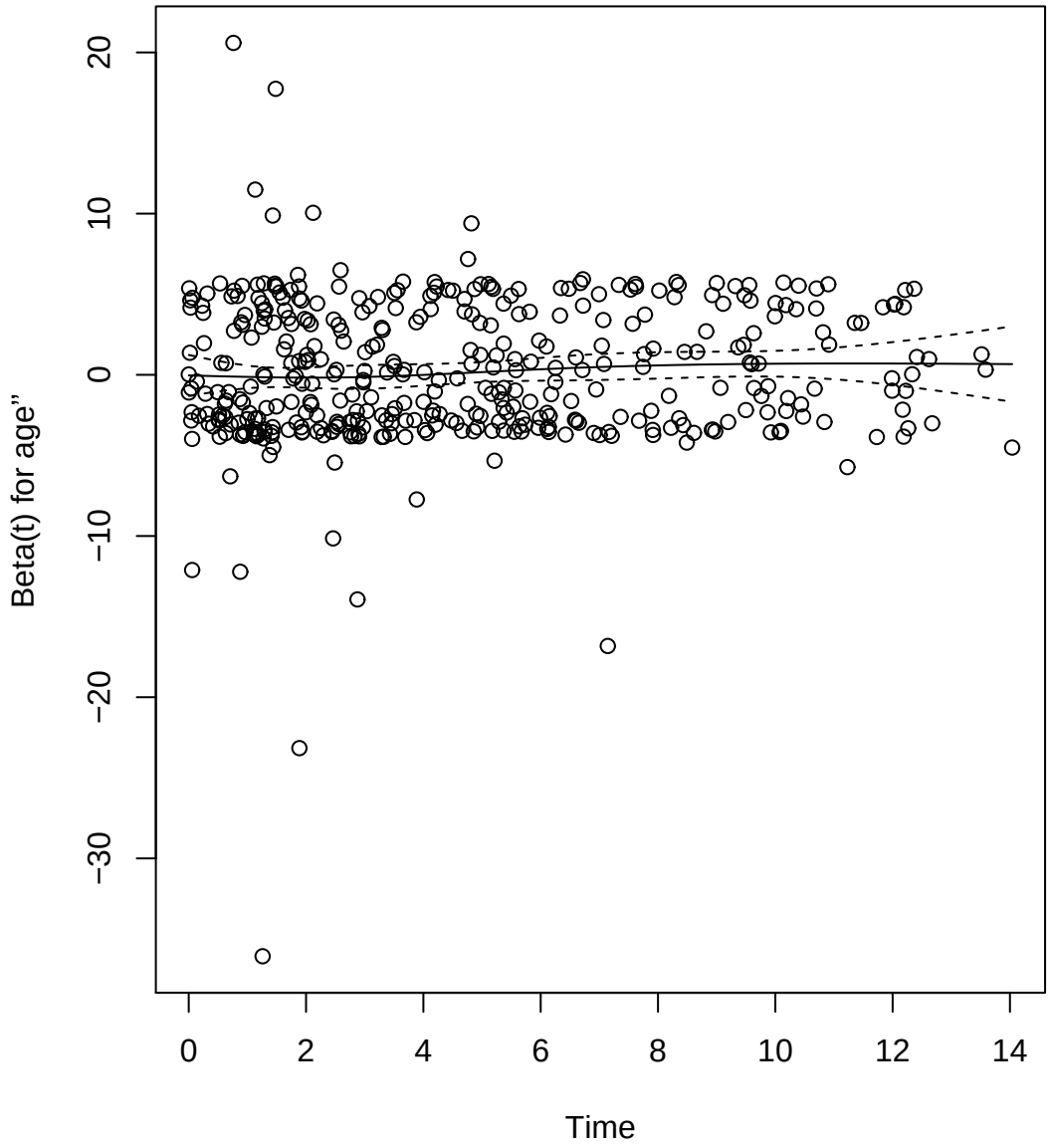

Fraction Surviving 1 Years
1.00
0.98
0.96
0.94
0.92
0.90
0.92
0.94
0.96
0.98
Predicted 1 Year Survival
help("zzrmsOverview")
Black: observed Gray: ideal
Blue : optimism corrected
B=10 based on observed−predicted
Mean |error|=0.009 0.9 Quantile=0.019



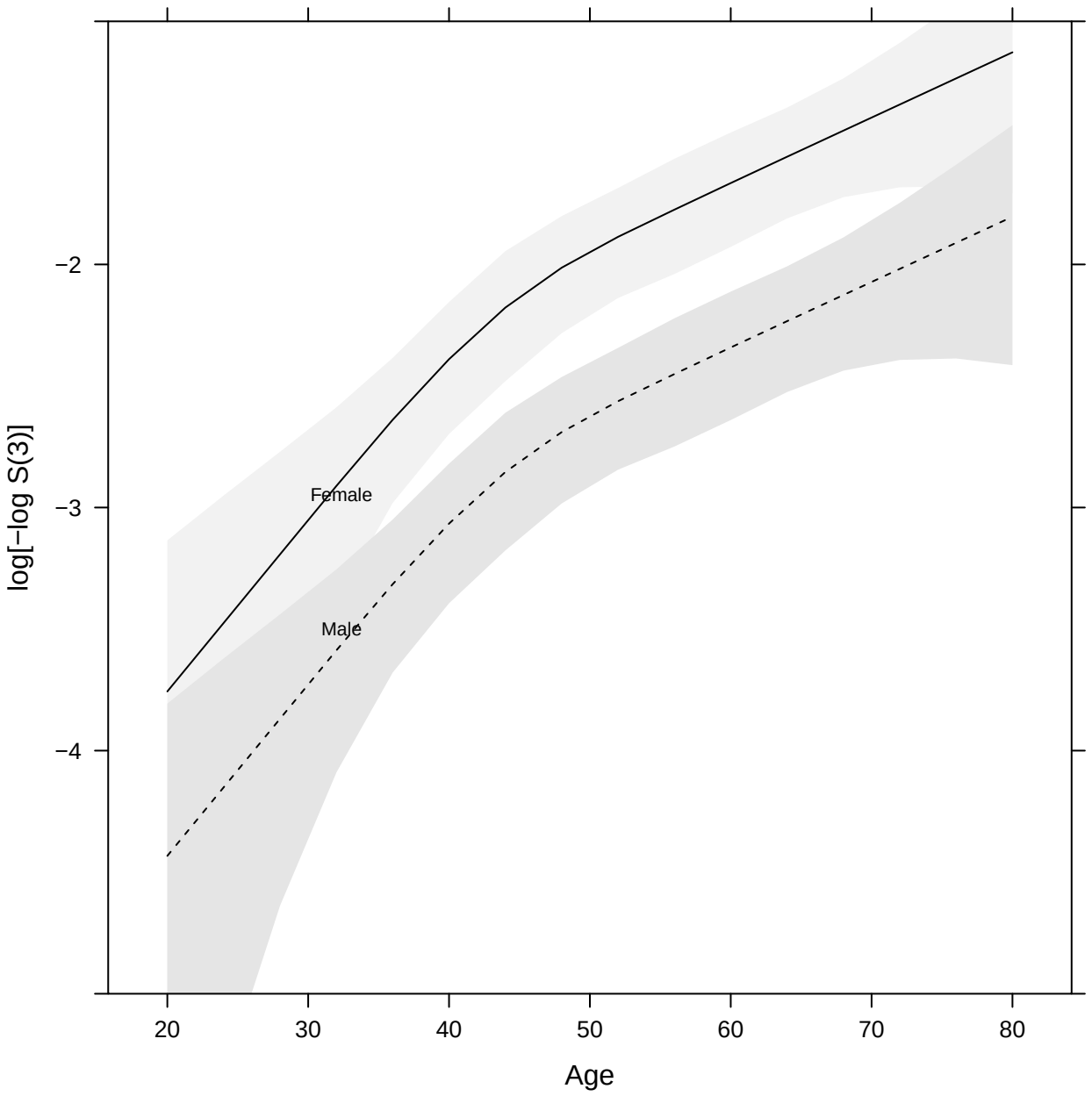
help("zzzrmsOverview")



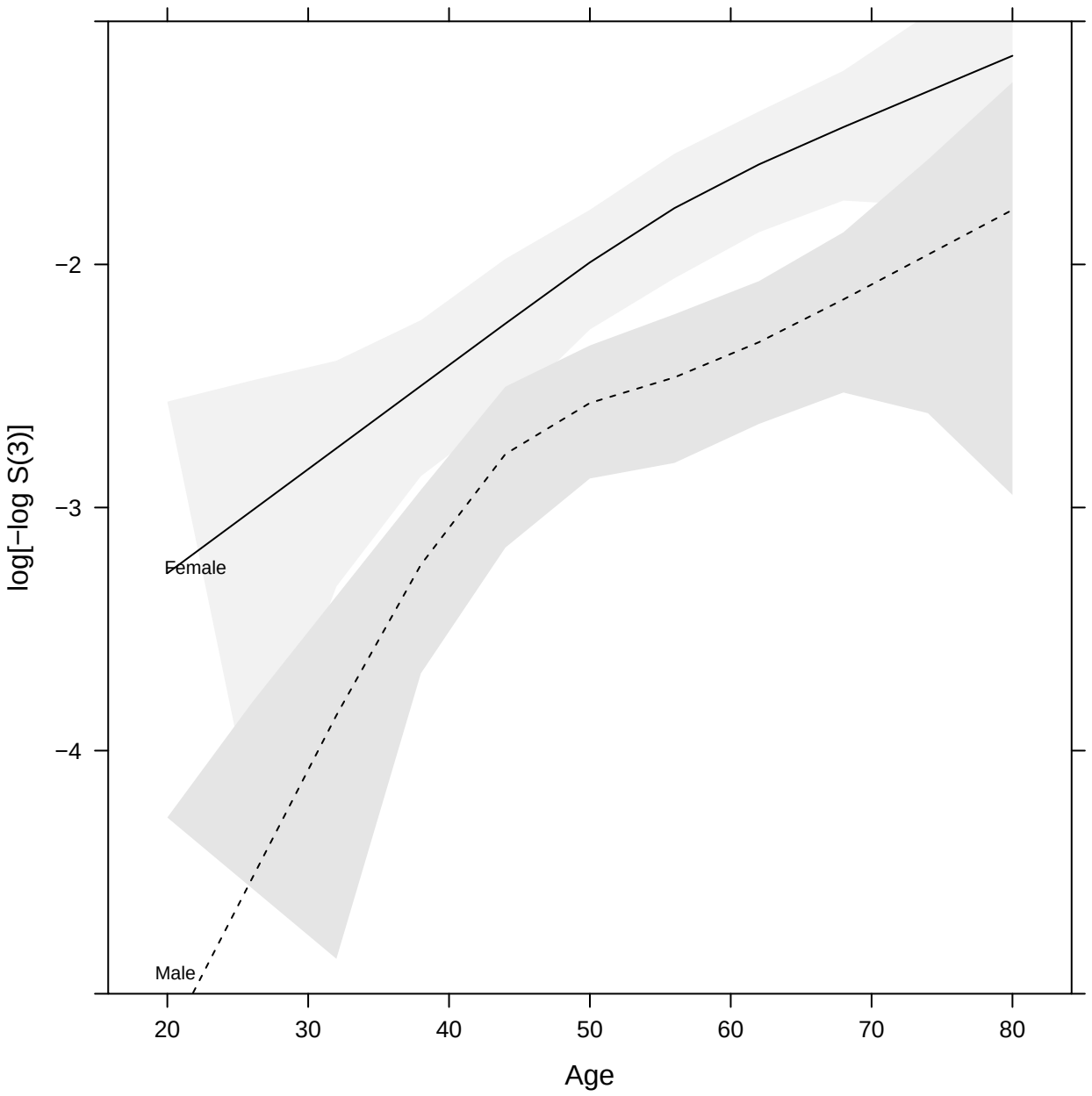
help("zzzrmsOverview")



