OBIWAN PLACEBO VS. TREATMENT ANALYSIS REPORT

David Munoz Tord

25 novembre, 2021

Contents

Setup

```
library(repro)
# load packages from yaml header
automate_load_packages()
# include external scripts
automate_load_scripts()

# load data
data_ambroise_full  <- automate_load_data(data_ambroise_full, read_sav)

## we recommend running this is a fresh R session or restarting your current session
#install.packages("cmdstanr", repos = c("https://mc-stan.org/r-packages/", getOption("repos")))
#install_cmdstan()


# check_git(); check_make(); check_docker() #check if installed


sessio = sessionInfo(); #opts_chunk$set(echo = F, message=F, warning=F) # set echo F for all


#May I suggest running `repro::automate()`?

#This will create a `Dockerfile` & `Makefile` based on every RMarkdown in this folder and the special y
```

This file was automatically created via `the Repro package (version 0.1.0)` using R version 4.0.1 (2020-06-06)

```
options(scipen = 666, warn=-1, contrasts=c("contr.sum","contr.poly"))  #remove scientific notation # re
 #cl = parallel::detectCores()/2
set.seed(666) #set random seed

# panderOptions('knitr.auto.asis', FALSE) #remove auto styling

# Look at R/clean.R (listed in the YAML) which does all the preprocessing for more info


# If you are unsure weather or not you have `git` `make` & `docker`.
# check_git()
```

```
# check_make()
# check_docker()
```

Description

Blabla

Demographics

```
base[c("Age", "Genre", "Profession")] %>%  tbl_summary(statistic = list(all_continuous() ~ "{mean} ({sd
  bold_labels()
```

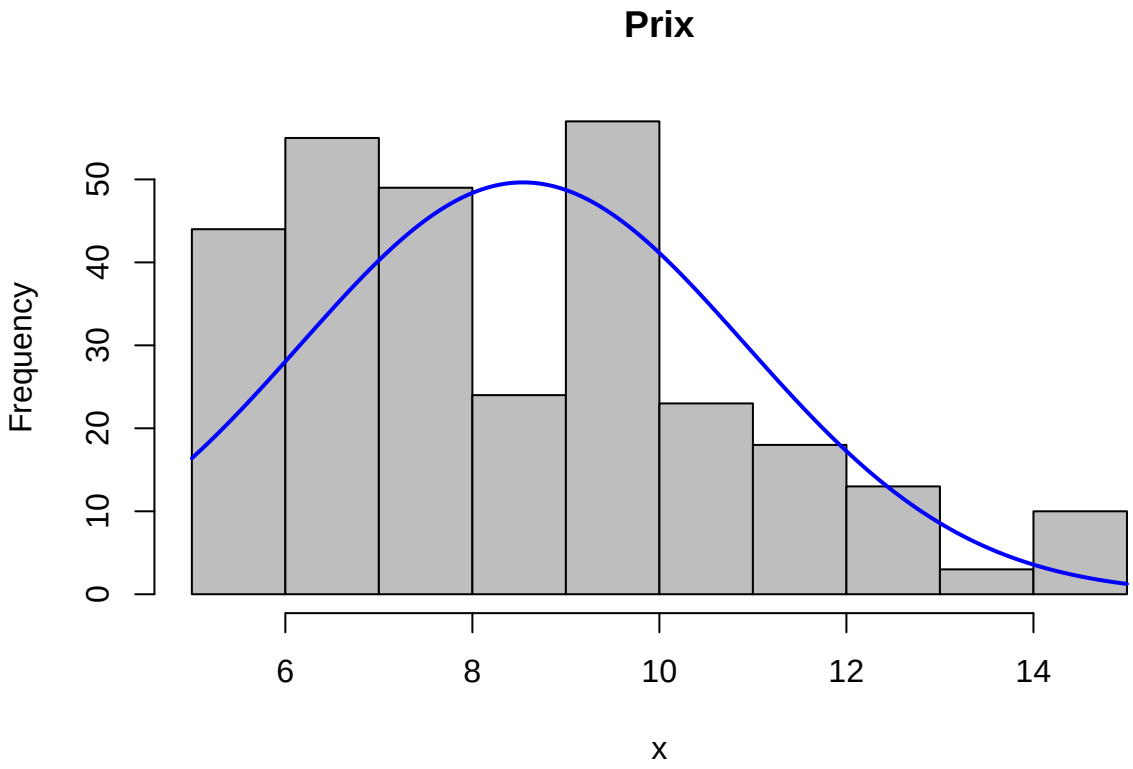
```
## Table printed with `knitr::kable()`, not {gt}. Learn why at
## http://www.danieldsjoberg.com/gtsummary/articles/rmarkdown.html
## To suppress this message, include `message = FALSE` in code chunk header.
```

Table 1: **Table 1. Participant Characteristics**

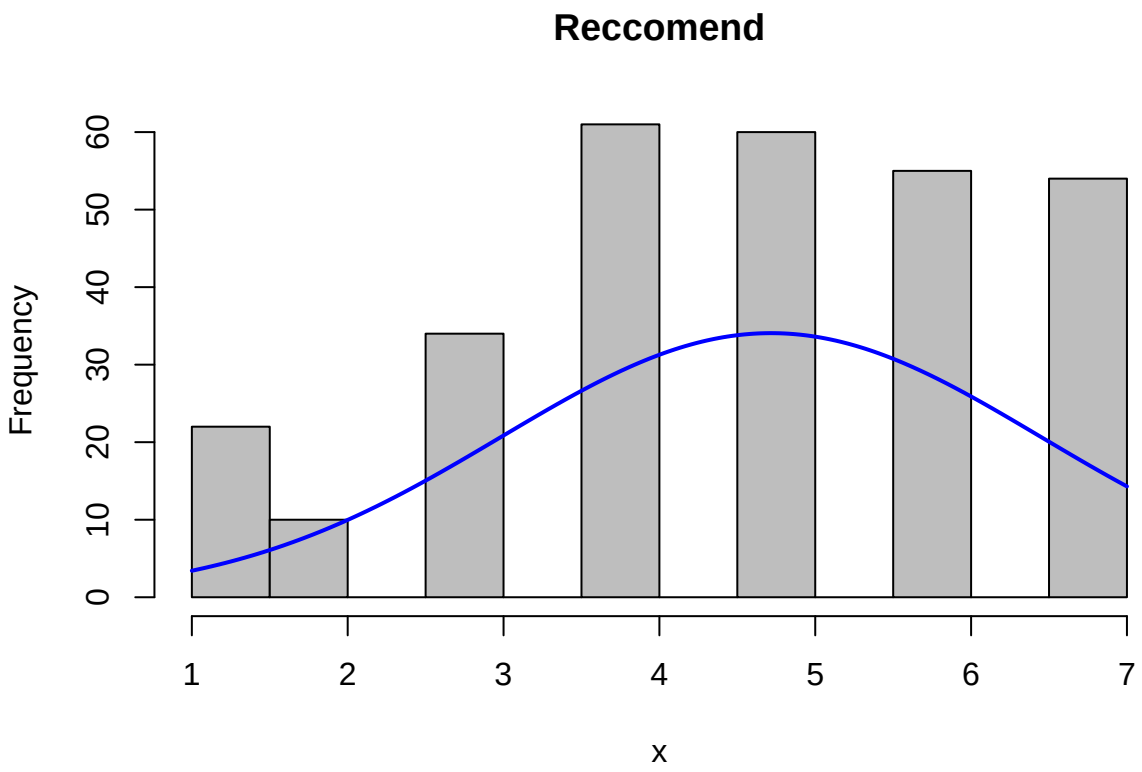
Characteristic	**N = 303**
Age	21.7 (4.4)
Genre	
Homme	56 / 303 (18%)
Femme	244 / 303 (81%)
Autre/NA	3 / 303 (1.0%)
Profession	
Etudiant.e	298 / 303 (98%)
Actif.ve	3 / 303 (1.0%)
Les deux	2 / 303 (0.7%)

```
# %>%
#   kbl(caption ="Summary statistics", digits = 2) %>%
#   kable_styling(latex_options = "HOLD_position", position = "center", full_width = F) %>%
#   row_spec(0,bold=T,align='c')
```

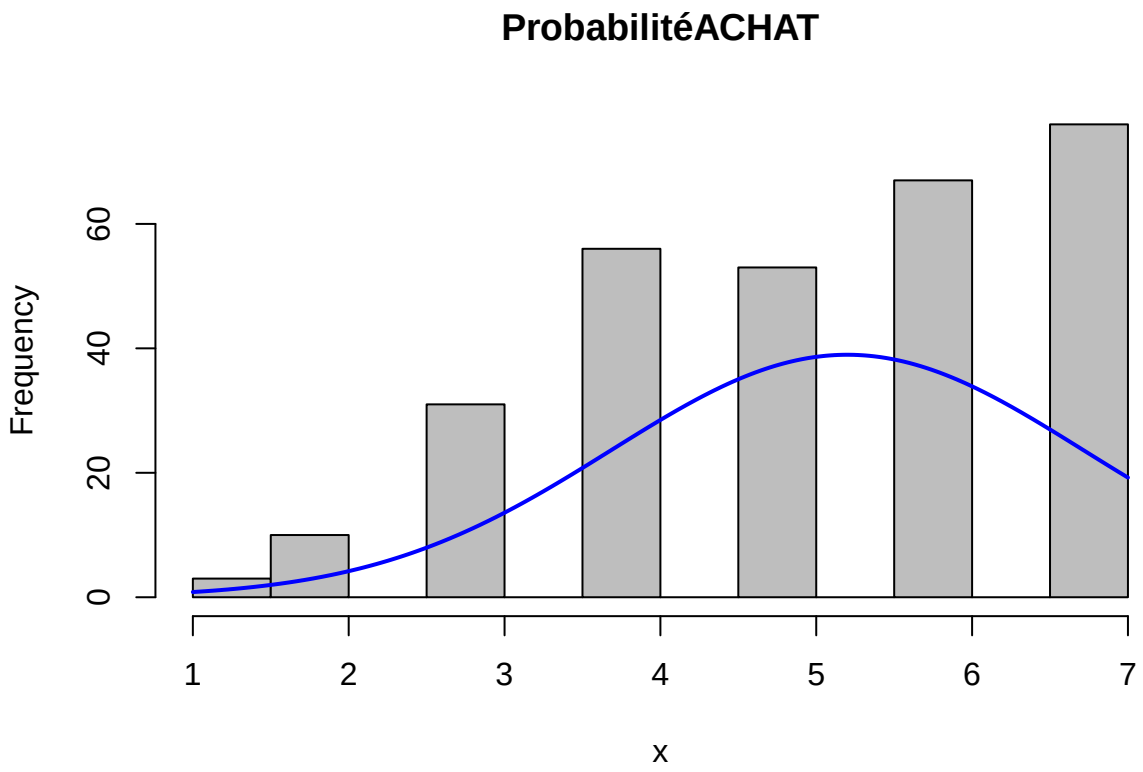
```
#check normlaity



plotNormalHistogram(base_clean$Prix, main = "Prix")
```



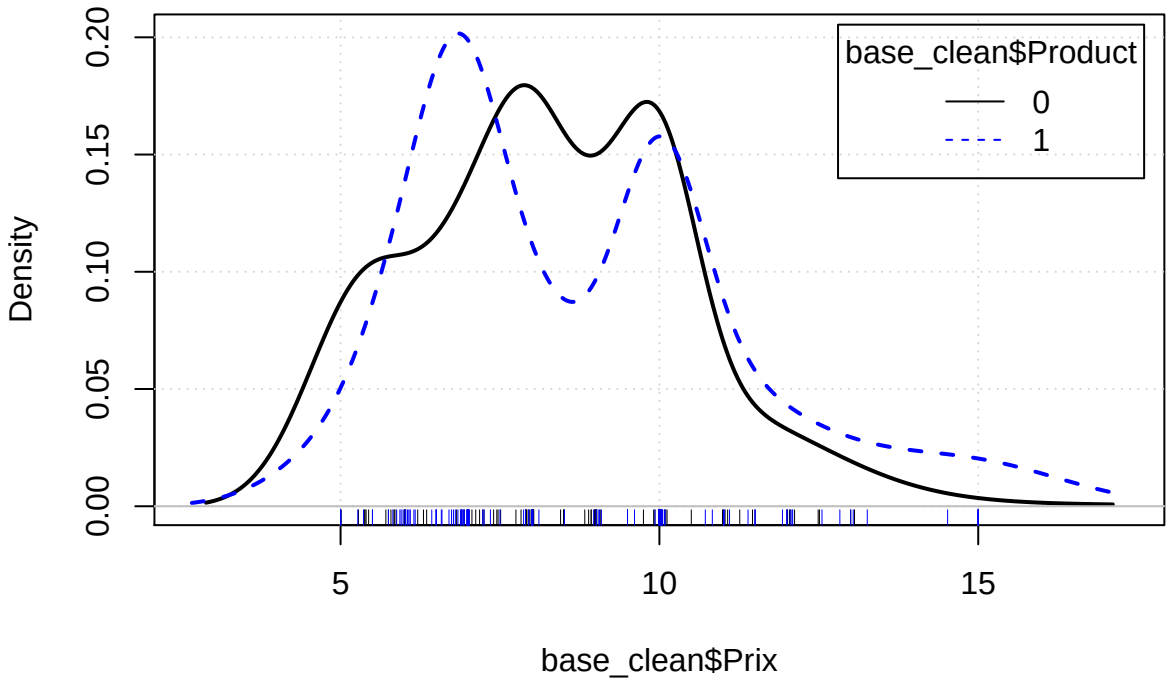

```
plotNormalHistogram(base_clean$Reccomend, main = "Reccomend")
```




```
plotNormalHistogram(base_clean$ProbabilitéACHAT, main = "ProbabilitéACHAT")
```




```
densityPlot(base_clean$Prix, g = base_clean$Product) # by product
```




```
library(moments) #The rule of thumb seems to be: If the skewness is between -0.5 and 0.5, the data are
skewness(base_clean$Prix, na.rm = TRUE)
```

```
## [1] 0.6081667
```