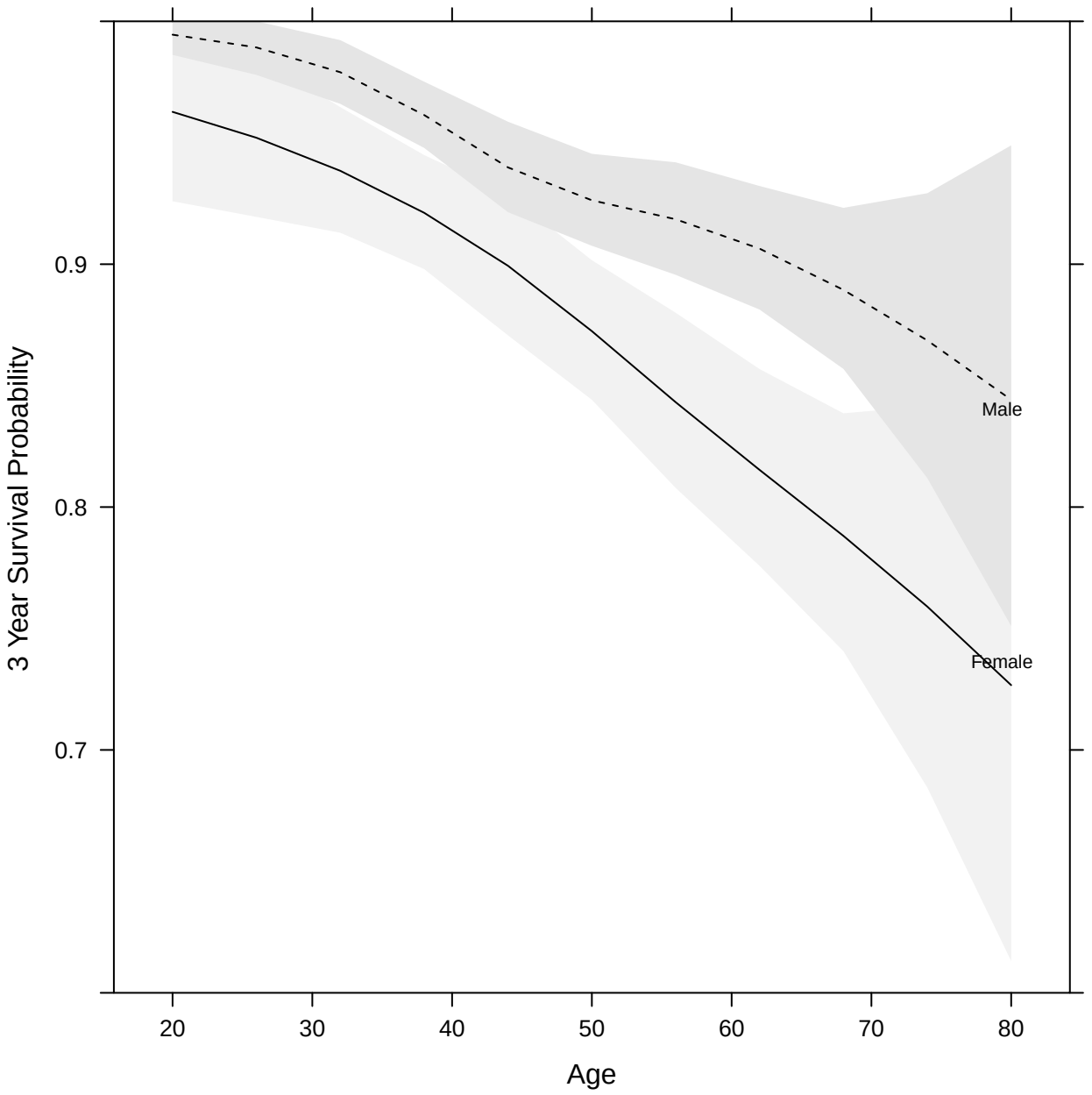
help("zzzrmsOverview")



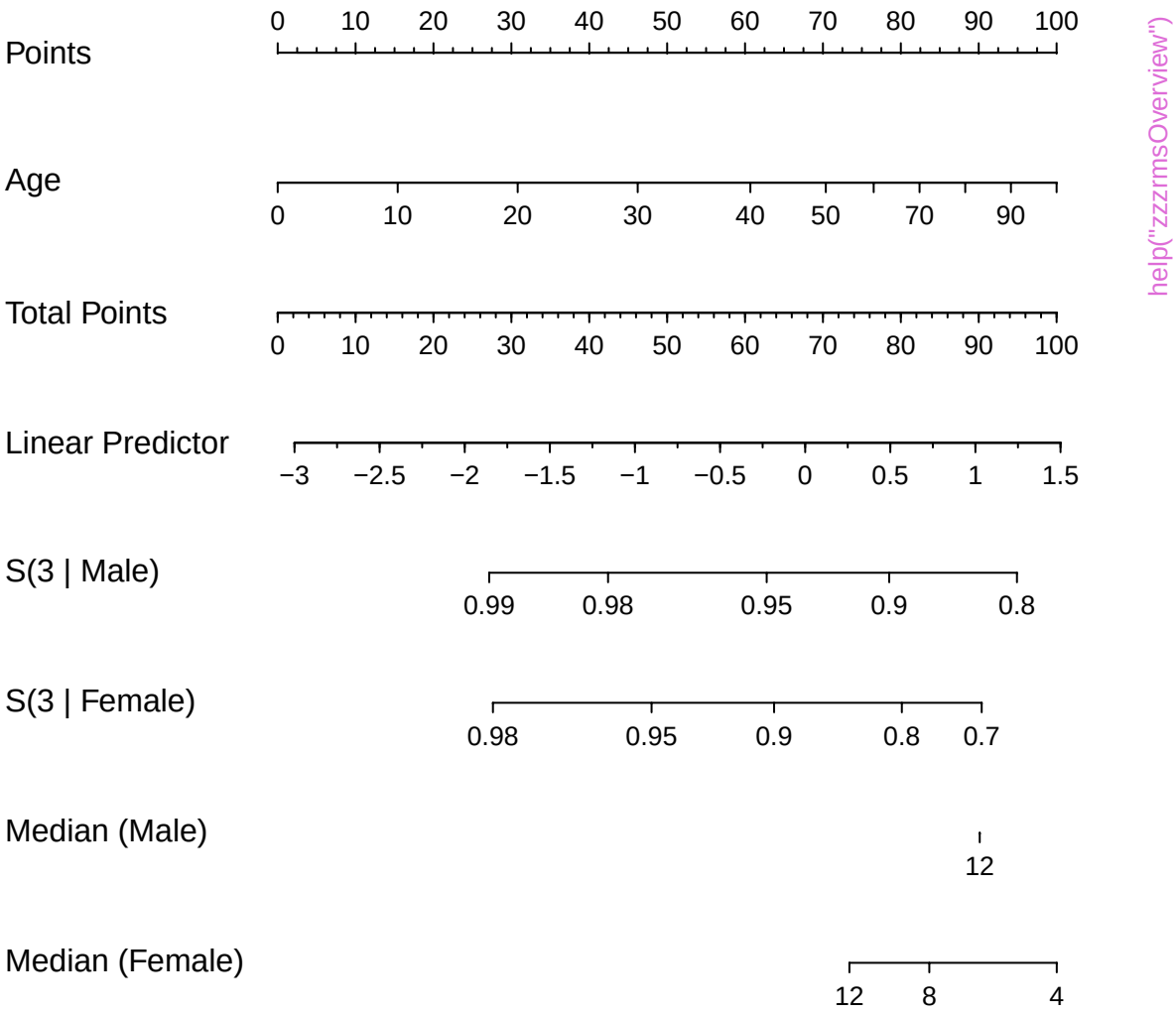
help("zzzrmsOverview")