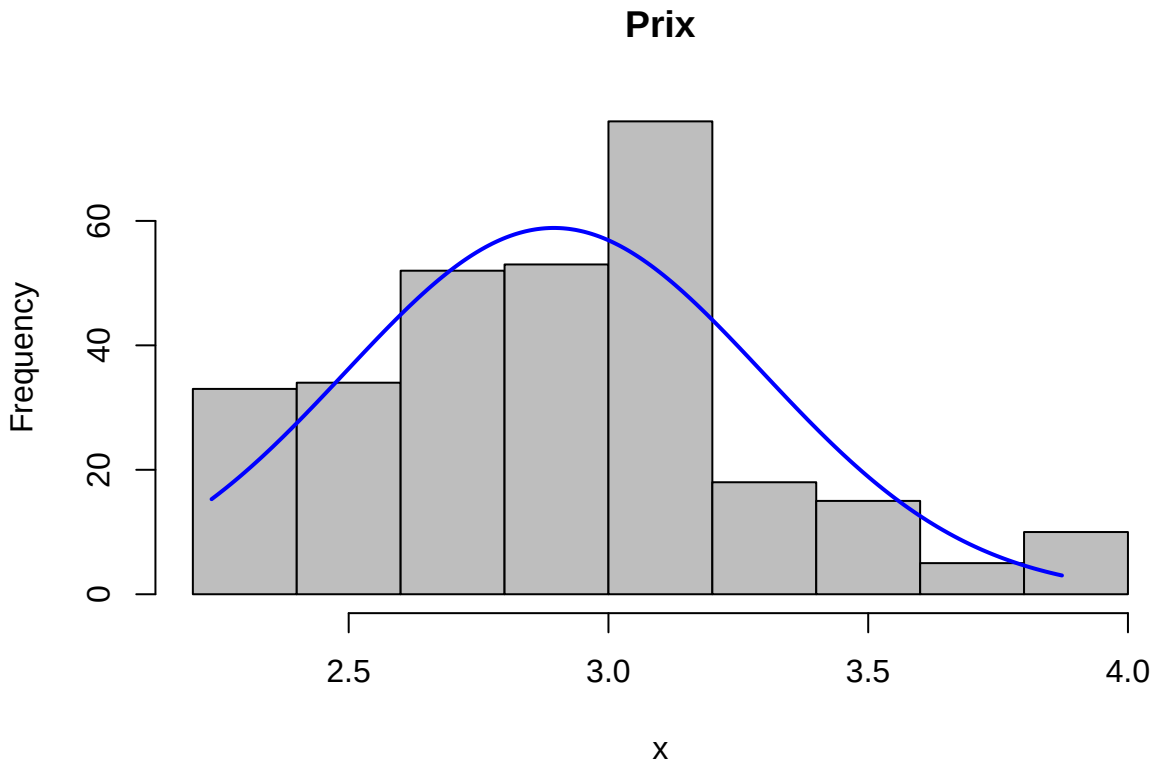
```
skewness(base_clean$Reccomend, na.rm = TRUE)
```

```
## [1] -0.4974926
```

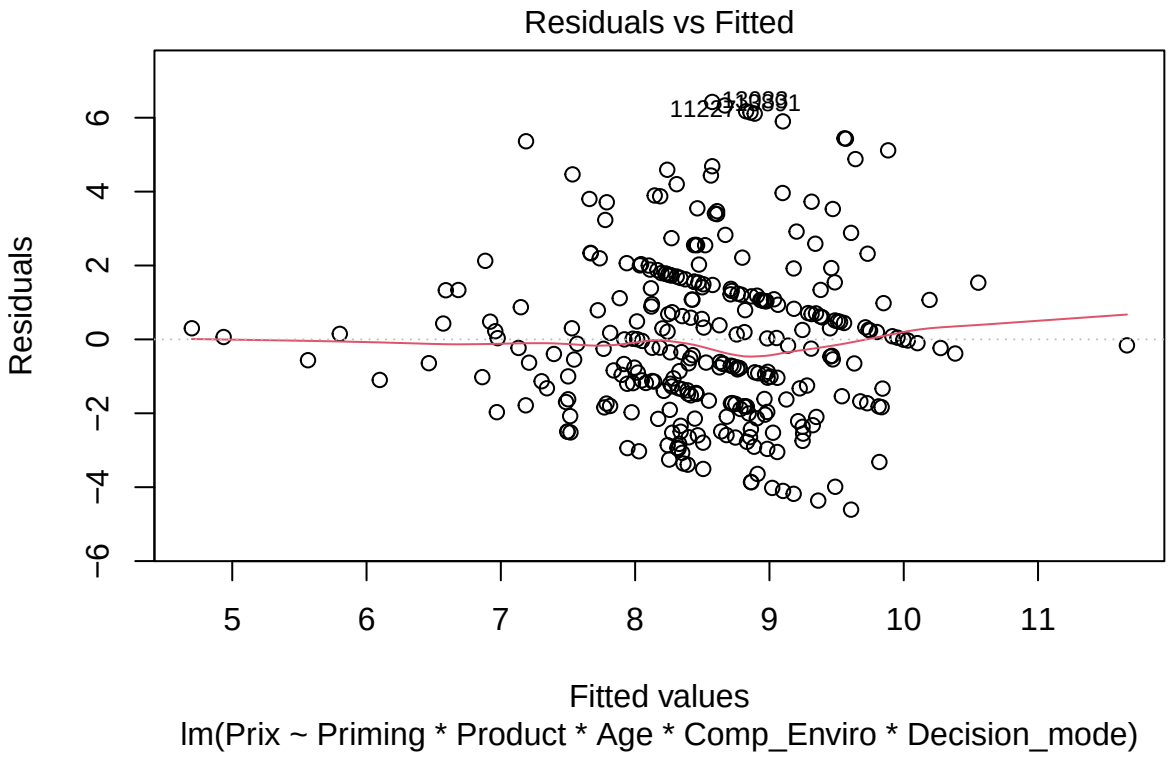
```
skewness(base_clean$ProbabilitéACHAT, na.rm = TRUE)
```

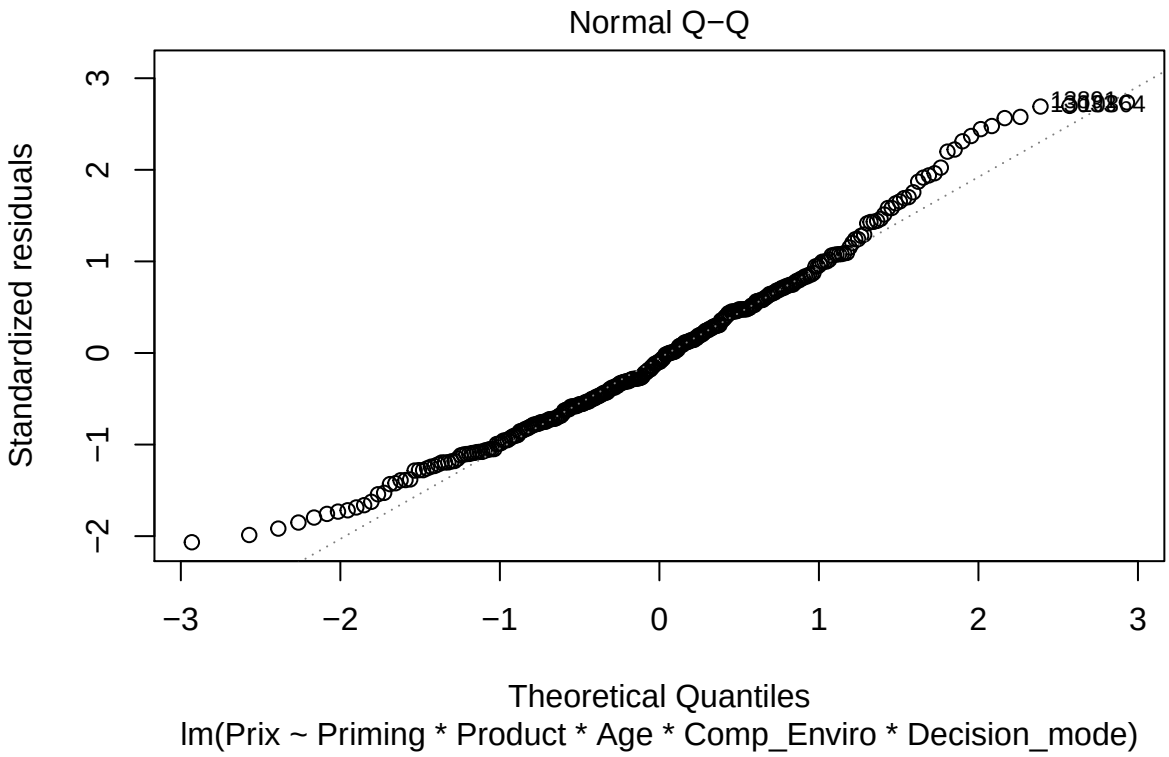
```
## [1] -0.4864478
```

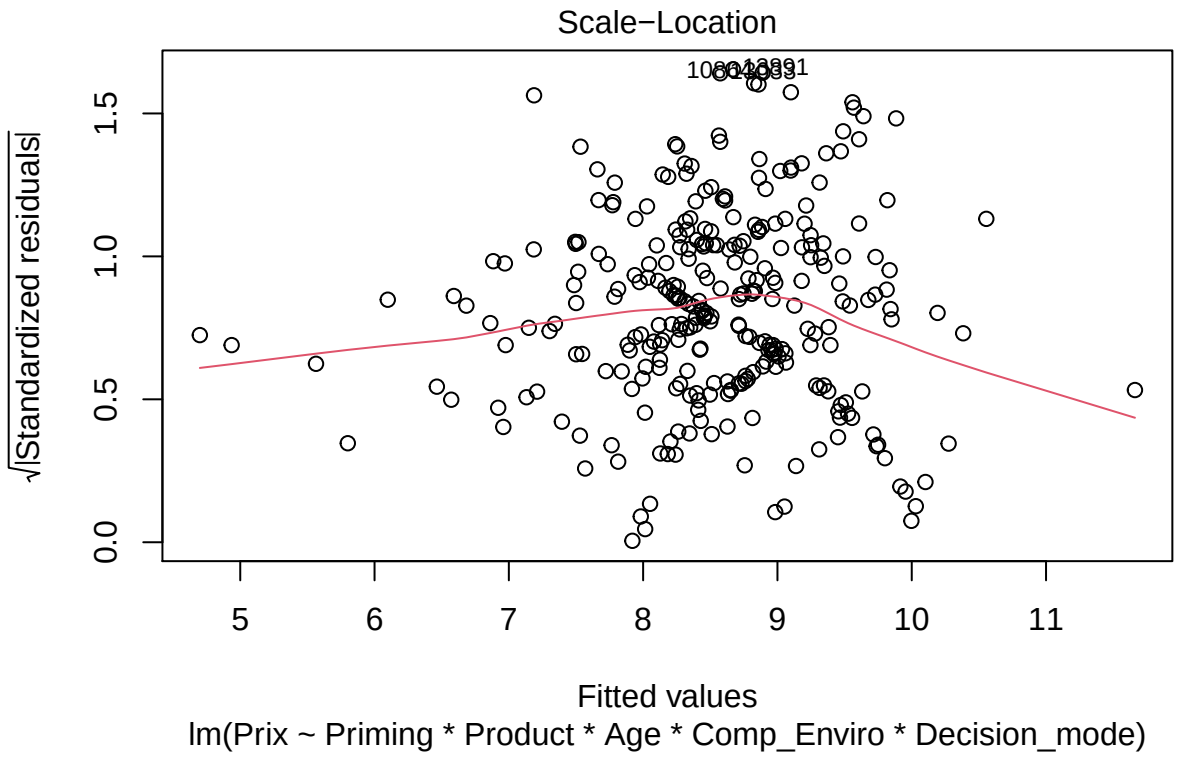
```
#modeling

plotNormalHistogram(sqrt(base_clean$Prix), main = "Prix")
```

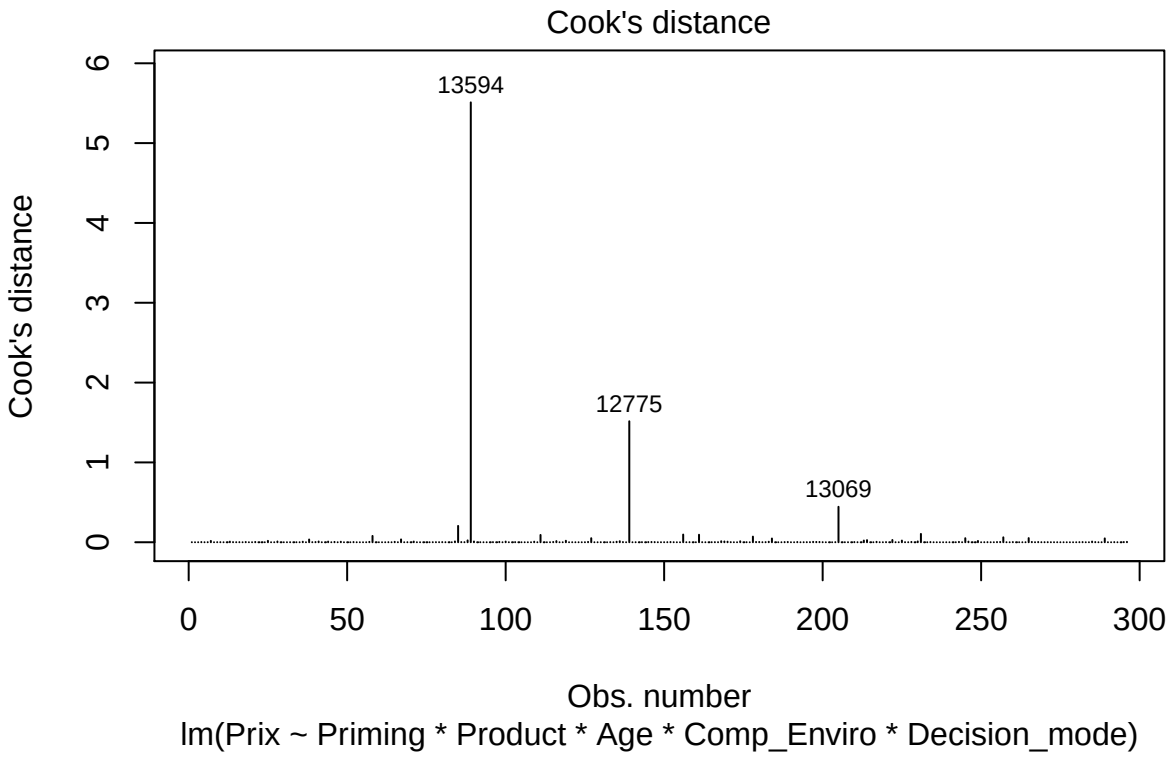


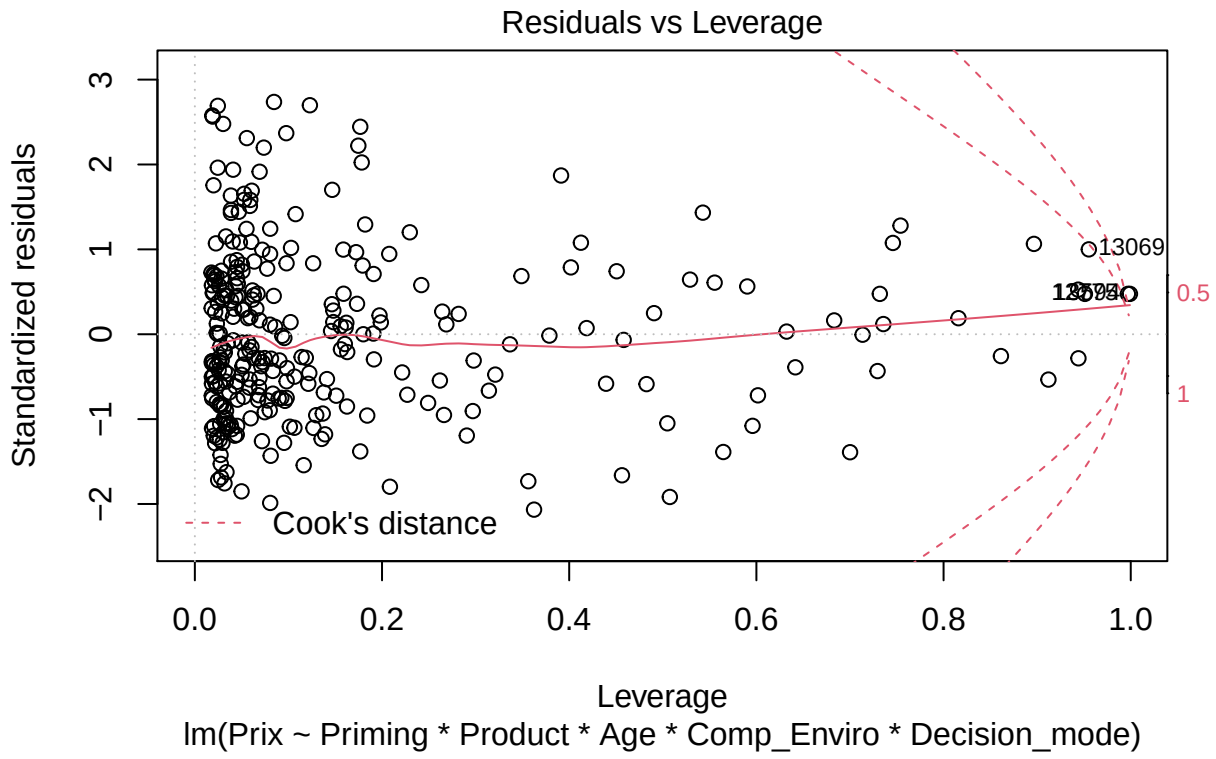

```
# PRIX ------------------------------------------------------------------

modprice = lm(Prix ~ Priming*Product*Age*Comp_Enviro*Decision_mode, data = base_clean)

plot(modprice, 1:5, labels.id = base_clean$id )
```


Residuals vs Fitted
Residuals
Fitted values
lm(Prix ~ Priming * Product * Age * Comp_Enviro * Decision_mode)

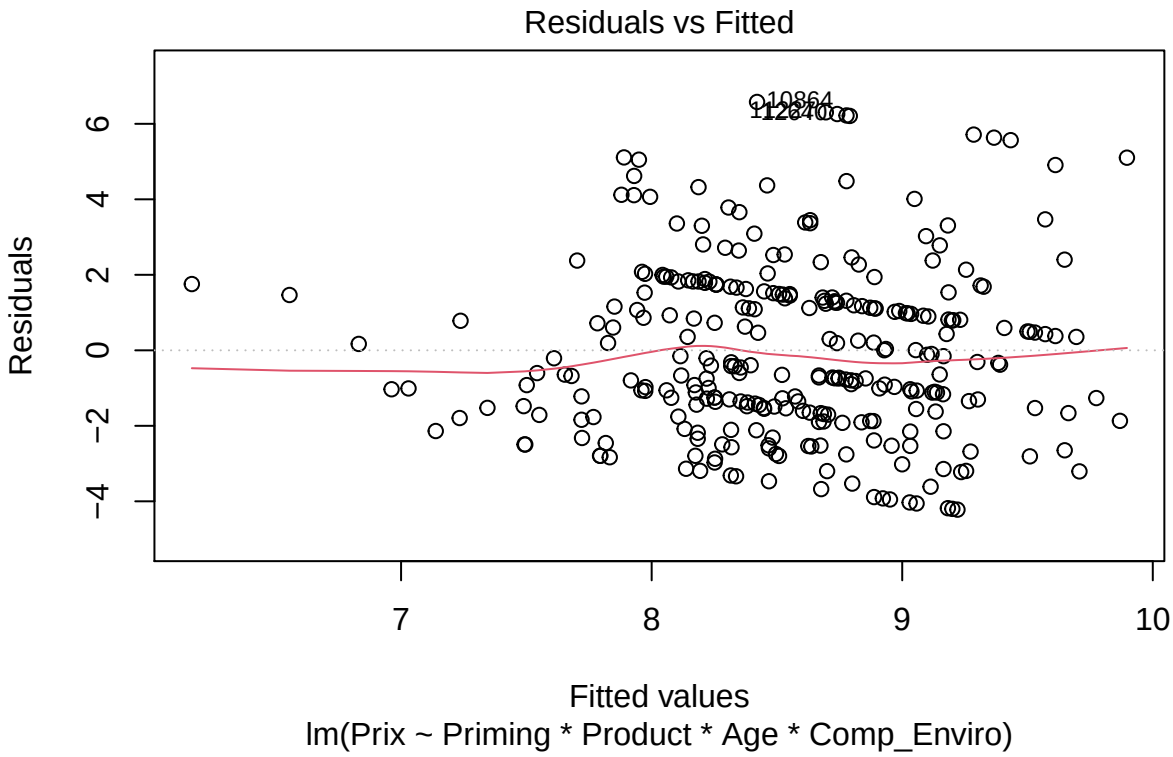

Normal Q−Q
Standardized residuals
Theoretical Quantiles
lm(Prix ~ Priming * Product * Age * Comp_Enviro * Decision_mode)

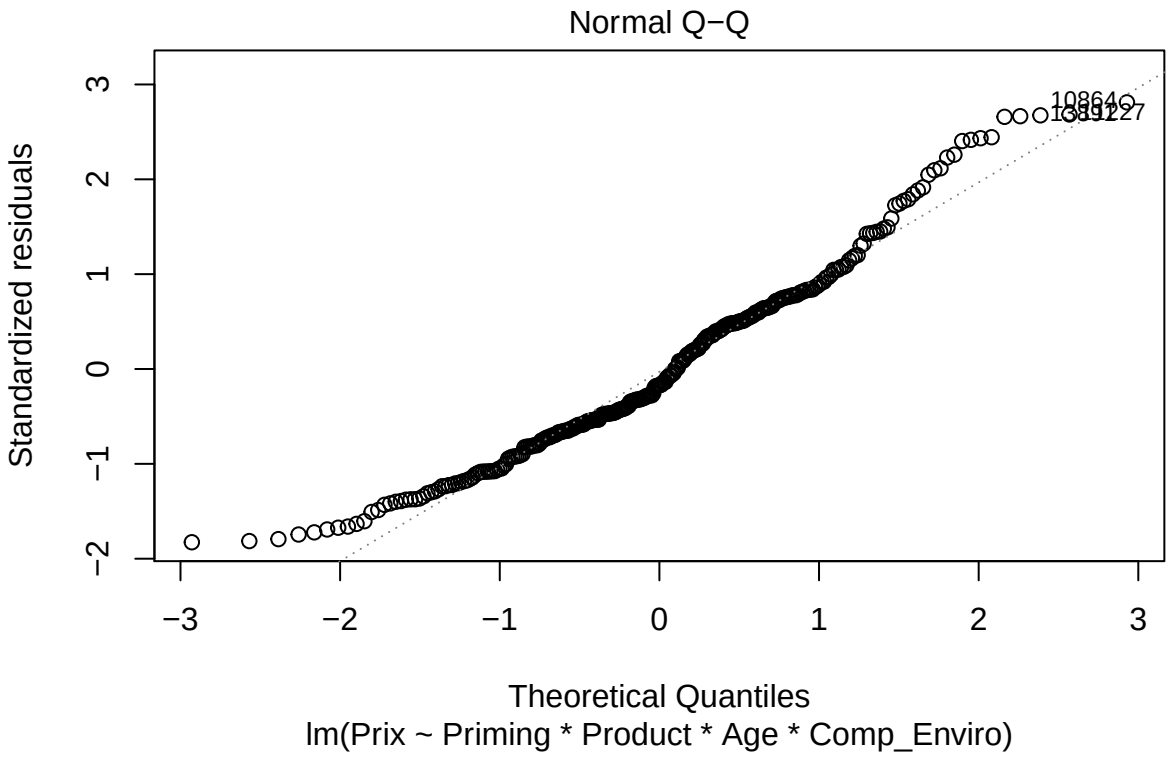

Scale−Location
√|Standardized residuals|
0.0
0.5
1.0
1.5
5
6
7
8
9
10
11
Fitted values
lm(Prix ~ Priming * Product * Age * Comp_Enviro * Decision_mode)

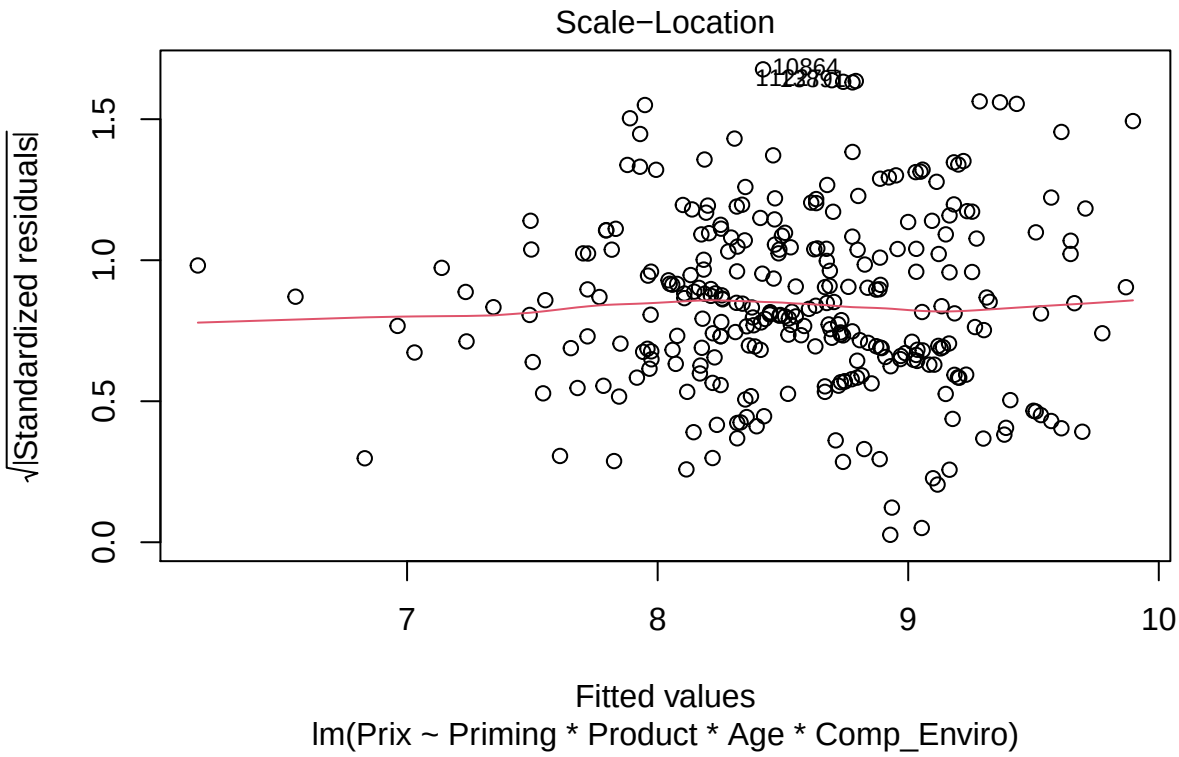

Cook's distance
13594
12775
13069
Cook's distance
0
1
2
3
4
5
6
0
50
100
150
200
250
300
Obs. number
lm(Prix ~ Priming * Product * Age * Comp_Enviro * Decision_mode)