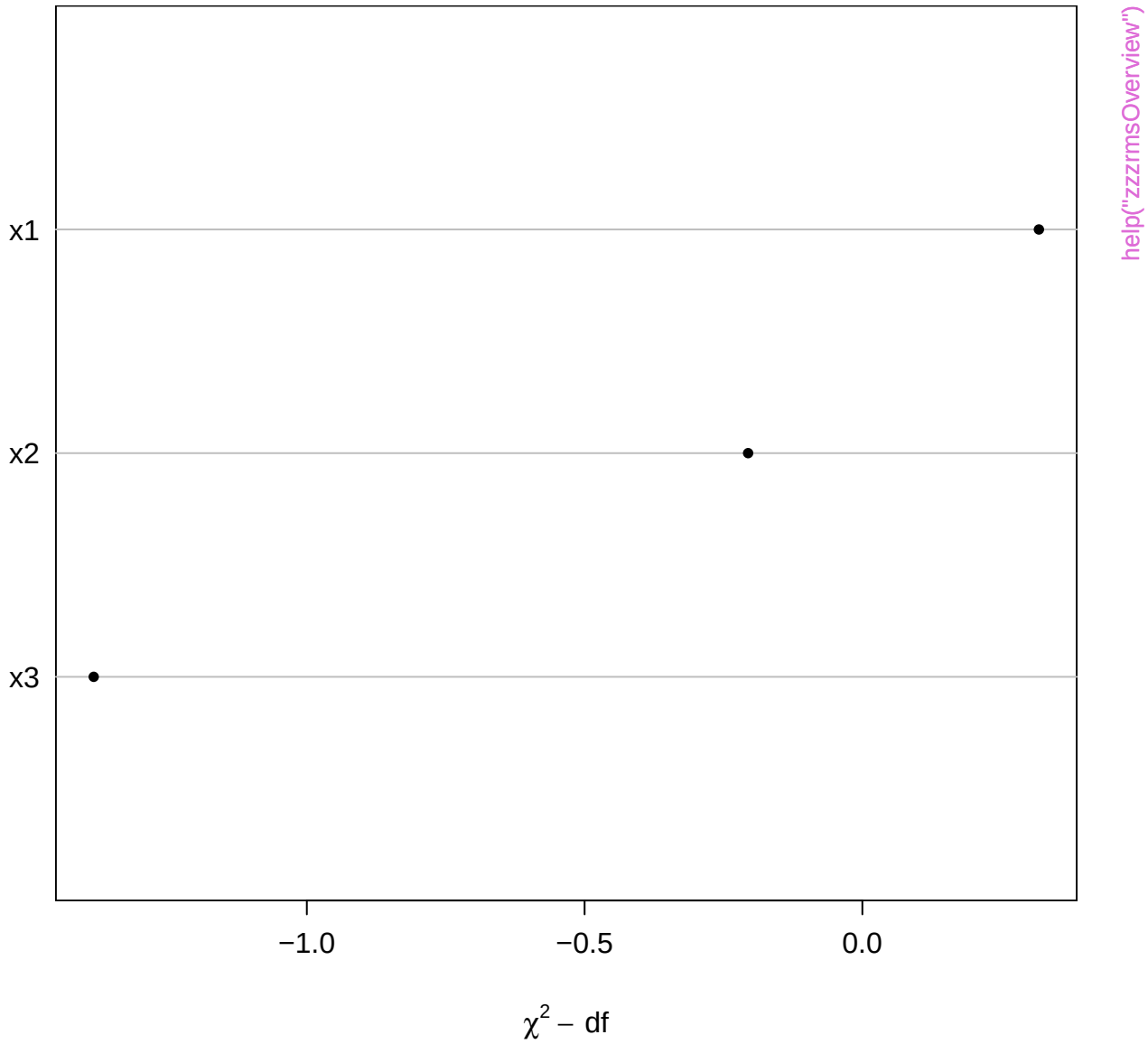


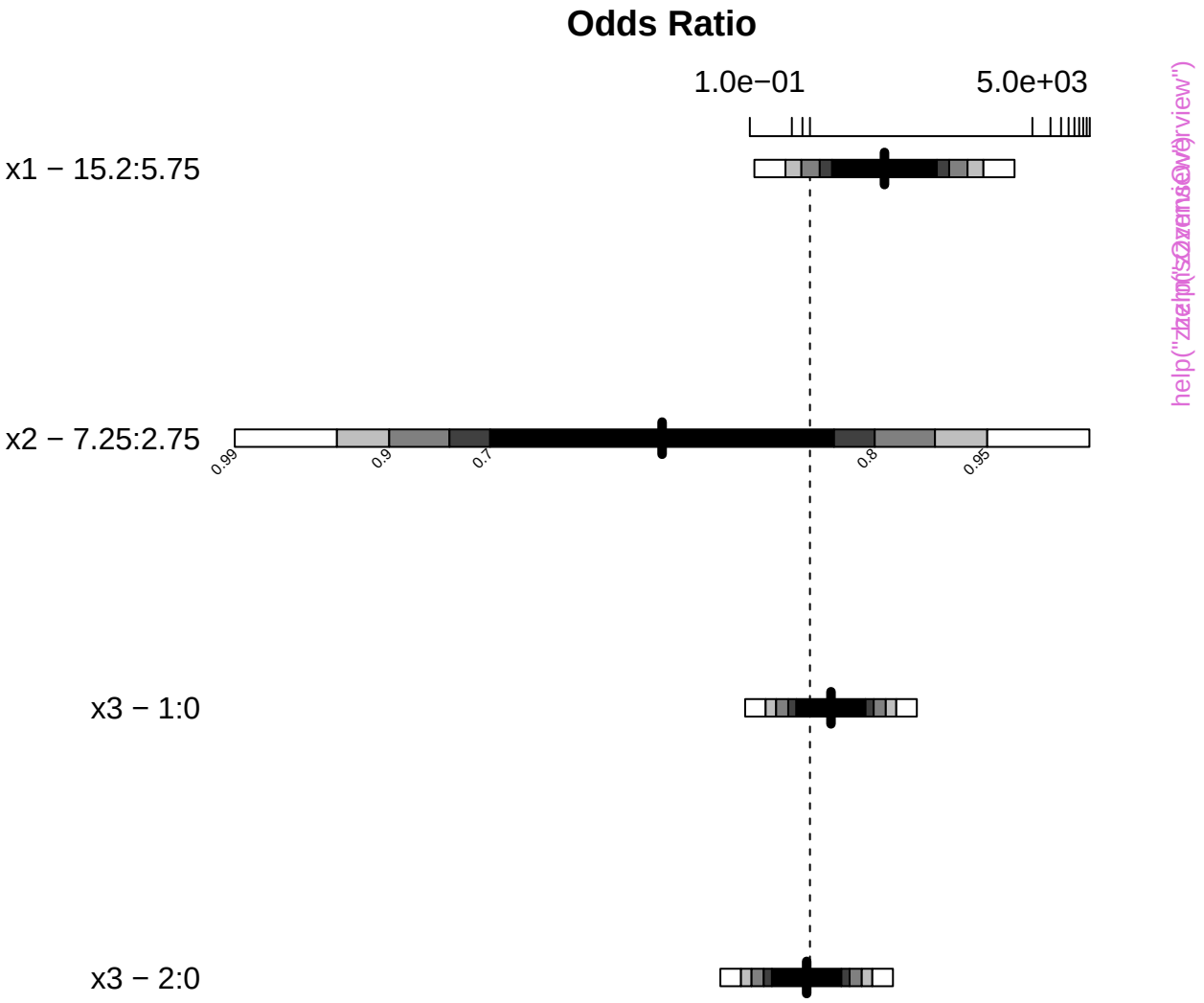
help("zzzrmsOverview")