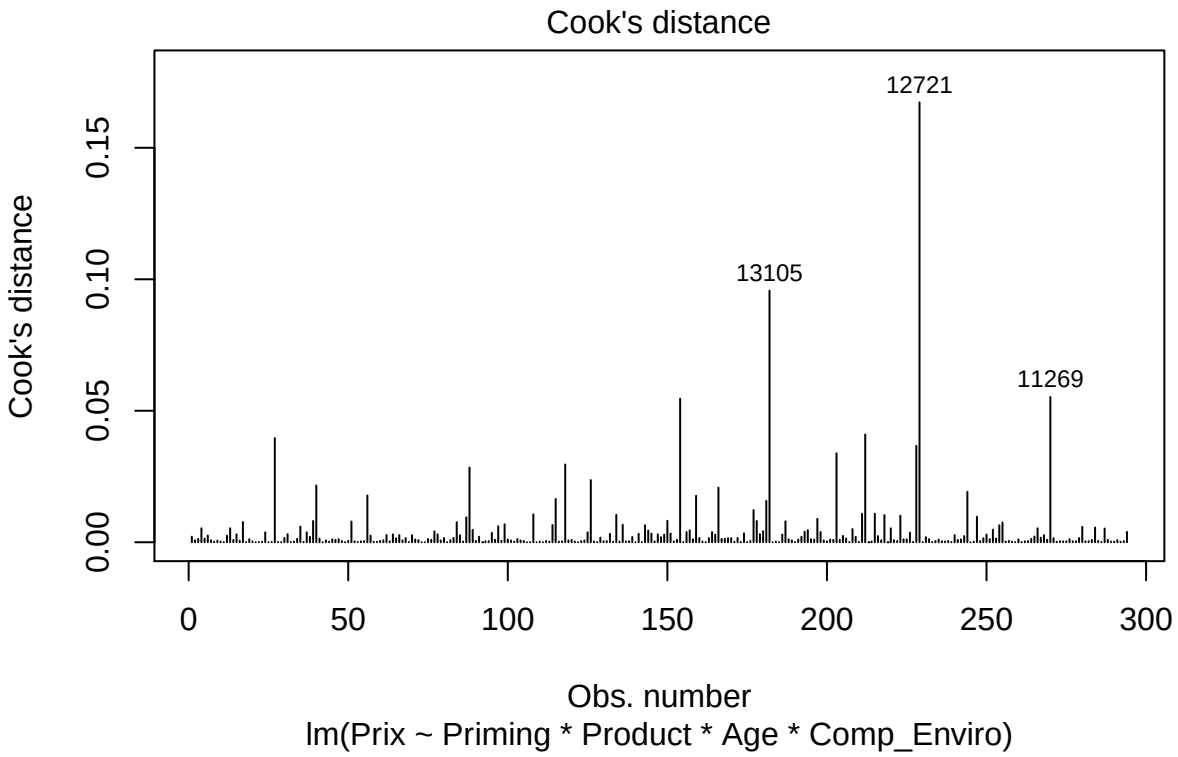


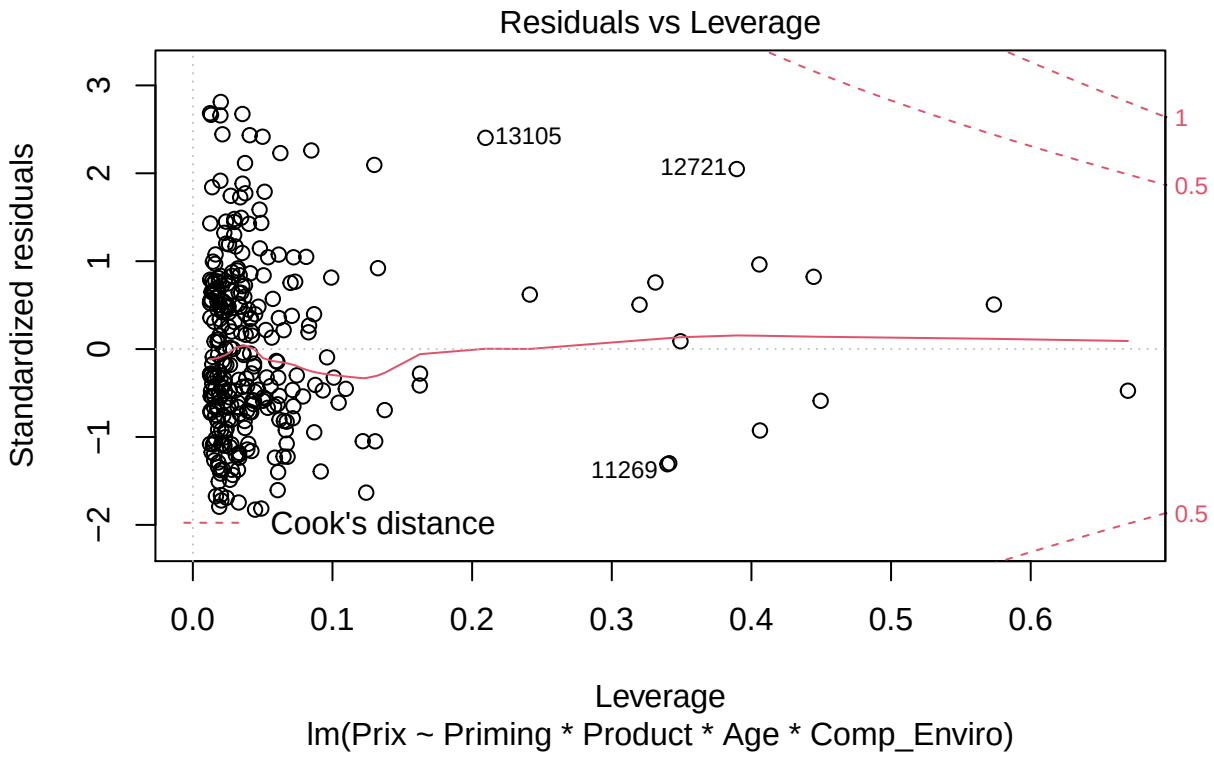

```
base_price = filter(base_clean, id %notin% c("11188", "12775"))


modprice = lm(Prix ~ Priming*Product*Age*Comp_Enviro, data = base_price)

plot(modprice, 1:5, labels.id = base_price$id )
```


Residuals vs Fitted
10864
11264
Residuals
6
4
2
0
−2
−4
7
8
9
10
Fitted values
lm(Prix ~ Priming * Product * Age * Comp_Enviro)


Normal Q−Q
Standardized residuals
Theoretical Quantiles
lm(Prix ~ Priming * Product * Age * Comp_Enviro)


Scale−Location
10864
√|Standardized residuals|
0.0
0.5
1.0
1.5
7
8
9
10
Fitted values
lm(Prix ~ Priming * Product * Age * Comp_Enviro)


Cook's distance
12721
13105
11269
Cook's distance
0.00
0.05
0.10
0.15
0
50
100
150
200
250
300
Obs. number
lm(Prix ~ Priming * Product * Age * Comp_Enviro)




```
MS = MASS::stepAIC(modprice, direction = "both", trace = FALSE)
MS$anova
```

```
## Stepwise Model Path
## Analysis of Deviance Table
##
## Initial Model:
## Prix ~ Priming * Product * Age * Comp_Enviro
##
## Final Model:
## Prix ~ Priming + Product + Age + Comp_Enviro + Priming:Product
##
##
##                                 Step Df    Deviance Resid. Df Resid. Dev
## 1                                                          278   1553.554
## 2  - Priming:Product:Age:Comp_Enviro  1 0.878450437       279   1554.433
## 3      - Priming:Product:Comp_Enviro  1 0.132418299       280   1554.565
## 4          - Priming:Age:Comp_Enviro  1 0.266802647       281   1554.832
## 5              - Priming:Comp_Enviro  1 0.007726993       282   1554.839
## 6              - Priming:Product:Age  1 7.108594510       283   1561.948
## 7                      - Priming:Age  1 0.225468378       284   1562.174
## 8          - Product:Age:Comp_Enviro  1 6.182373751       285   1568.356
## 9                  - Age:Comp_Enviro  1 0.030156091       286   1568.386
## 10             - Product:Comp_Enviro  1 0.576664291       287   1568.963
## 11                     - Product:Age  1 0.797327421       288   1569.760
##         AIC
```

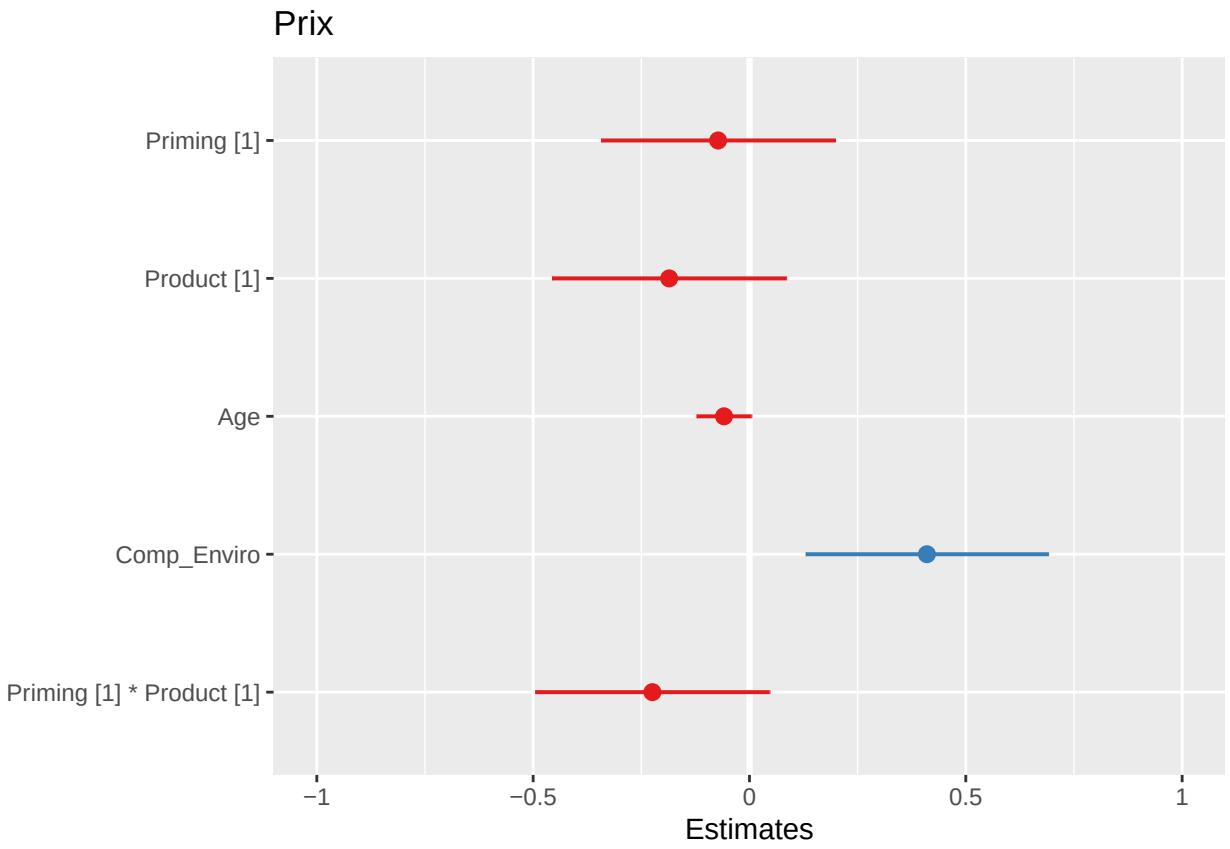
```
## 1  521.4279
## 2  519.5941
## 3  517.6191
## 4  515.6696
## 5  513.6711
## 6  513.0121
## 7  511.0546
## 8  510.2158
## 9  508.2214
## 10 506.3295
## 11 504.4789
```

```
final = lm(Prix~ Priming + Product + Age + Comp_Enviro + Priming:Product,  data = base_price)
anova(final)
```

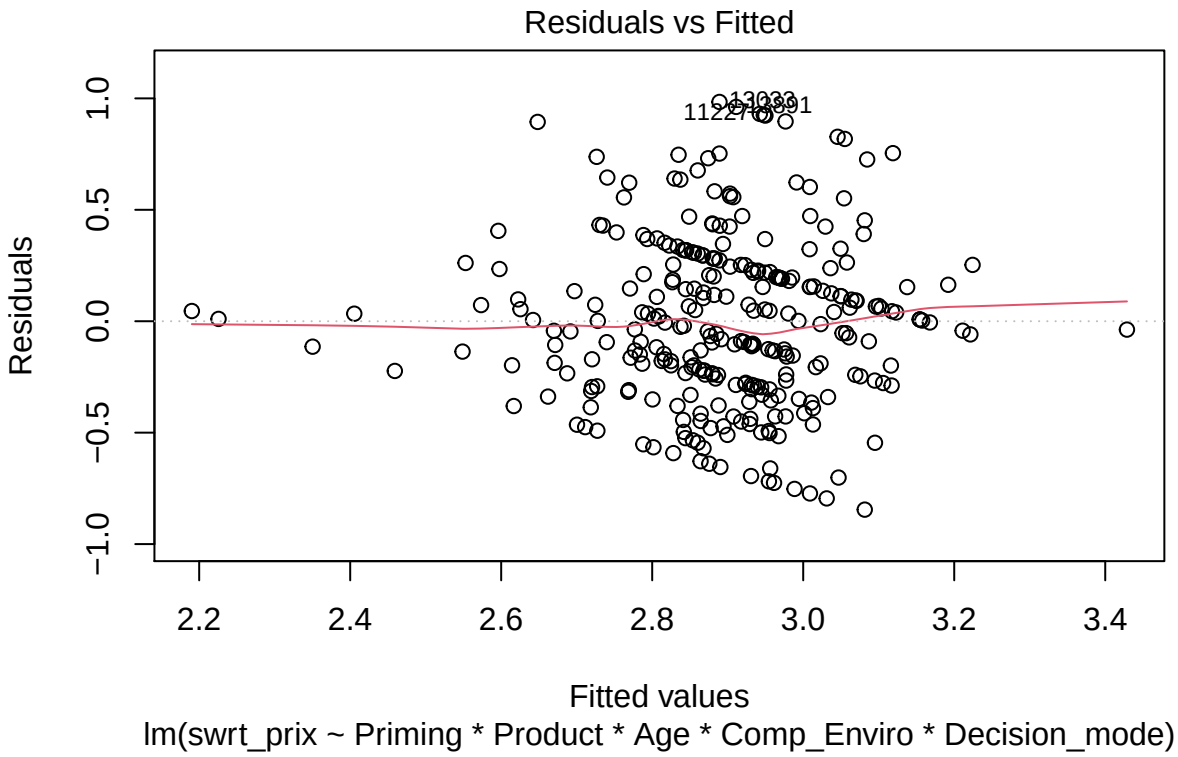
```
## Analysis of Variance Table
##
## Response: Prix
##                   Df  Sum Sq Mean Sq F value   Pr(>F)
## Priming            1    2.36   2.363  0.4335 0.510826
## Product            1   12.84  12.839  2.3555 0.125936
## Age                1   12.73  12.725  2.3346 0.127622
## Comp_Enviro        1   42.75  42.749  7.8431 0.005447 **
## Priming:Product    1   14.52  14.521  2.6642 0.103722
## Residuals        288 1569.76   5.451
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

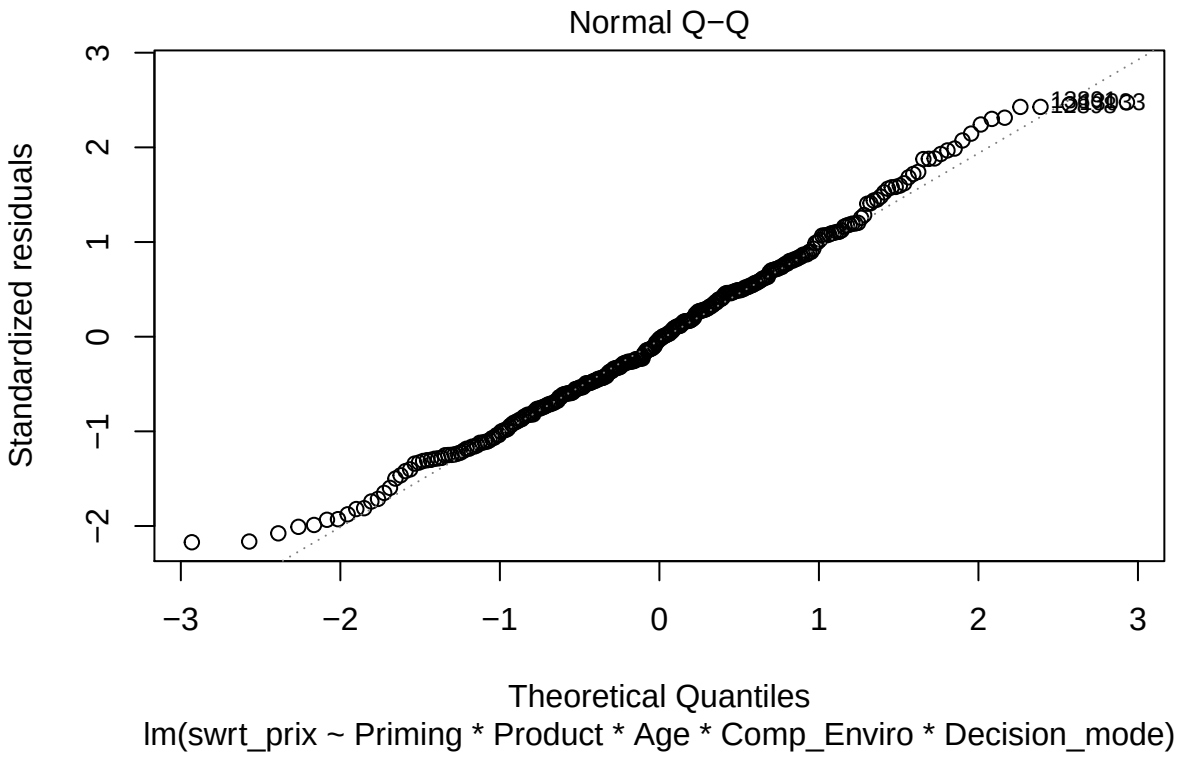
```
sjPlot::plot_model(final)
```

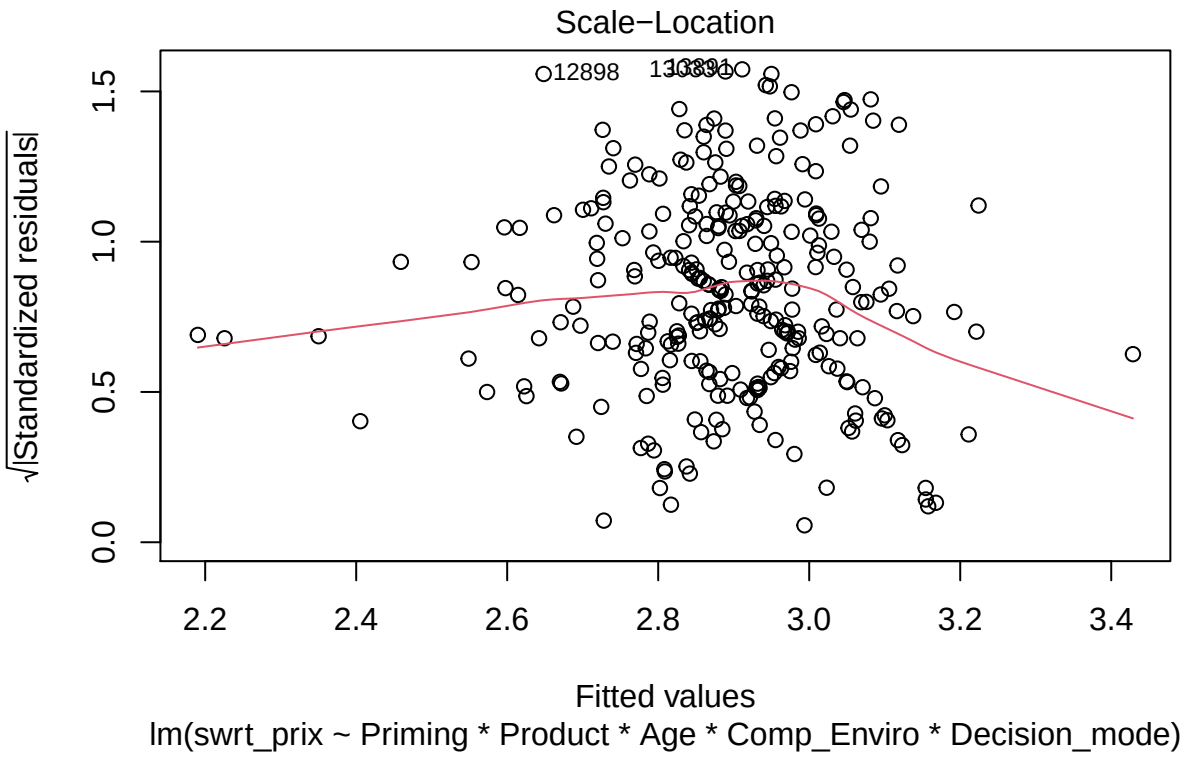
```
## Registered S3 methods overwritten by 'lme4':
##   method                          from
##   cooks.distance.influence.merMod car
##   influence.merMod                car
##   dfbeta.influence.merMod         car
##   dfbetas.influence.merMod        car
```

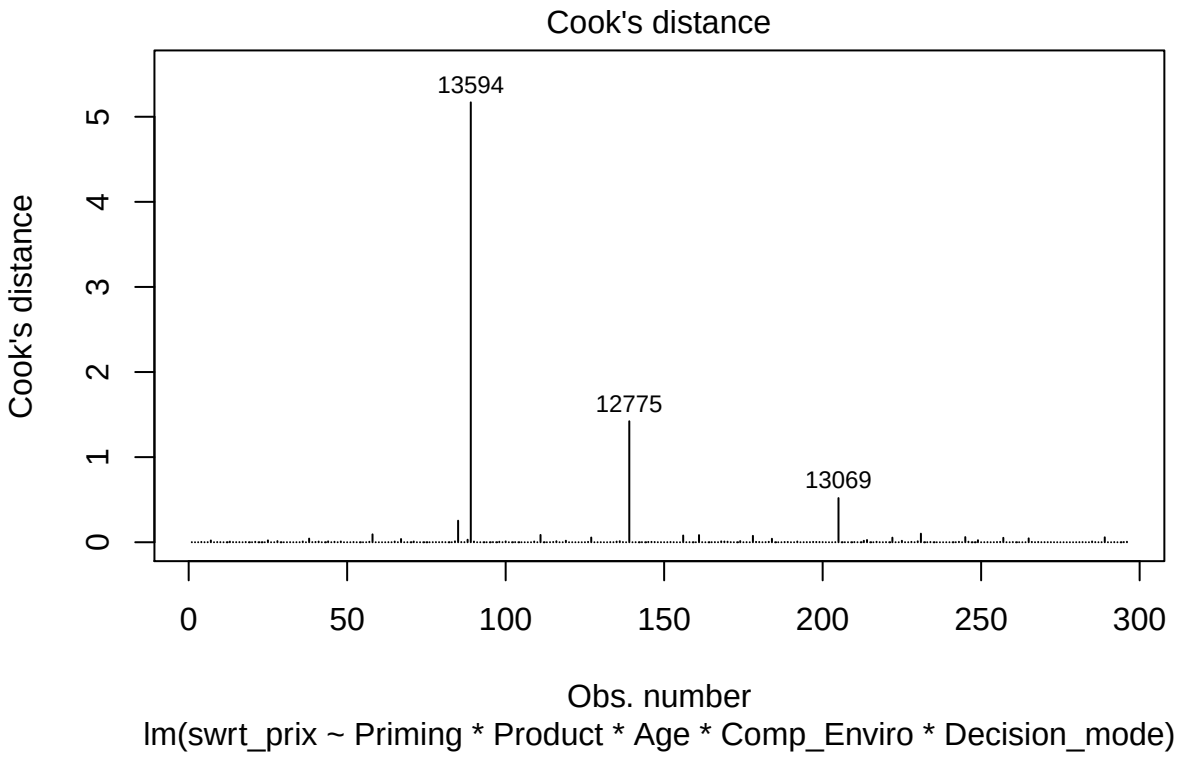


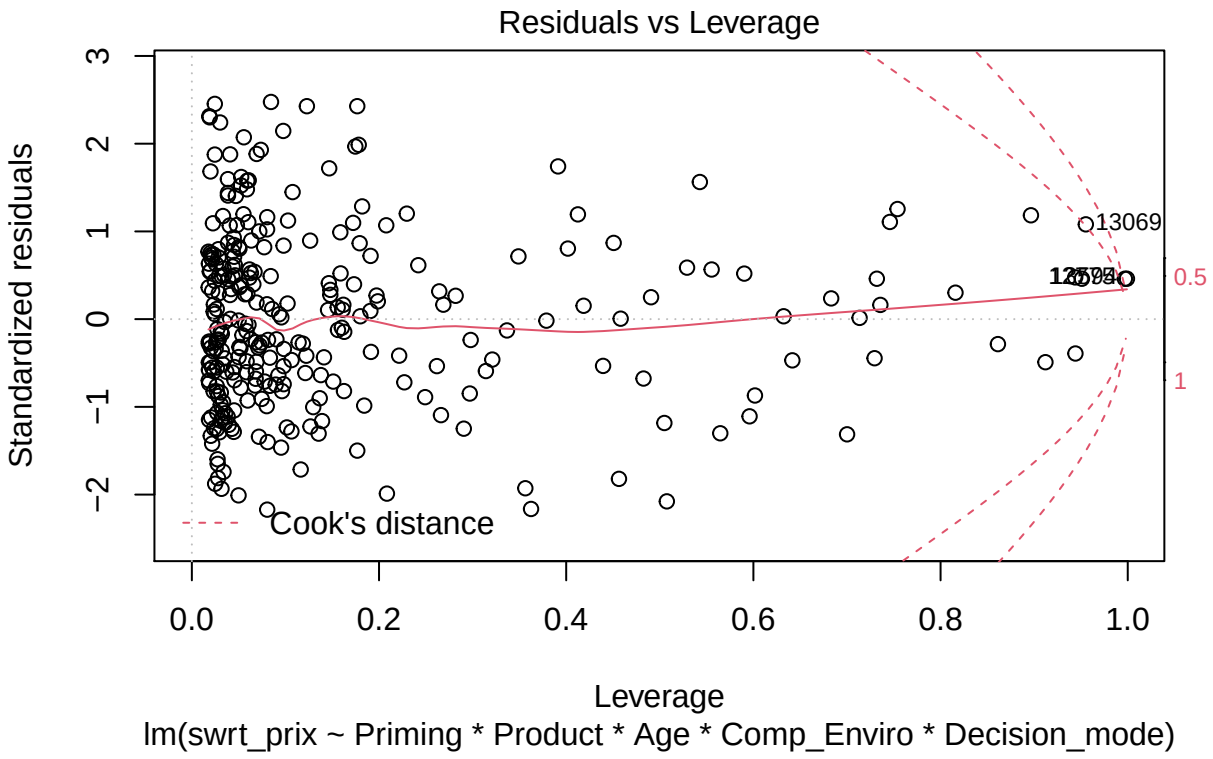

```
# PRIX SQRT-------------------------------------------------------------------
base_clean$swrt_prix = sqrt(base_clean$Prix)

modpricesqrt = lm(swrt_prix ~ Priming*Product*Age*Comp_Enviro*Decision_mode, data = base_clean)

plot(modpricesqrt, 1:5, labels.id = base_clean$id )
```


Residuals vs Fitted
Residuals
1.0
0.5
0.0
−0.5
−1.0
2.2
2.4
2.6
2.8
3.0
3.2
3.4
Fitted values
lm(swrt_prix ~ Priming * Product * Age * Comp_Enviro * Decision_mode)


Normal Q−Q
Standardized residuals
3
2
1
0
−1
−2
−3
−2
−1
0
1
2
3
Theoretical Quantiles
lm(swrt_prix ~ Priming * Product * Age * Comp_Enviro * Decision_mode)


Scale−Location
12898
√|Standardized residuals|
0.0
0.5
1.0
1.5
2.2
2.4
2.6
2.8
3.0
3.2
3.4
Fitted values
lm(swrt_prix ~ Priming * Product * Age * Comp_Enviro * Decision_mode)


Cook's distance
13594
12775
13069
Cook's distance
0
1
2
3
4
5
0
50
100
150
200
250
300
Obs. number
lm(swrt_prix ~ Priming * Product * Age * Comp_Enviro * Decision_mode)