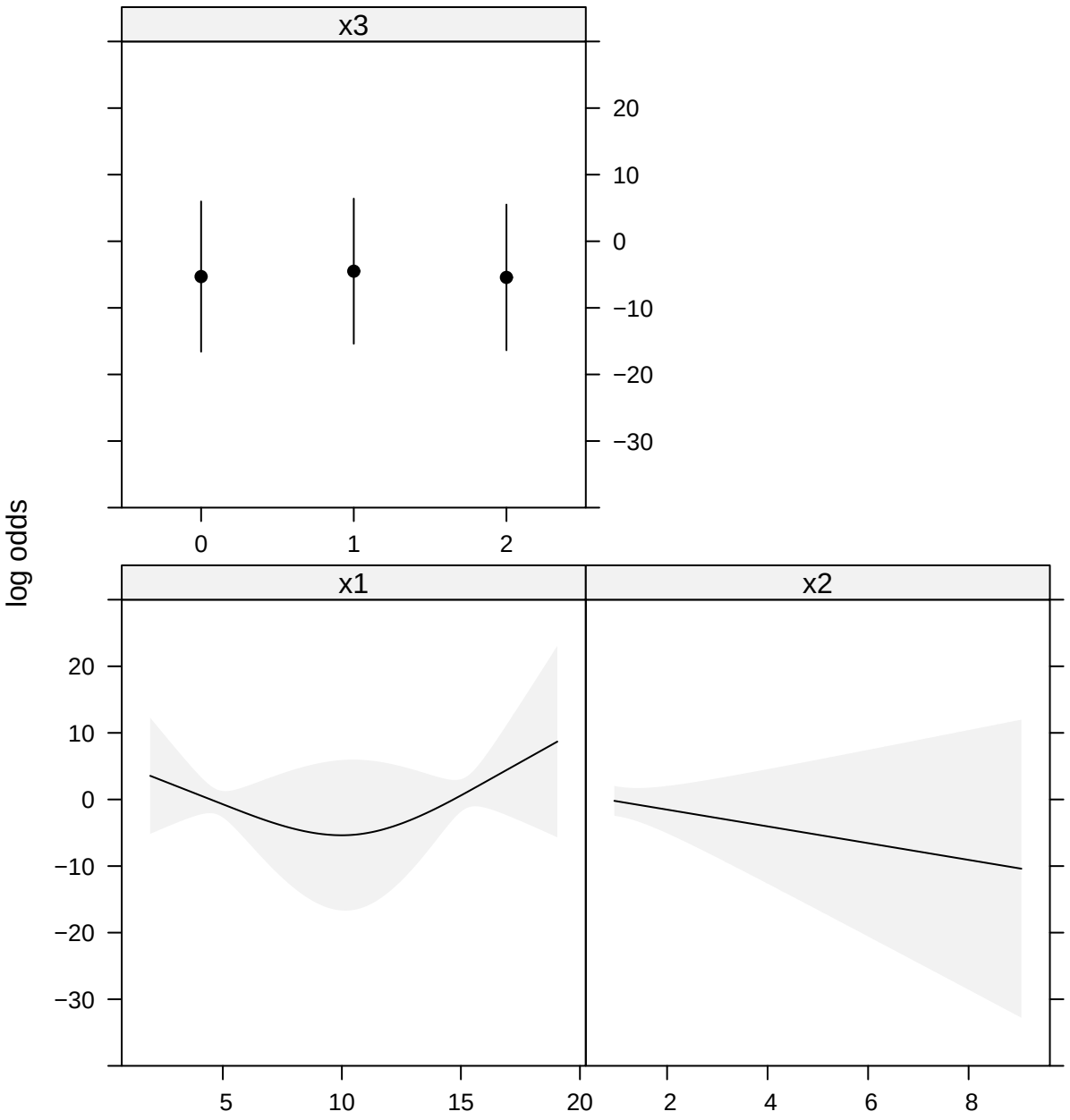


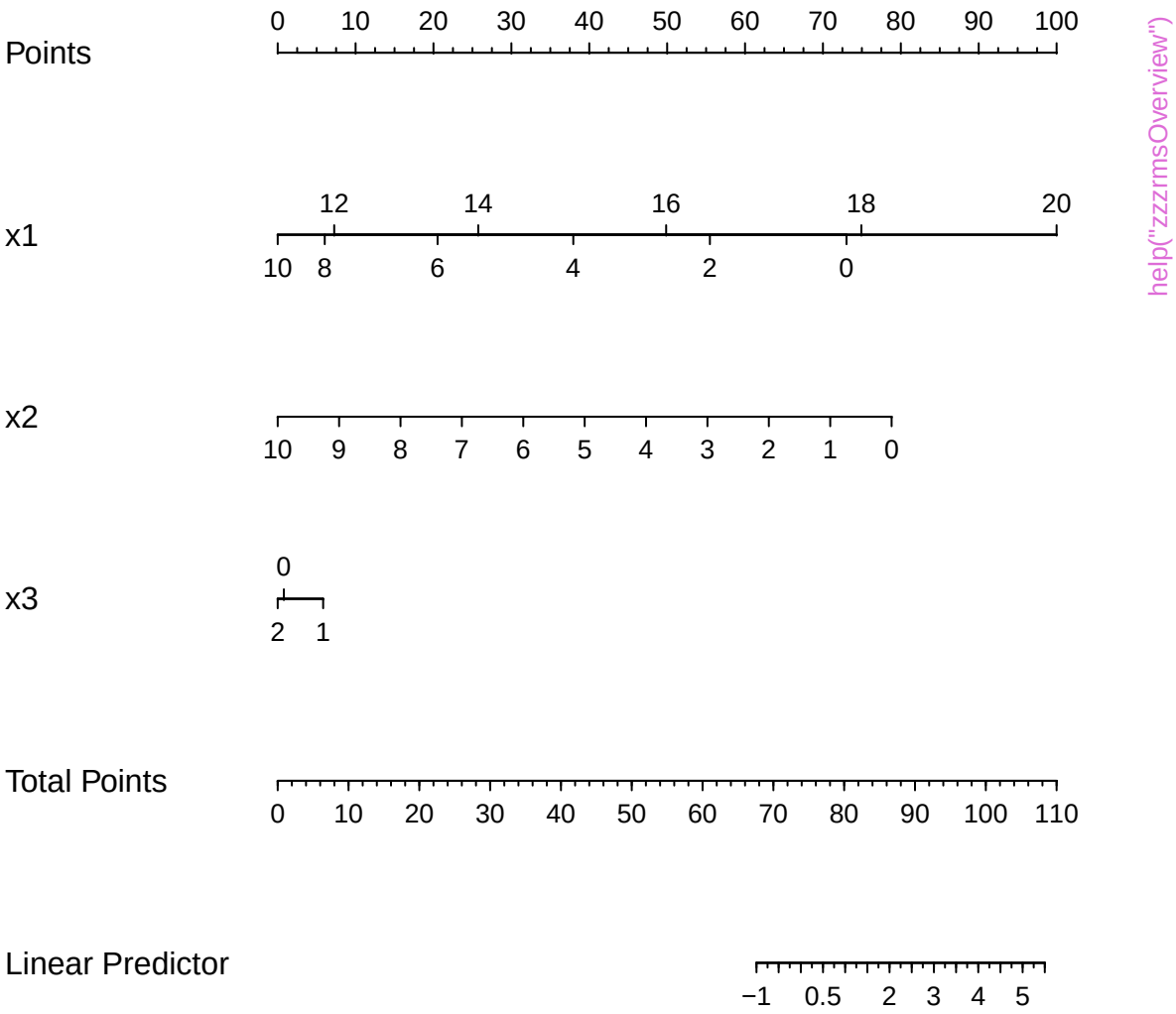
help("zzzrmsOverview")

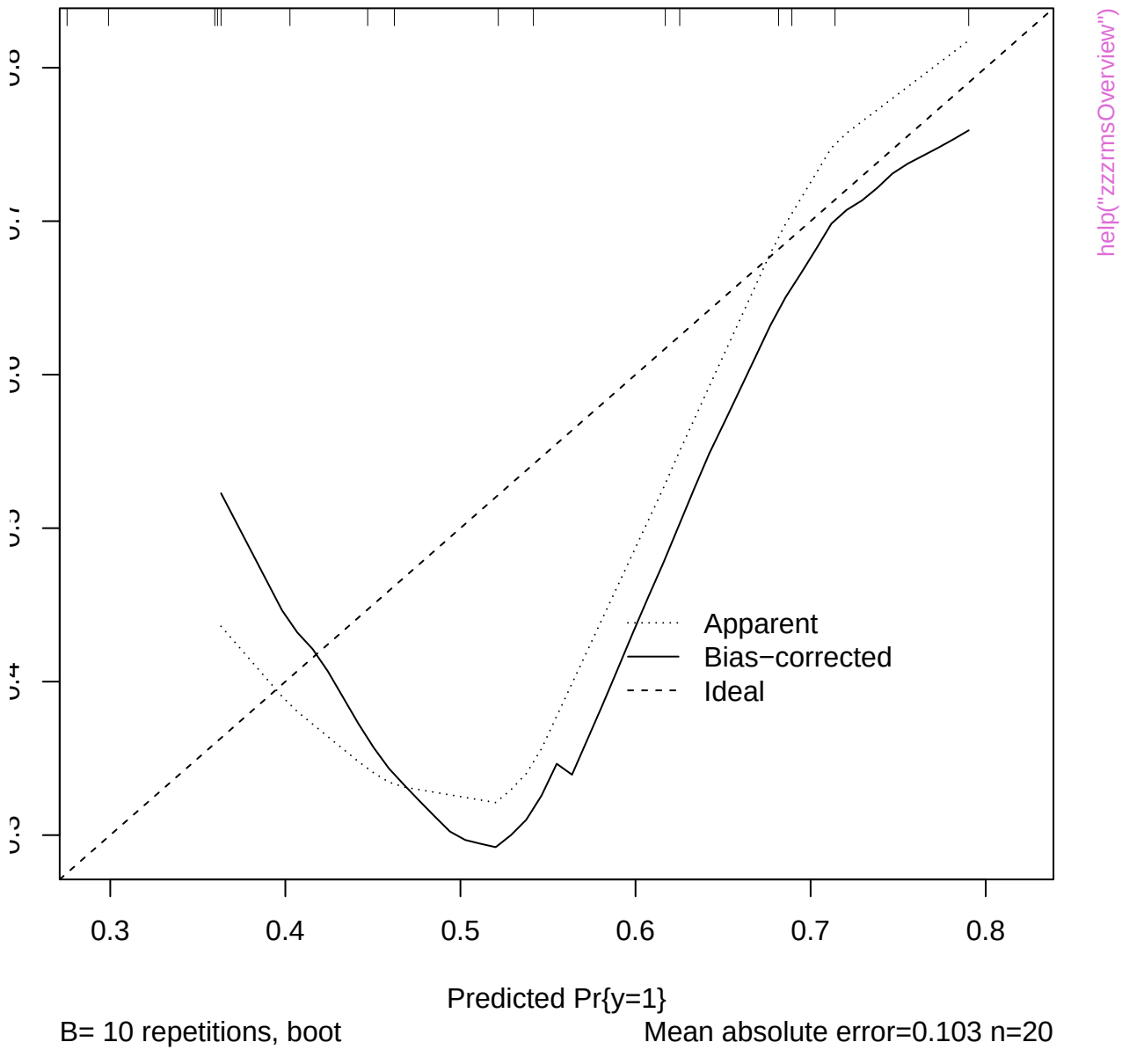

Points
0 10 20 30 40 50 60 70 80 90 100
Age
0 10 20 30 40 50 70 90
Total Points
0 10 20 30 40 50 60 70 80 90 100
Linear Predictor
−3 −2.5 −2 −1.5 −1 −0.5 0 0.5 1 1.5
S(3 | Male)
0.99 0.98 0.95 0.9 0.8
S(3 | Female)
0.98 0.95 0.9 0.8 0.7
Median (Male)
12
Median (Female)
12 8 4
help("zzrmsOverview")

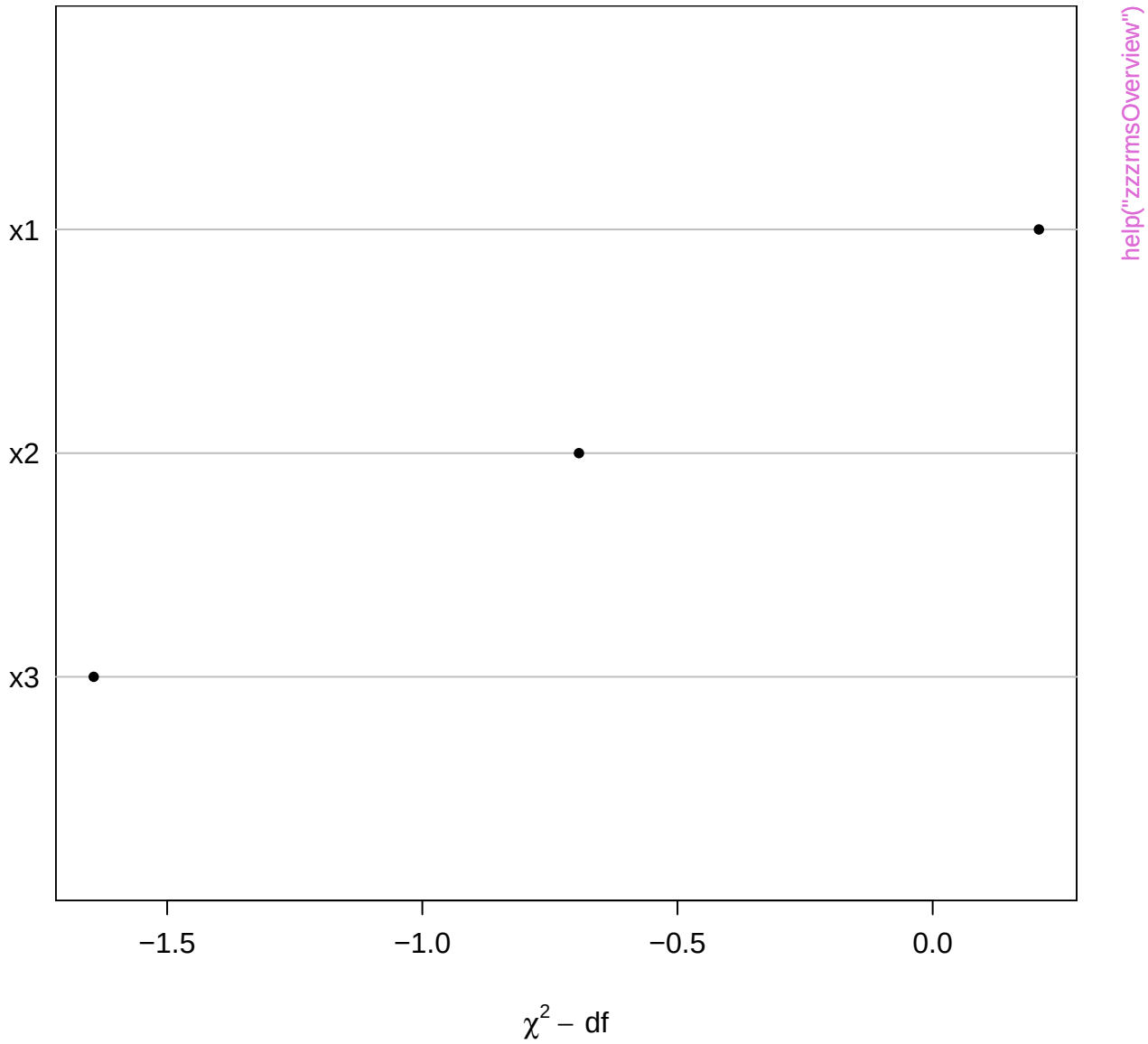

x1
x2
x3
−1.0
−0.5
0.0
χ² − df
help("zzrmsOverview")

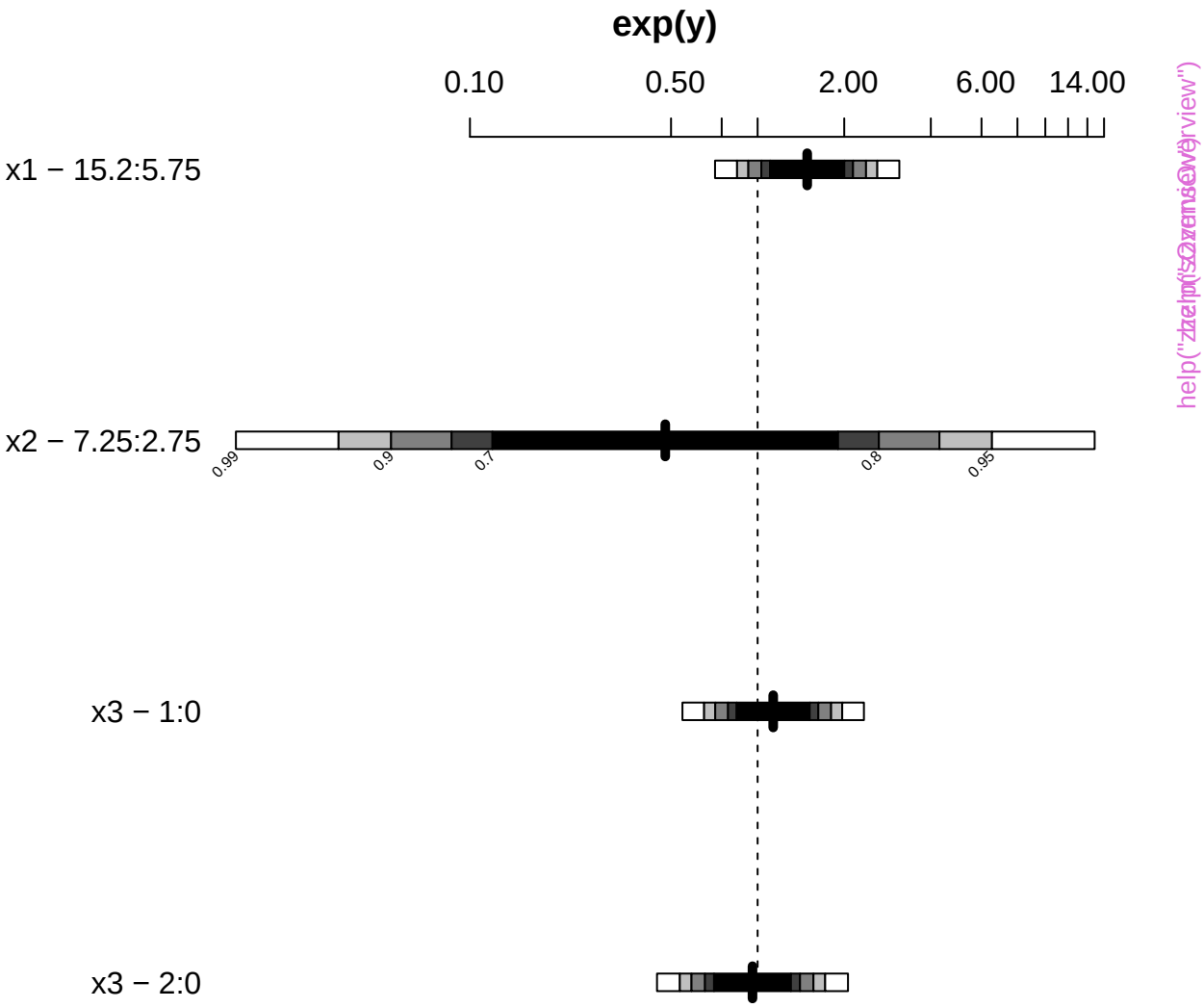

Odds Ratio
1.0e−01
5.0e+03
x1 − 15.2:5.75
x2 − 7.25:2.75
0.99
0.9
0.7
0.8
0.95
x3 − 1:0
x3 − 2:0

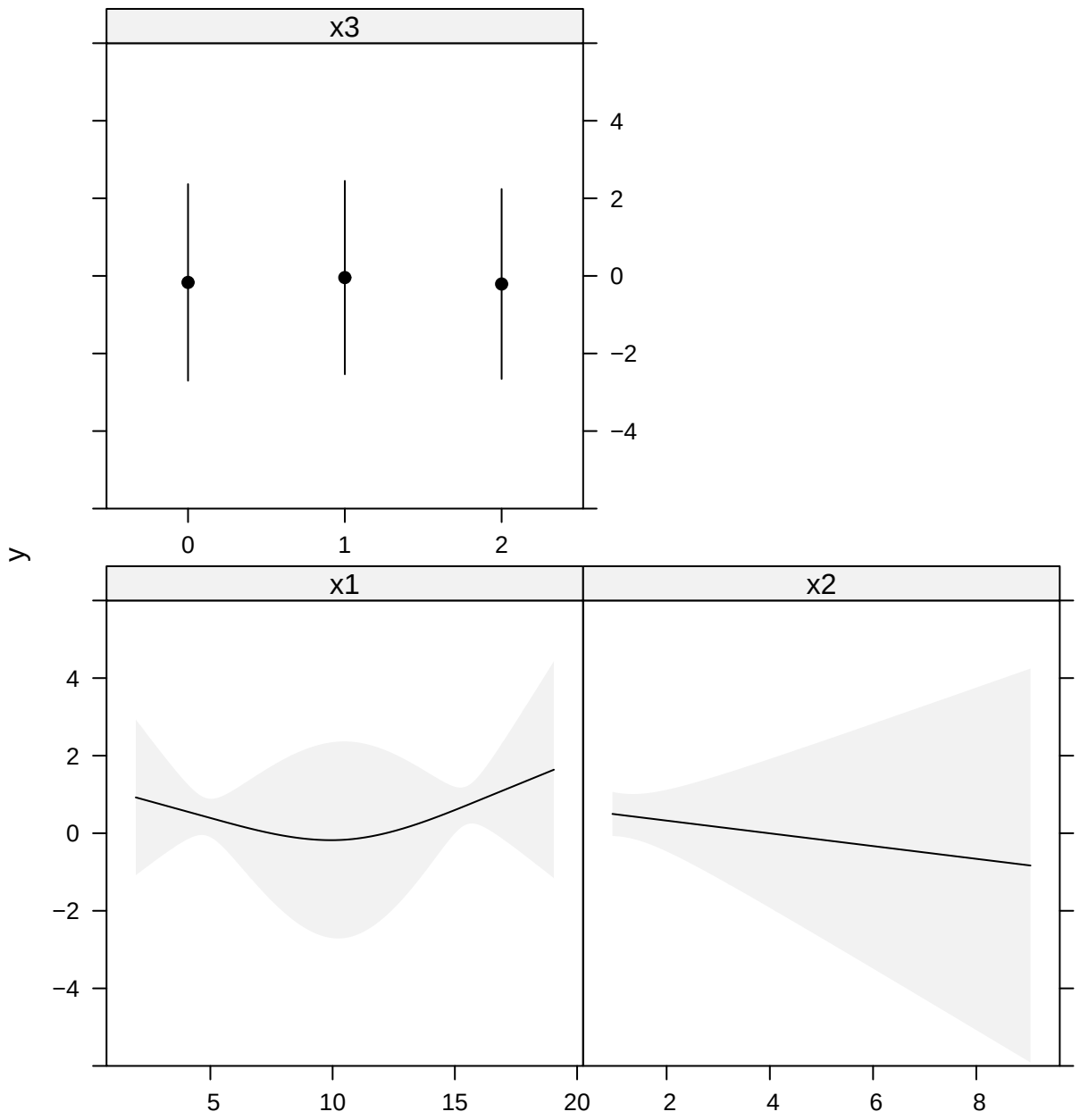



Points
0 10 20 30 40 50 60 70 80 90 100
x1
12 14 16 18 20
10 8 6 4 2 0
x2
10 9 8 7 6 5 4 3 2 1 0
x3
0
2 1
Total Points
0 10 20 30 40 50 60 70 80 90 100 110
Linear Predictor
−1 0.5 2 3 4 5
help("zzrmsOverview")