```
base_price = filter(base_clean, id %notin% c("11188", "12775"))


modprice = lm(Prix ~ Priming*Product*Age*Comp_Enviro, data = base_price)

plot(modprice, 1:5, labels.id = base_price$id )
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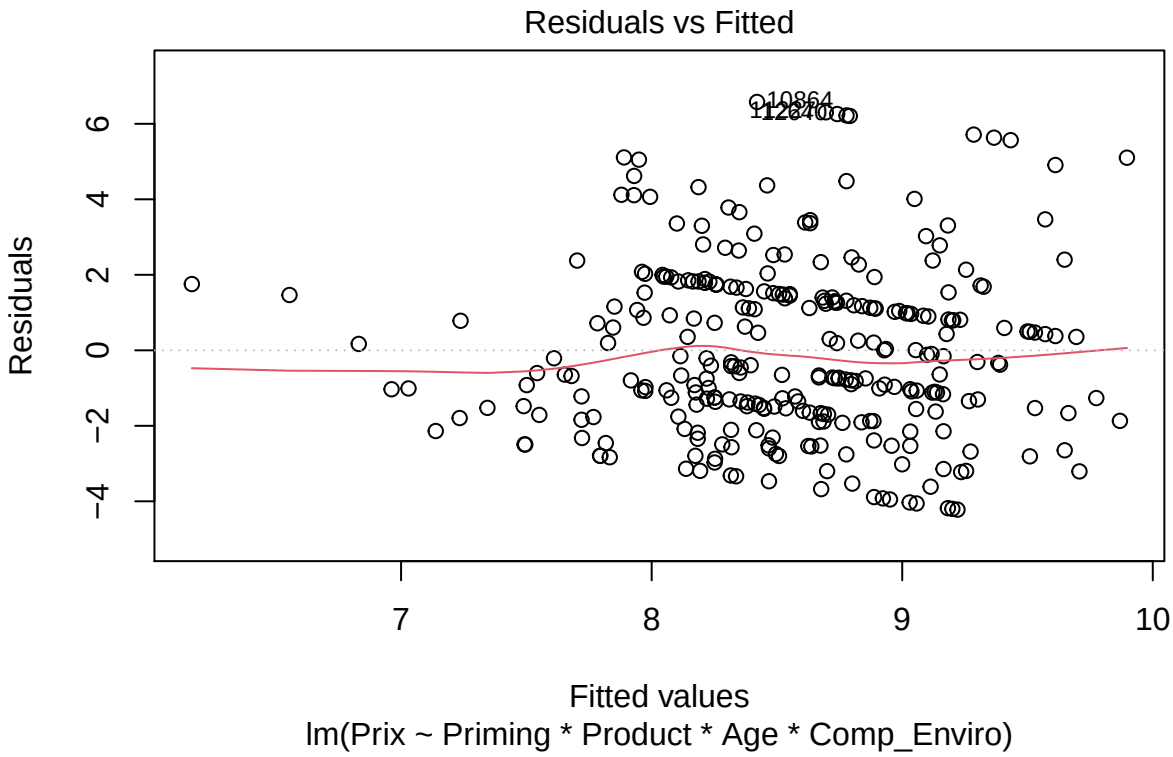
Residuals vs Fitted
10864
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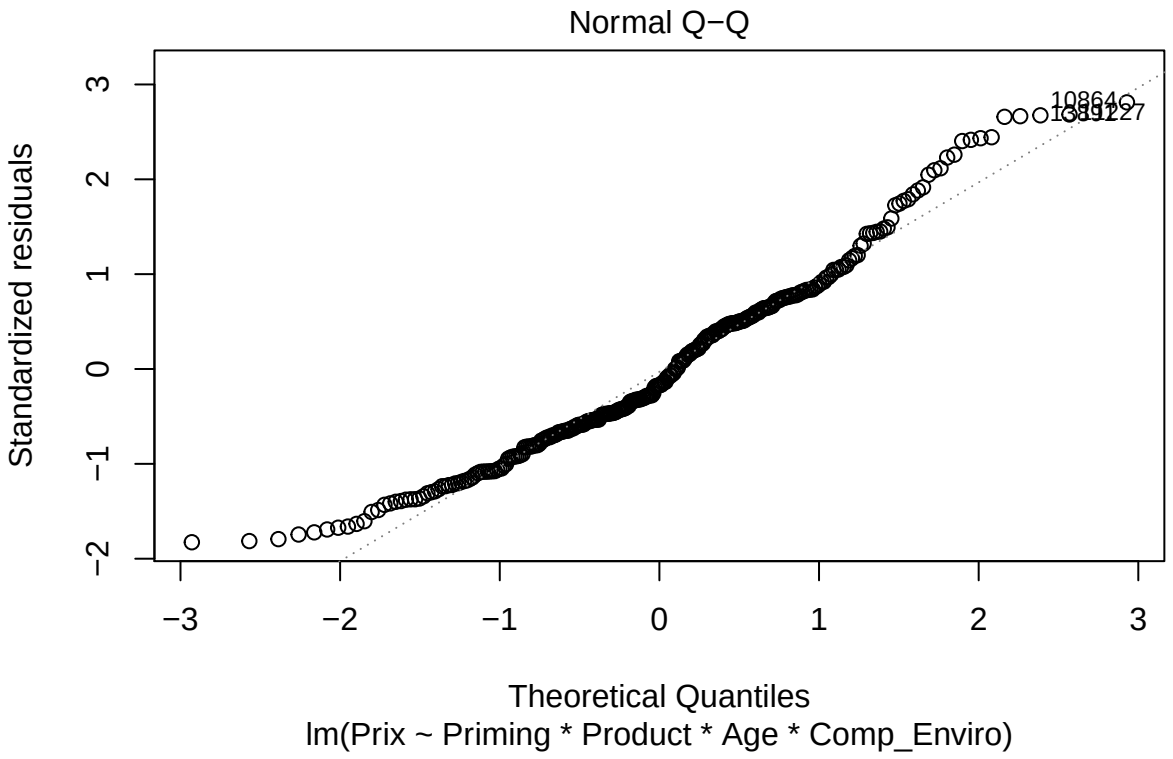
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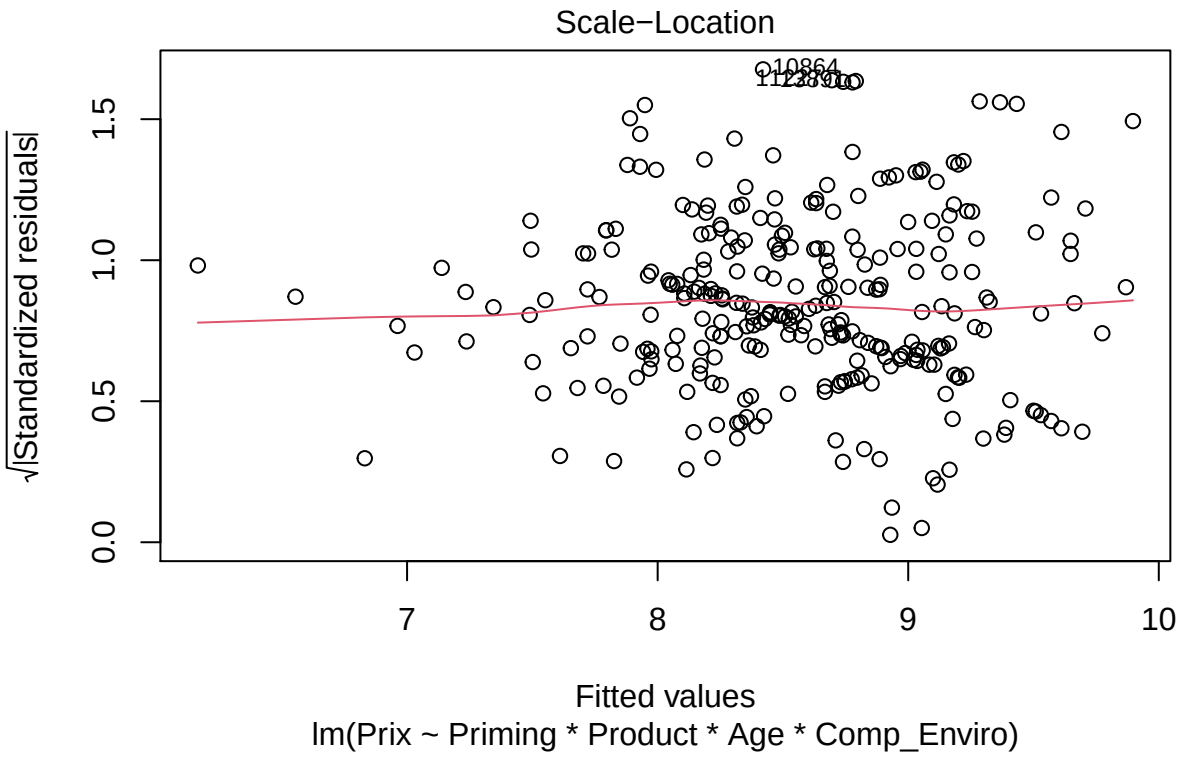
Scale−Location
10864
√|Standardized residuals|
0.0
0.5
1.0
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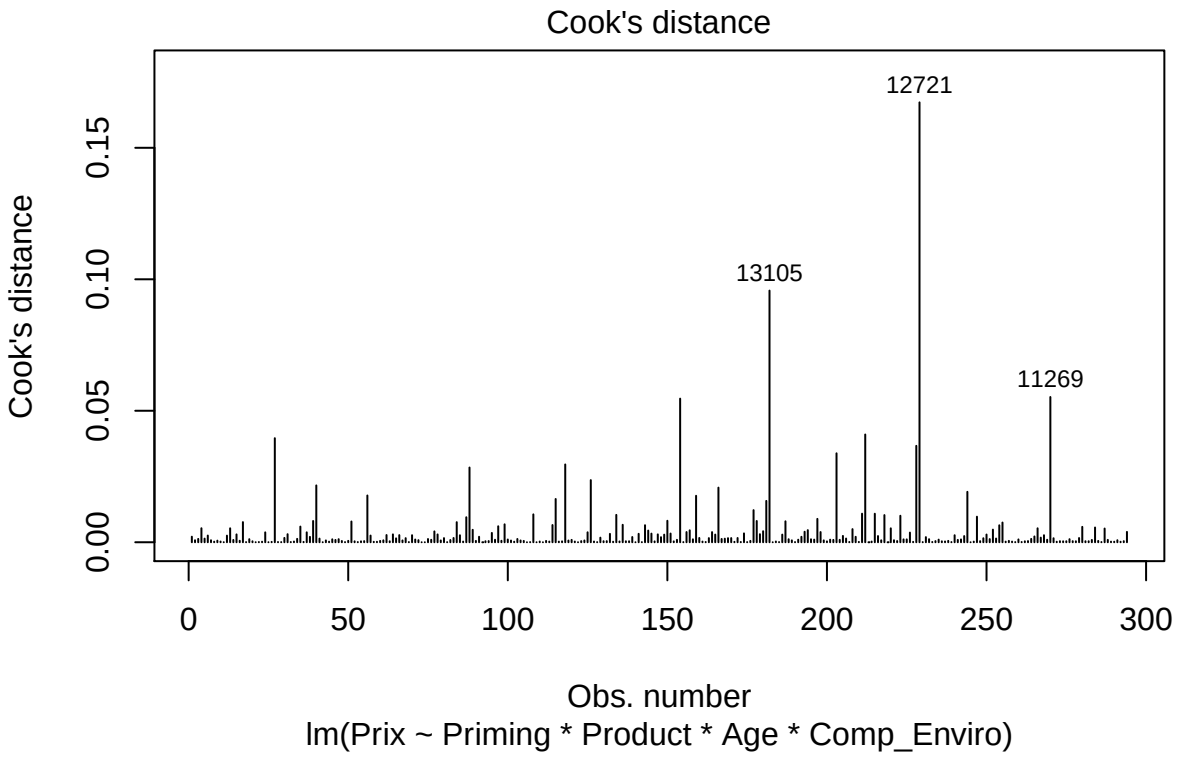
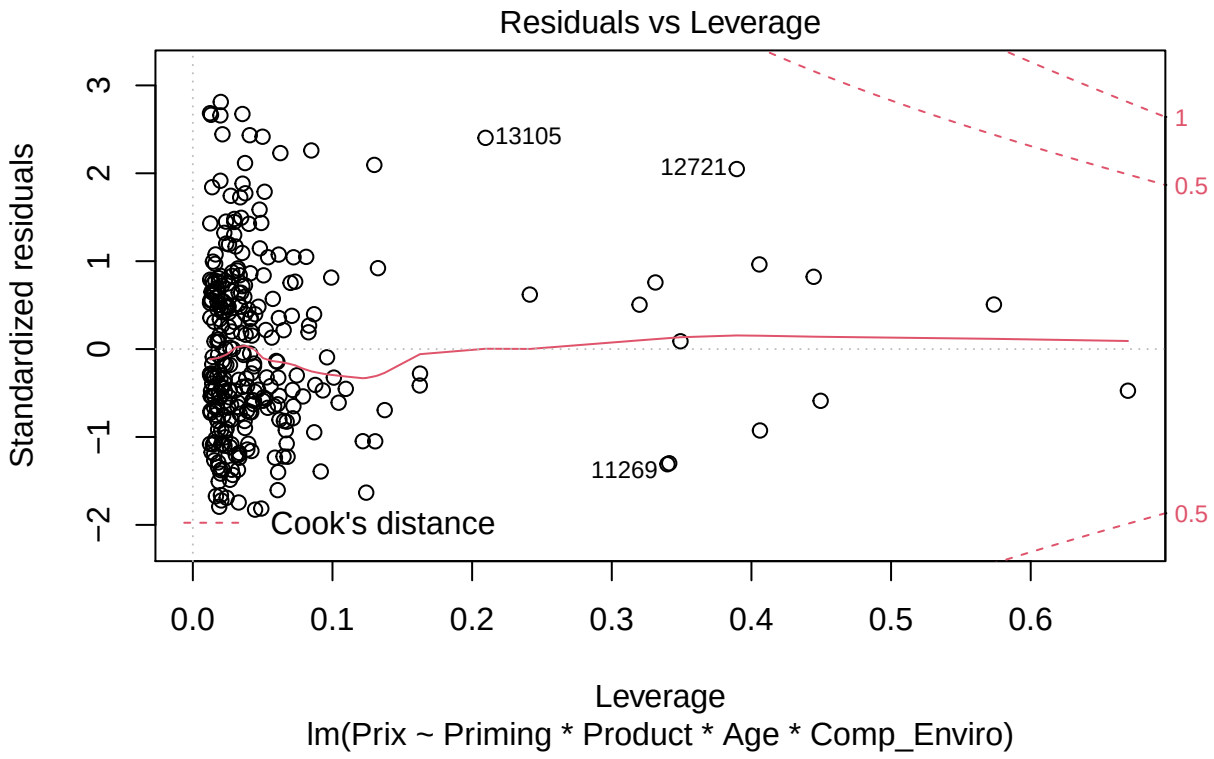
Fitted values
lm(Prix ~ Priming * Product * Age * Comp_Enviro)