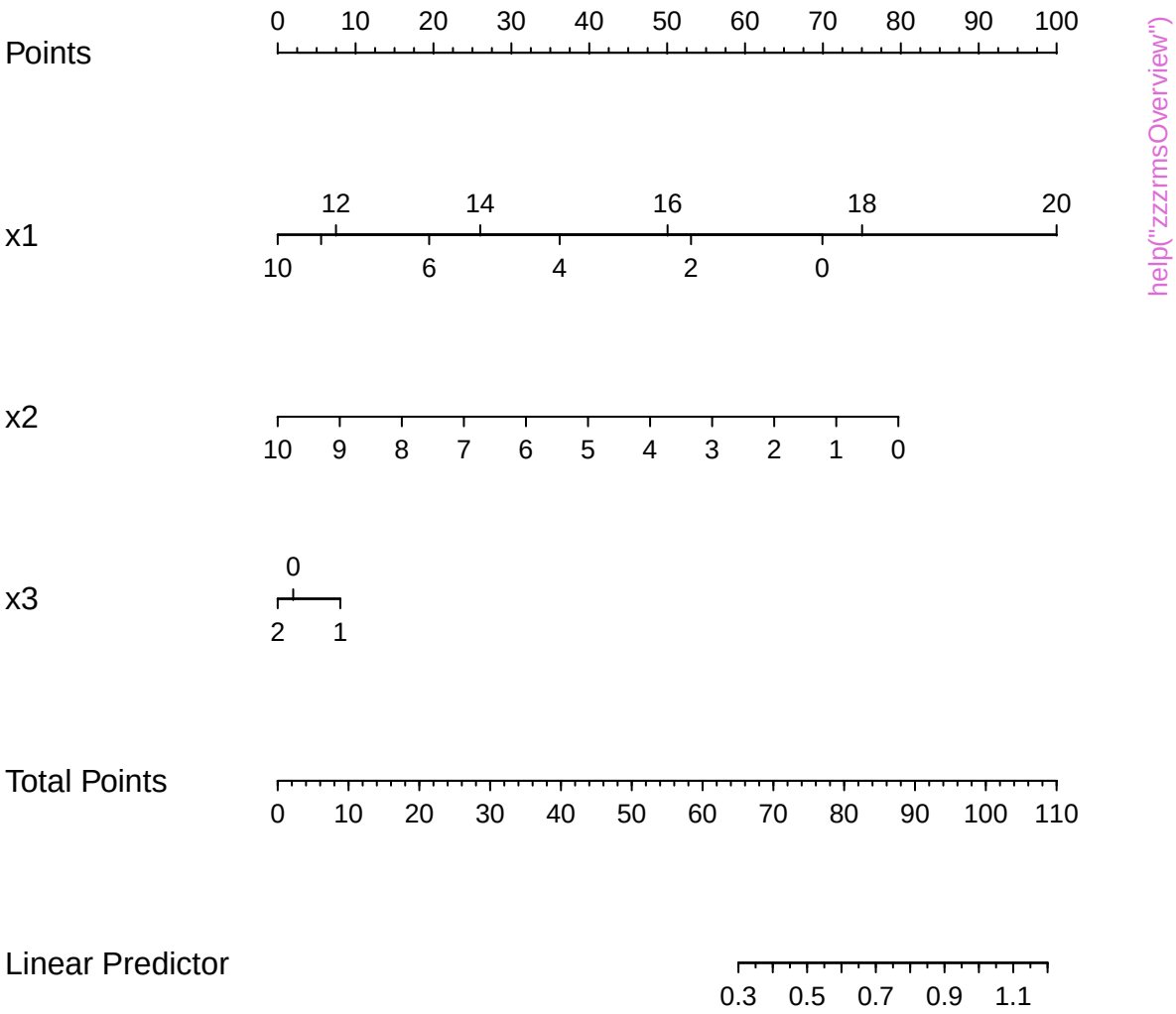

help("zzrmsOverview")
Apparent
Bias−corrected
Ideal
0.3
0.4
0.5
0.6
0.7
0.8
Predicted Pr{y=1}
B= 10 repetitions, boot
Mean absolute error=0.103 n=20

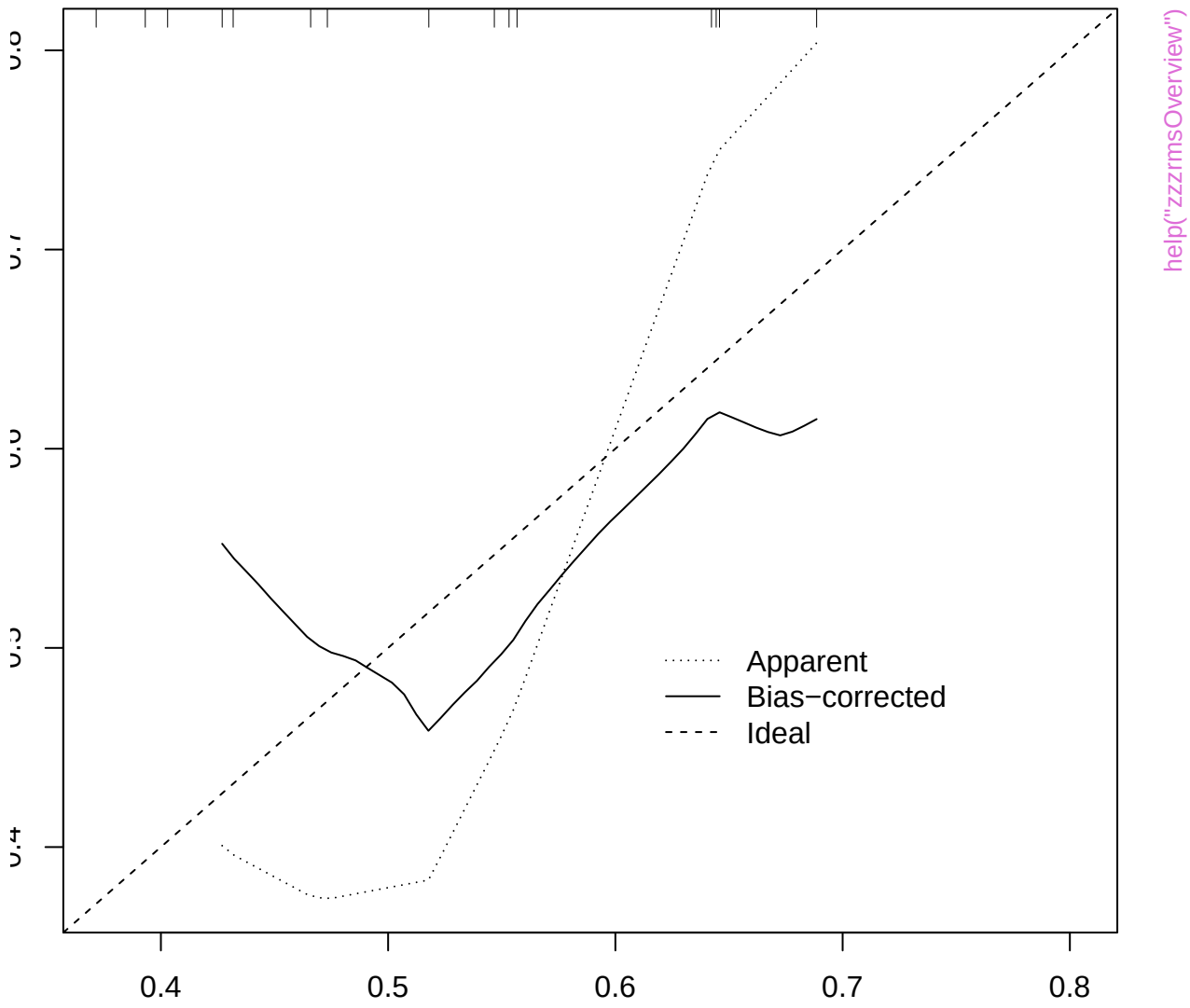

x1
x2
x3
−1.5
−1.0
−0.5
0.0
χ^2 − df
help("zzrmsOverview")

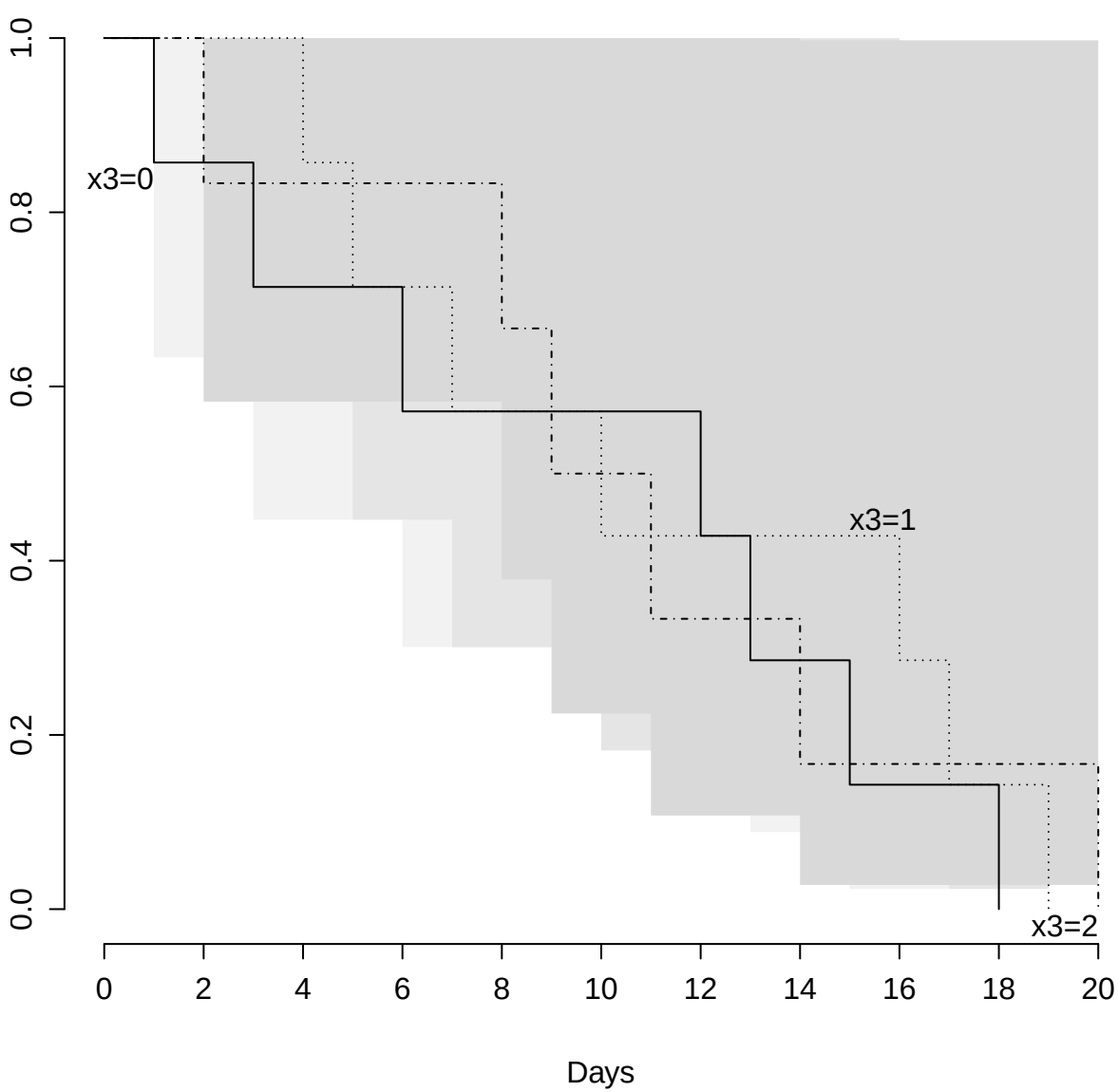

exp(y)
0.10
0.50
2.00
6.00
14.00
x1 − 15.2:5.75
x2 − 7.25:2.75
0.99
0.9
0.7
0.8
0.95
x3 − 1:0
x3 − 2:0



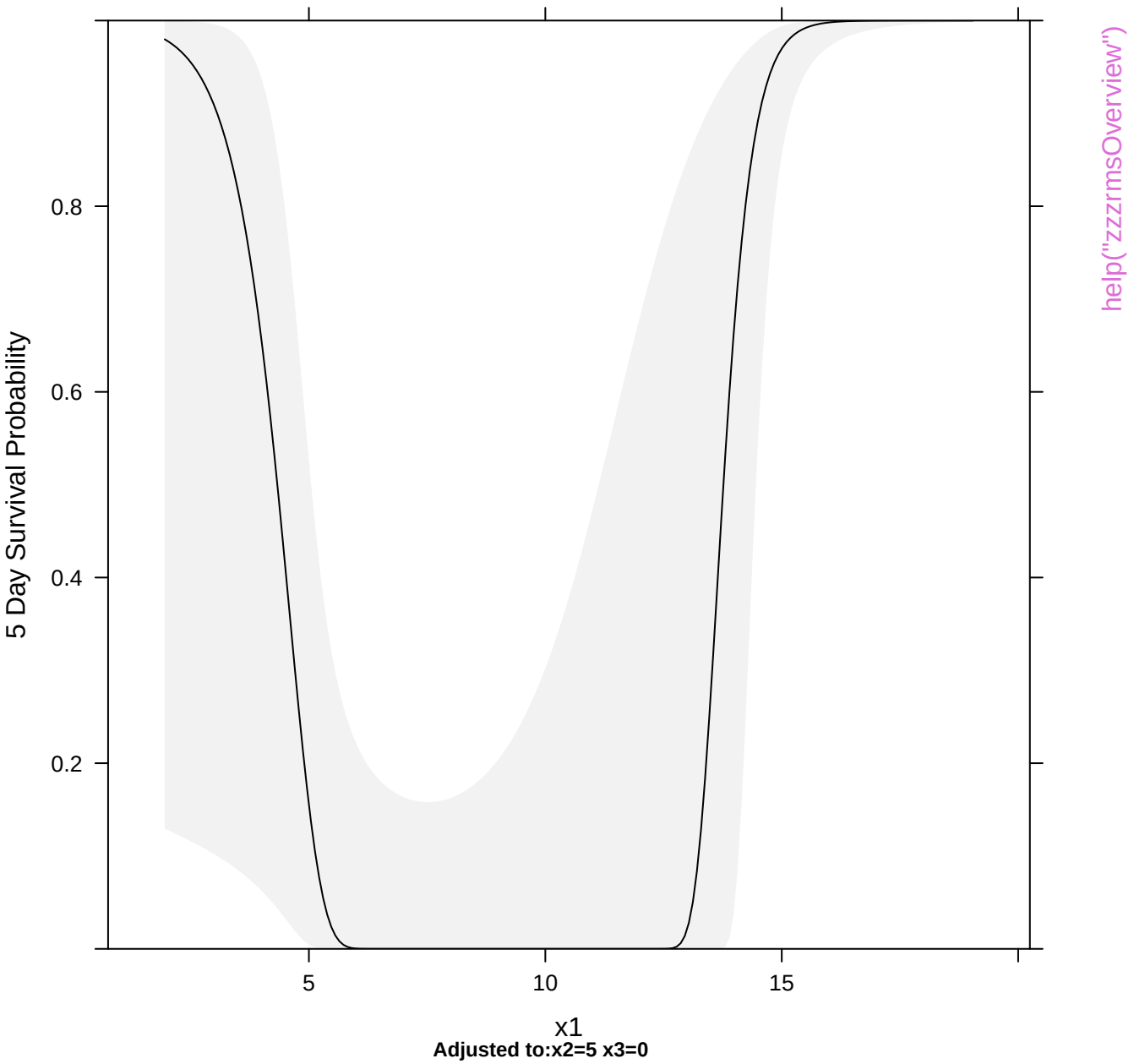
help("zzzrmsOverview")


Points
0 10 20 30 40 50 60 70 80 90 100
x1
12 14 16 18 20
10 6 4 2 0
x2
10 9 8 7 6 5 4 3 2 1 0
x3
0
2 1
Total Points
0 10 20 30 40 50 60 70 80 90 100 110
Linear Predictor
0.3 0.5 0.7 0.9 1.1
help("zzrmsOverview")

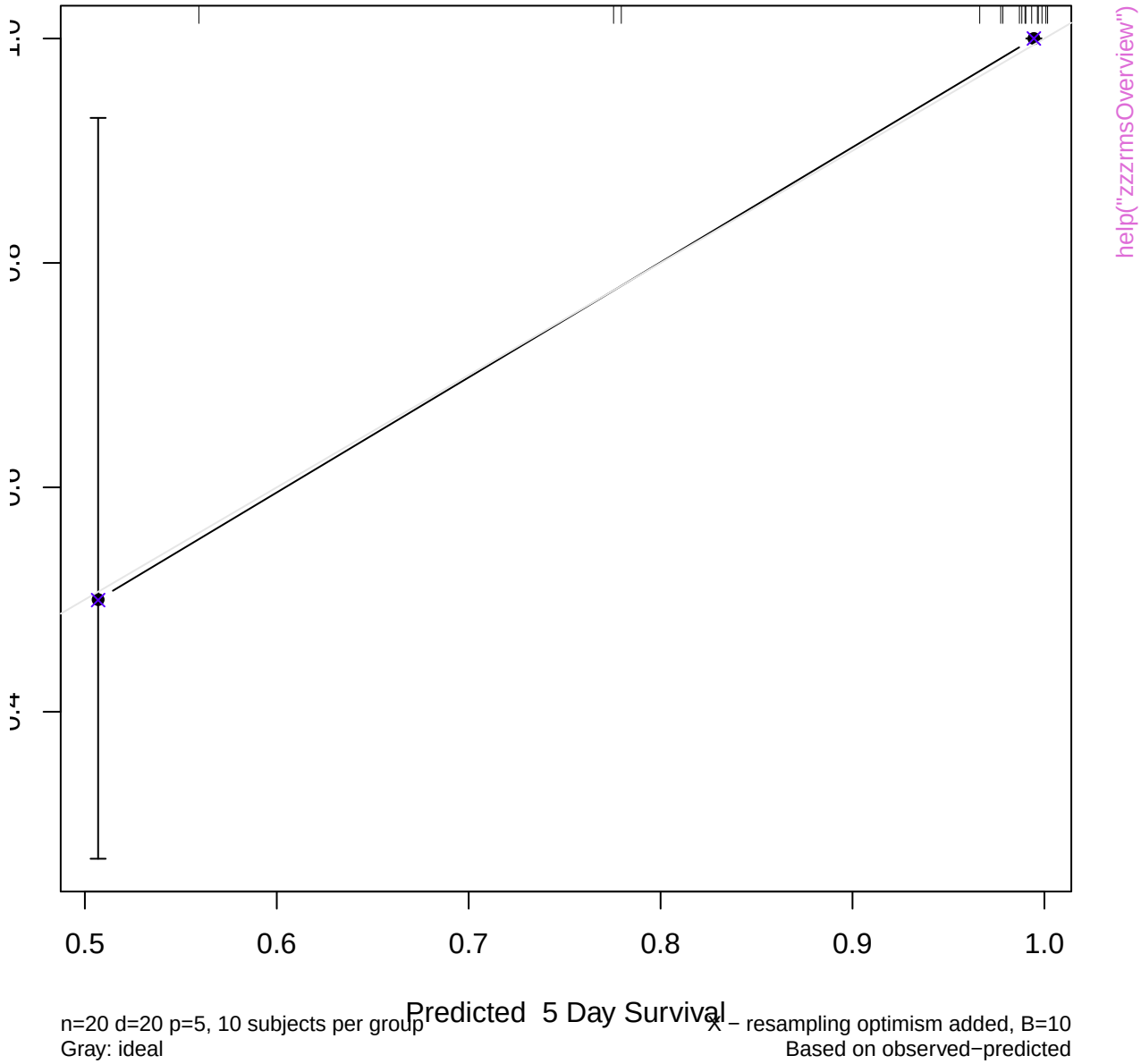

help("zzrmsOverview")
0.4
0.5
0.6
0.7
0.8
Predicted y
Apparent
Bias−corrected
Ideal
B= 10 repetitions, boot
Mean absolute error=0.056 n=20