Cook's distance
12721
13105
11269
Cook's distance
0.00
0.05
0.10
0.15
0
50
100
150
200
250
300
Obs. number
lm(Prix ~ Priming * Product * Age * Comp_Enviro)




```
MS = MASS::stepAIC(modprice, direction = "both", trace = FALSE)
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## Analysis of Deviance Table
##
## Initial Model:
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## 8          - Product:Age:Comp_Enviro  1 6.182373751       285   1568.356
## 9                  - Age:Comp_Enviro  1 0.030156091       286   1568.386
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```
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## 2  519.5941
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## 5  513.6711
## 6  513.0121
## 7  511.0546
## 8  510.2158
## 9  508.2214
## 10 506.3295
## 11 504.4789
```

```
final = lm(Prix~ Priming + Product + Age + Comp_Enviro + Priming:Product,  data = base_price)
anova(final)
```

```
## Analysis of Variance Table
##
## Response: Prix
##                   Df  Sum Sq Mean Sq F value   Pr(>F)
## Priming            1    2.36   2.363  0.4335 0.510826
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## Priming:Product    1   14.52  14.521  2.6642 0.103722
## Residuals        288 1569.76   5.451
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```
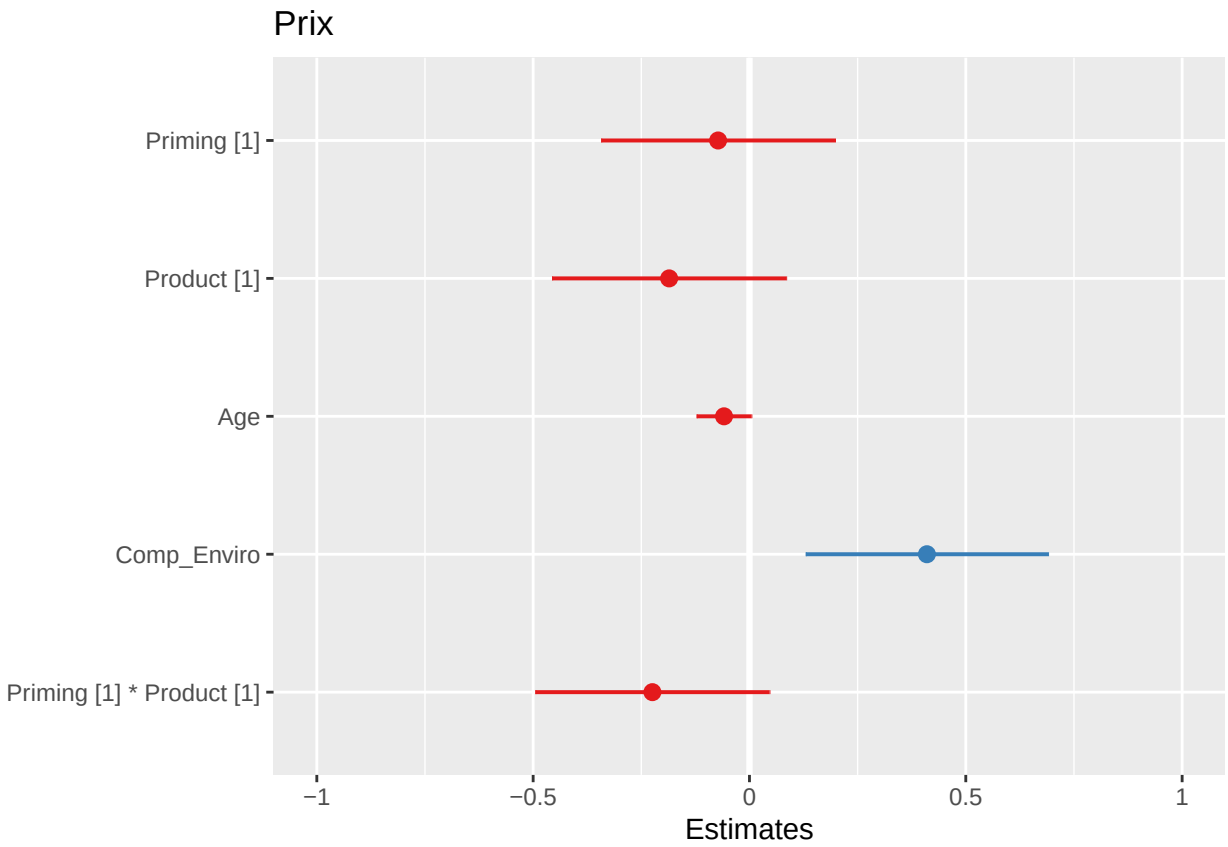
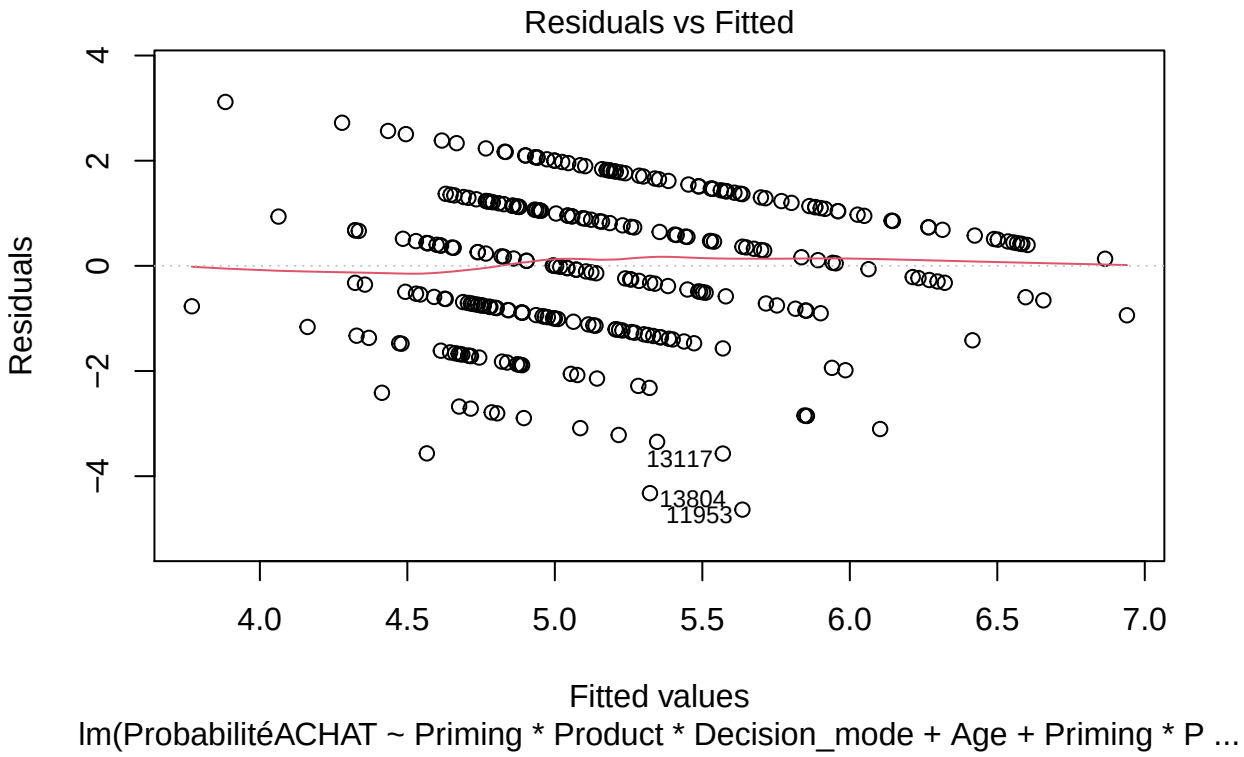
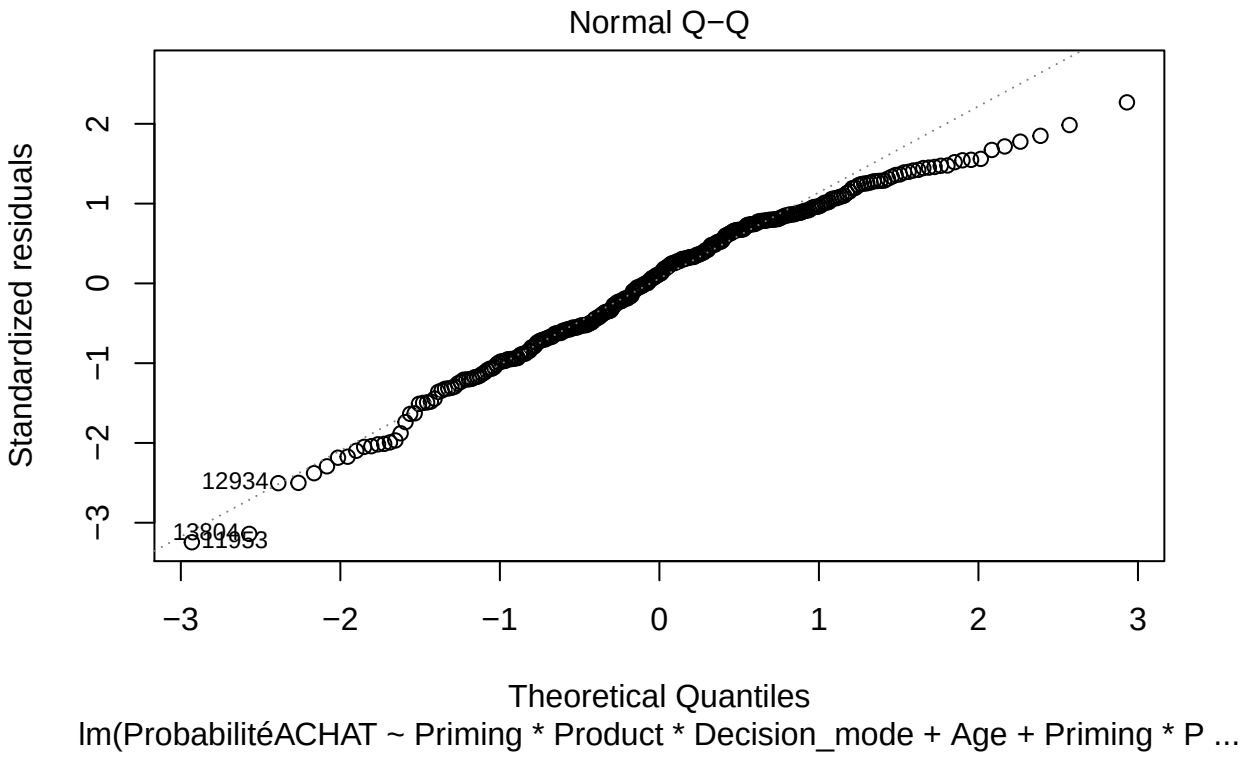
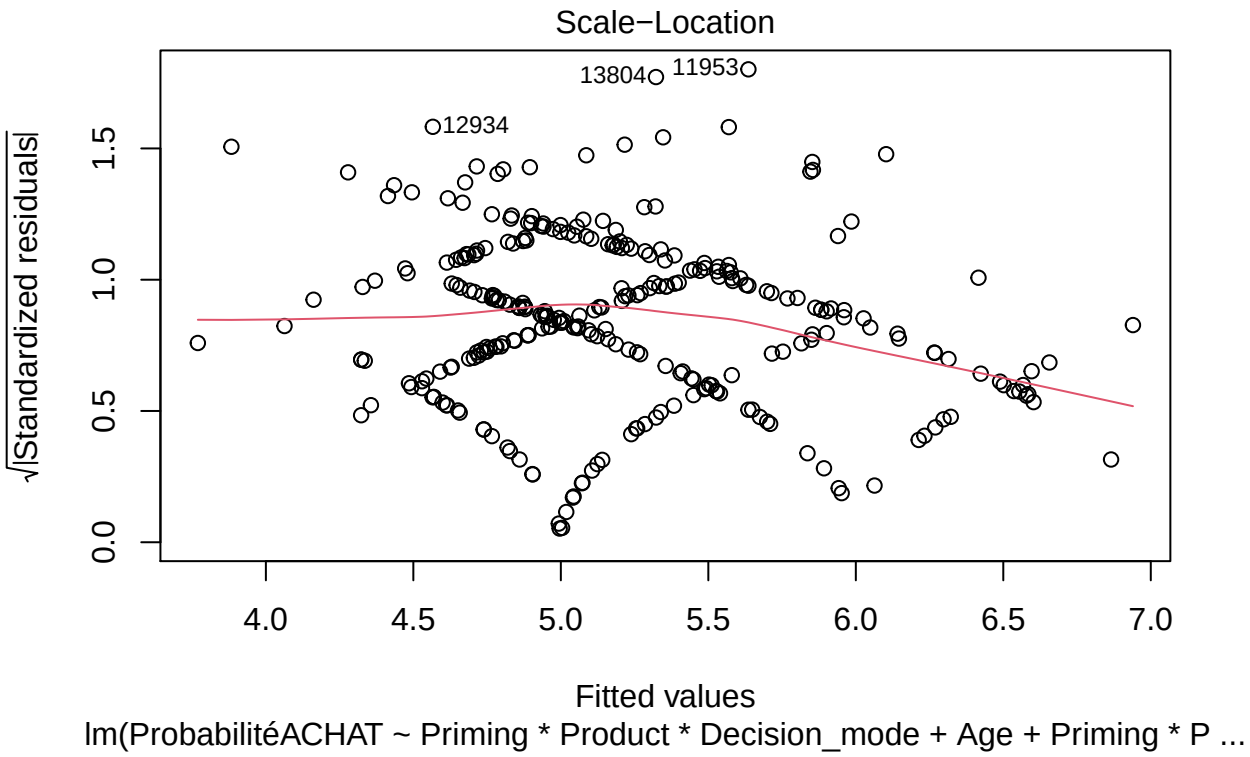