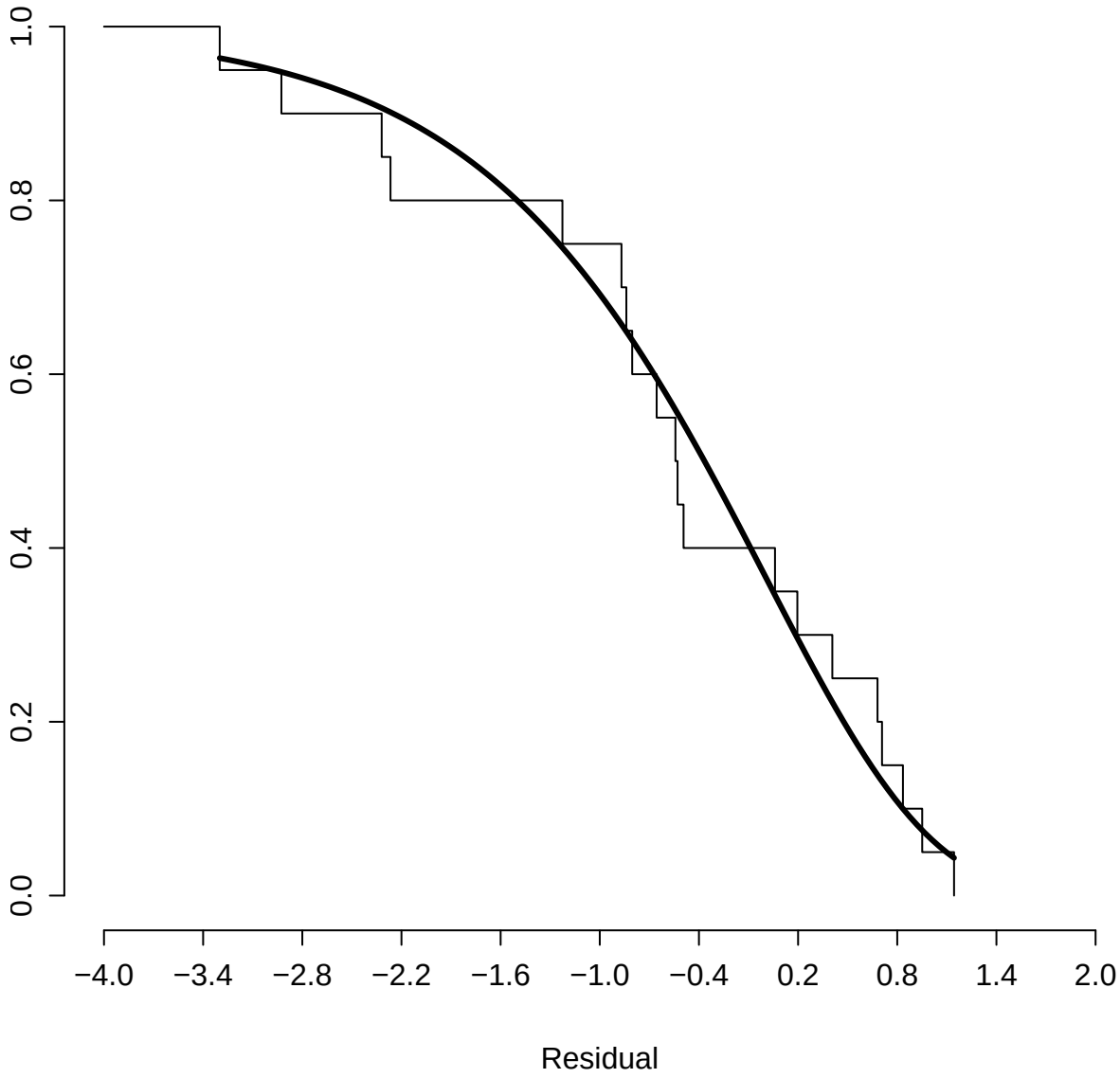


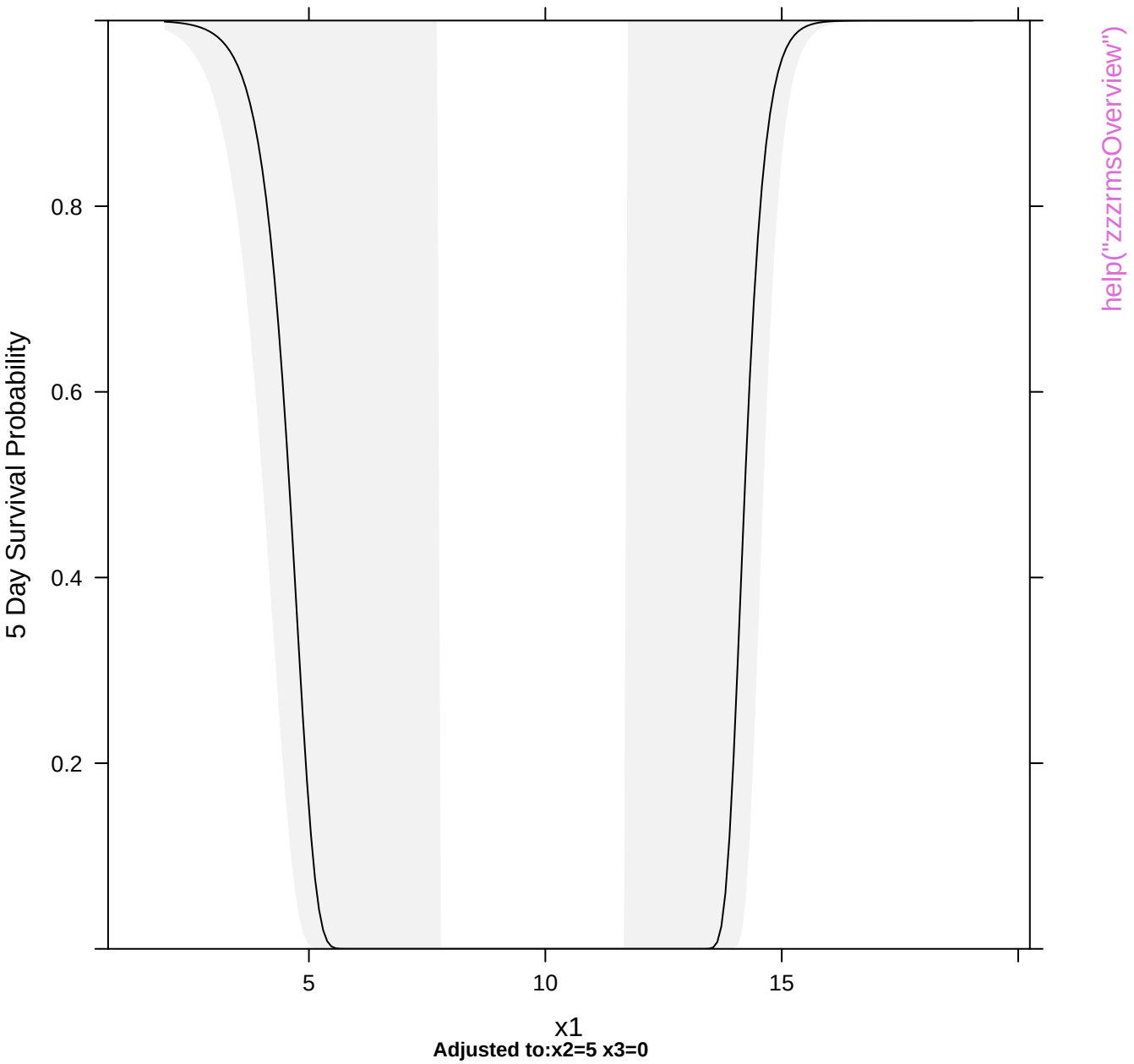
help("zzzrmsOverview")

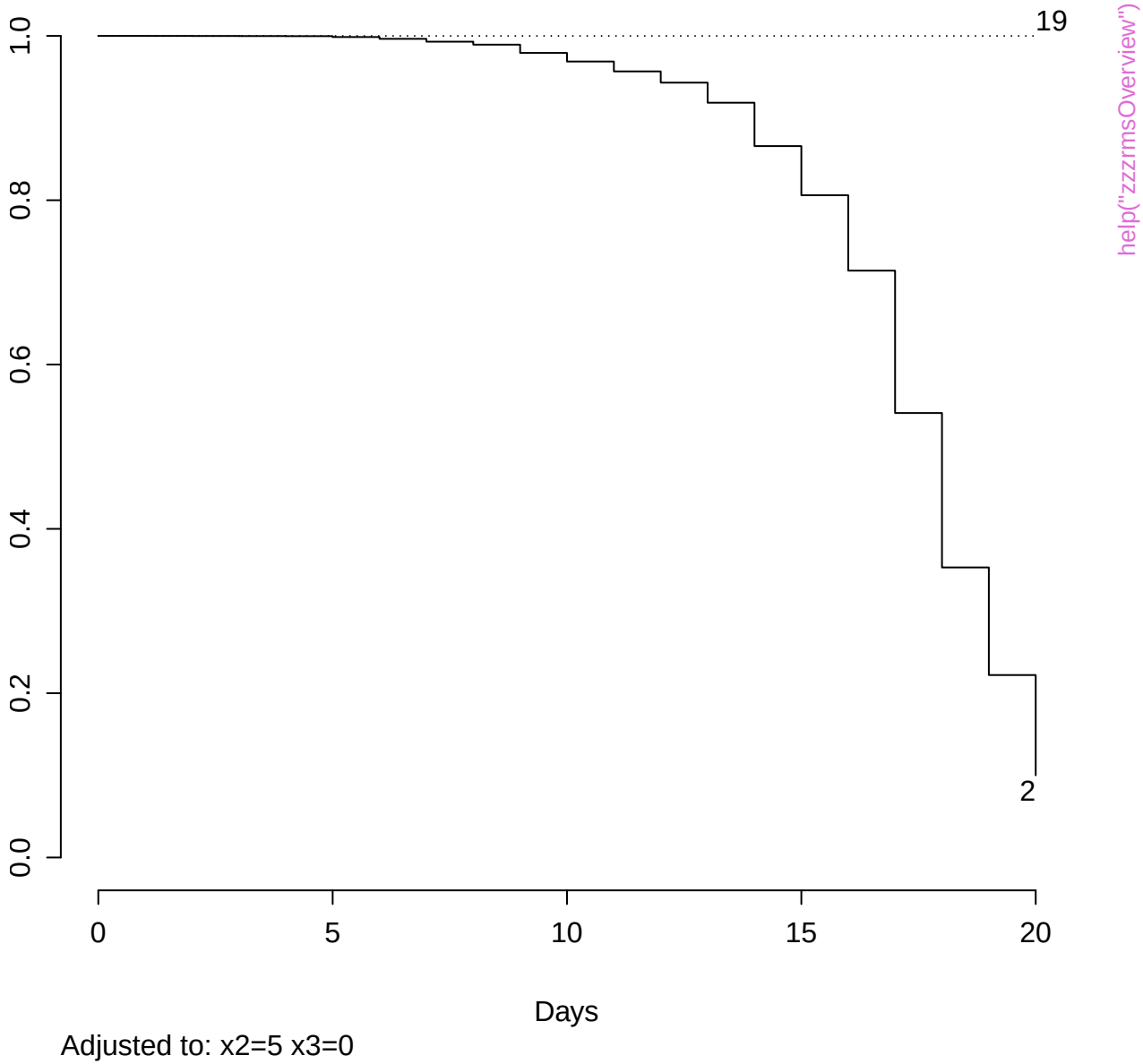


help("zzzrmsOverview")


help("zzrmsOverview")
0.5
0.6
0.7
0.8
0.9
1.0
Predicted 5 Day Survival
n=20 d=20 p=5, 10 subjects per group
Gray: ideal
X – resampling optimism added, B=10
Based on observed−predicted


1.0
0.8
0.6
0.4
0.2
0.0
−4.0
−3.4
−2.8
−2.2
−1.6
−1.0
−0.4
0.2
0.8
1.4
2.0
Residual
help("zzrmsOverview")


5 Day Survival Probability
0.8
0.6
0.4
0.2
5
10
15
x1
Adjusted to:x2=5 x3=0
help("zzzrmsOverview")


1.0
0.8
0.6
0.4
0.2
0.0
19
2
0
5
10
15
20
Days
help("zzrmsOverview")
Adjusted to: x2=5 x3=0