```
sjPlot::plot_model(final)
```

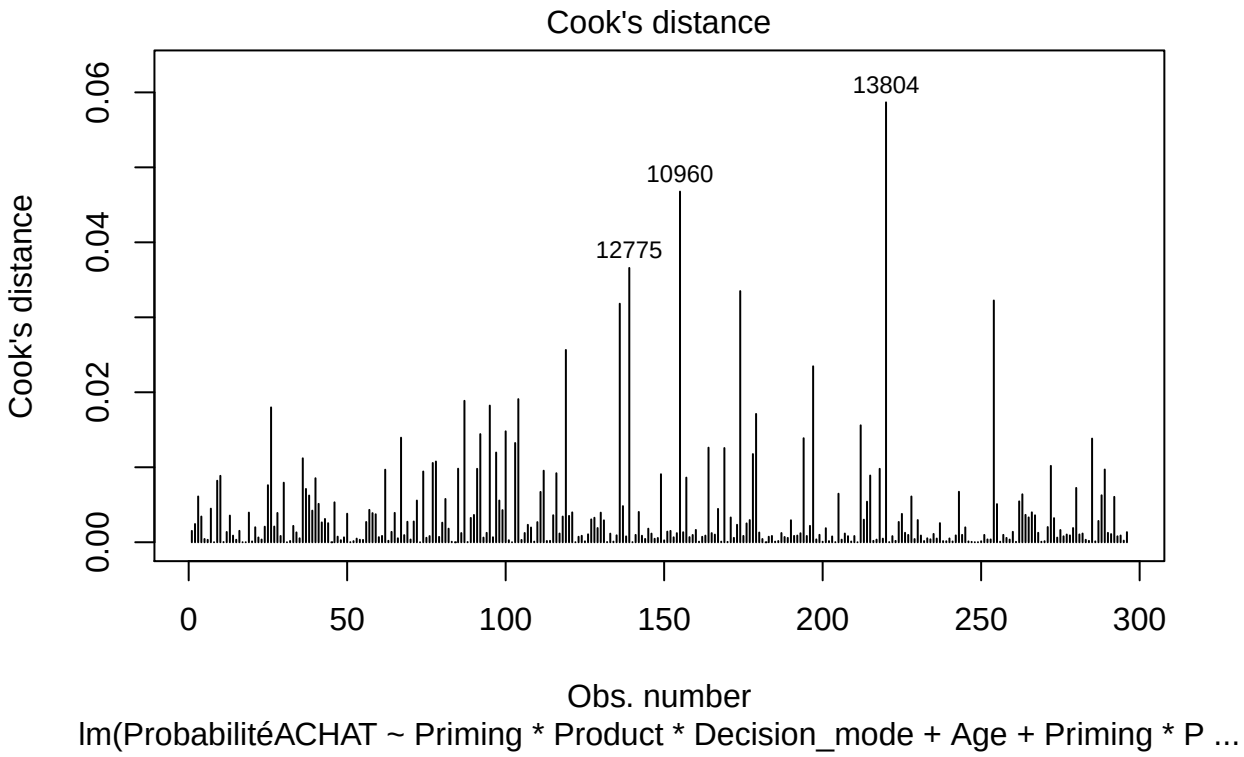


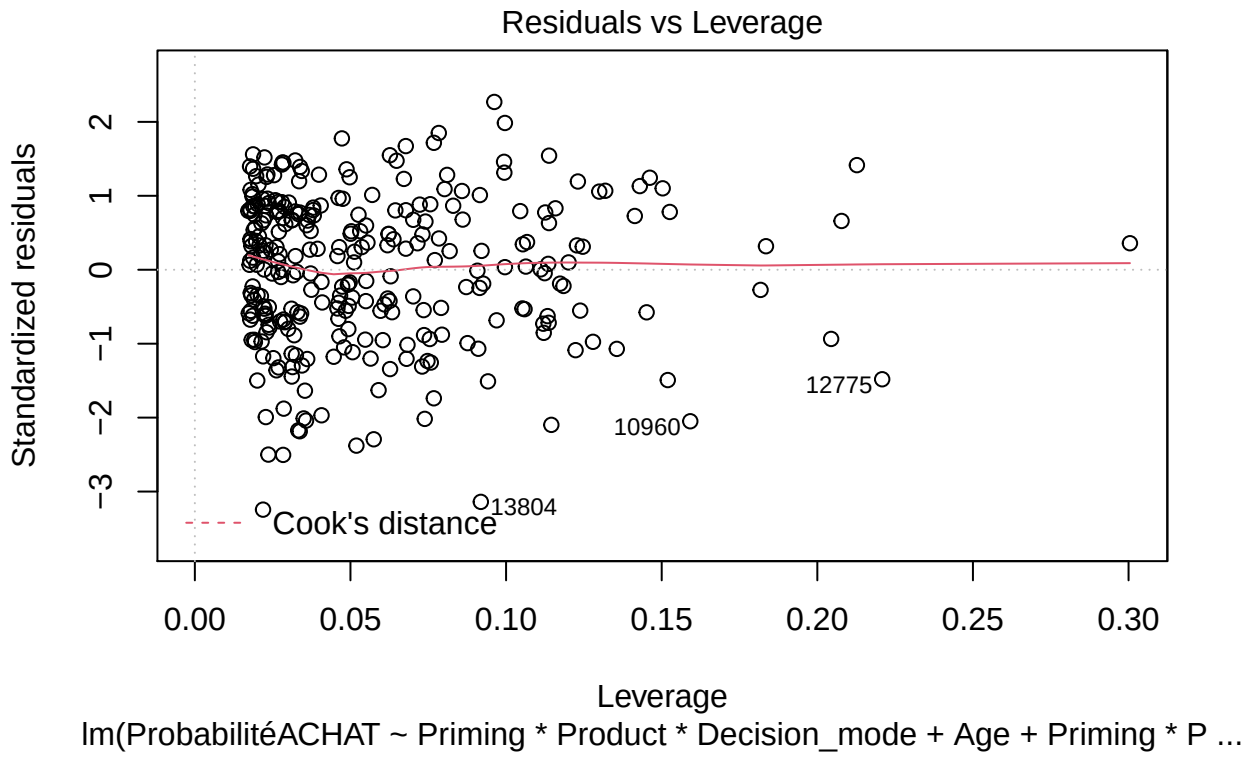

```
# ACHAT ------------------------------------------------------------------



modachat = lm(ProbabilitéACHAT ~ Priming*Product*Decision_mode +Age+ Priming*Product*Comp_Enviro, data =

plot(modachat, 1:5, labels.id = base_clean$id )
```


Residuals vs Fitted
Residuals
4
2
0
−2
−4
13117
13804
11953
4.0
4.5
5.0
5.5
6.0
6.5
7.0
Fitted values
lm(ProbabilitéACHAT ~ Priming * Product * Decision_mode + Age + Priming * P ...

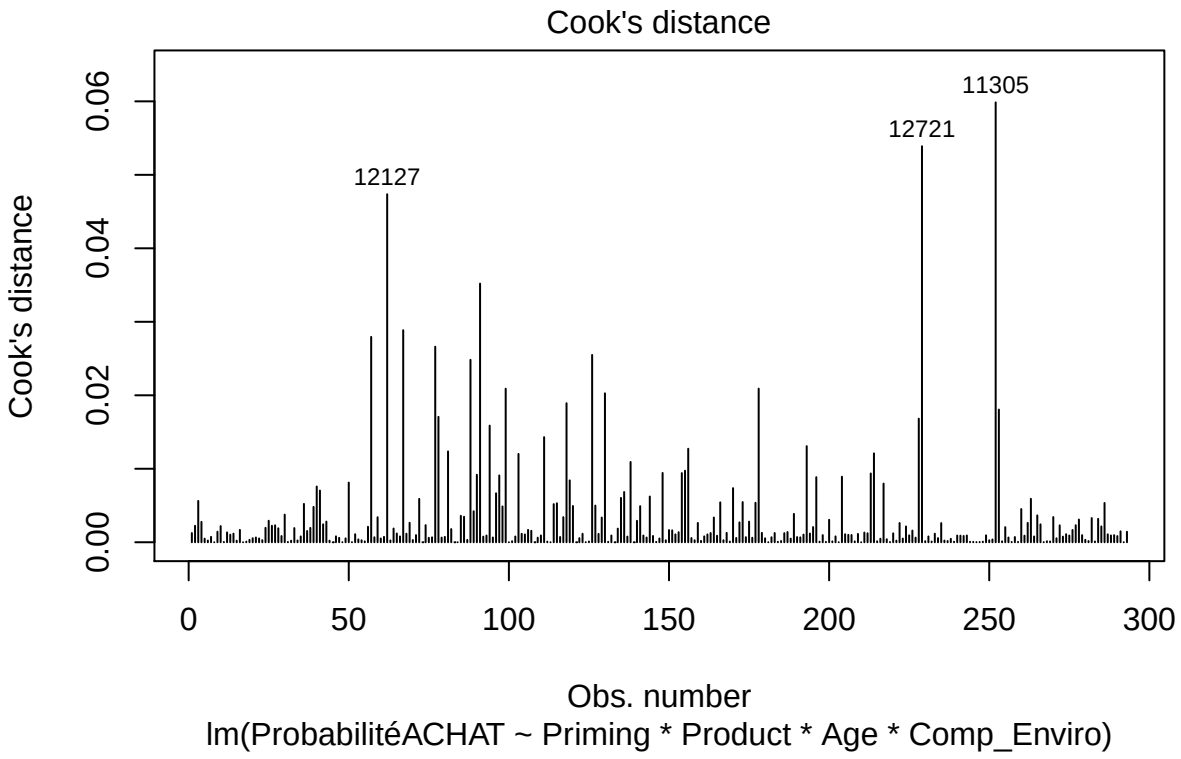

Normal Q−Q
Standardized residuals
Theoretical Quantiles
lm(ProbabilitéACHAT ~ Priming * Product * Decision_mode + Age + Priming * P ...
12934
13804
11953
−3
−2
−1
0
1
2
3


Scale−Location
13804
11953
12934
√|Standardized residuals|
0.0
0.5
1.0
1.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
Fitted values
lm(ProbabilitéACHAT ~ Priming * Product * Decision_mode + Age + Priming * P ...


Cook's distance
13804
10960
12775
0.00
0.02
0.04
0.06
Cook's distance
0
50
100
150
200
250
300
Obs. number
lm(ProbabilitéACHAT ~ Priming * Product * Decision_mode + Age + Priming * P ...




```
base_achat = filter(base_clean, id %notin% c("11269","13804", "12766"))

modachat = lm(ProbabilitéACHAT ~ Priming*Product*Age*Comp_Enviro, data = base_achat)

plot(modachat, which = 4, labels.id = base_achat$id )
```




```
MS = MASS::stepAIC(modachat, direction = "both", trace = FALSE)
MS$anova
```

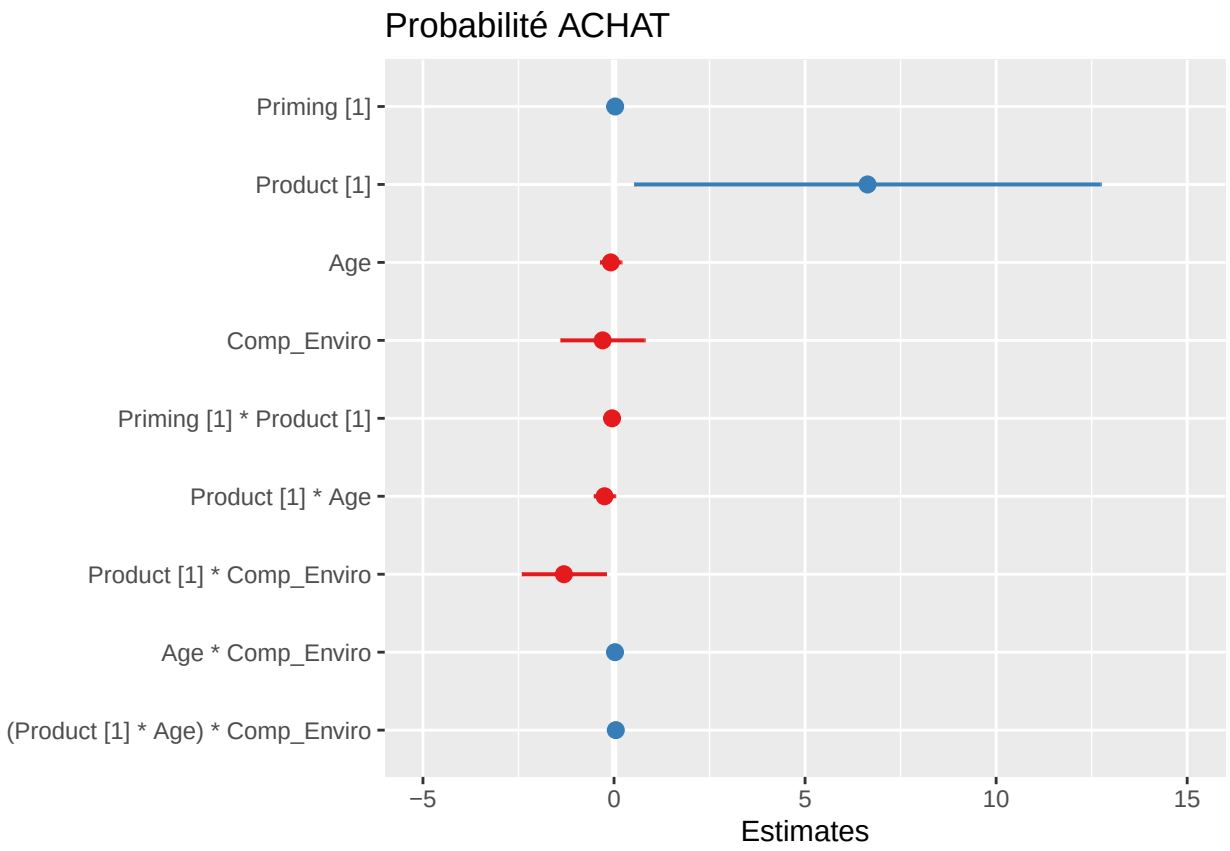
```
## Stepwise Model Path
## Analysis of Deviance Table
##
## Initial Model:
## ProbabilitéACHAT ~ Priming * Product * Age * Comp_Enviro
##
## Final Model:
## ProbabilitéACHAT ~ Product + Age + Comp_Enviro + Product:Age +
##     Product:Comp_Enviro + Age:Comp_Enviro + Product:Age:Comp_Enviro
##
##
##                                 Step Df    Deviance Resid. Df Resid. Dev
## 1                                                          277   543.9239
## 2 - Priming:Product:Age:Comp_Enviro  1 2.060254251       278   545.9842
## 3         - Priming:Age:Comp_Enviro  1 0.005577941       279   545.9898
## 4             - Priming:Product:Age  1 0.807562789       280   546.7973
## 5     - Priming:Product:Comp_Enviro  1 1.297616484       281   548.0949
## 6                 - Priming:Product  1 0.929195478       282   549.0241
## 7             - Priming:Comp_Enviro  1 1.711599923       283   550.7357
## 8                     - Priming:Age  1 1.678624608       284   552.4144
## 9                         - Priming  1 0.250186458       285   552.6646
##        AIC
## 1 213.2606
```

```
## 2 212.3683
## 3 210.3713
## 4 208.8043
## 5 207.4988
## 6 205.9952
## 7 204.9072
## 8 203.7989
## 9 201.9315
```

```
final = lm(ProbabilitéACHAT ~ Priming*Product + Age + Comp_Enviro + Product:Age +
             Product:Comp_Enviro + Age:Comp_Enviro + Product:Age:Comp_Enviro,  data = base_achat)
anova(final)
```

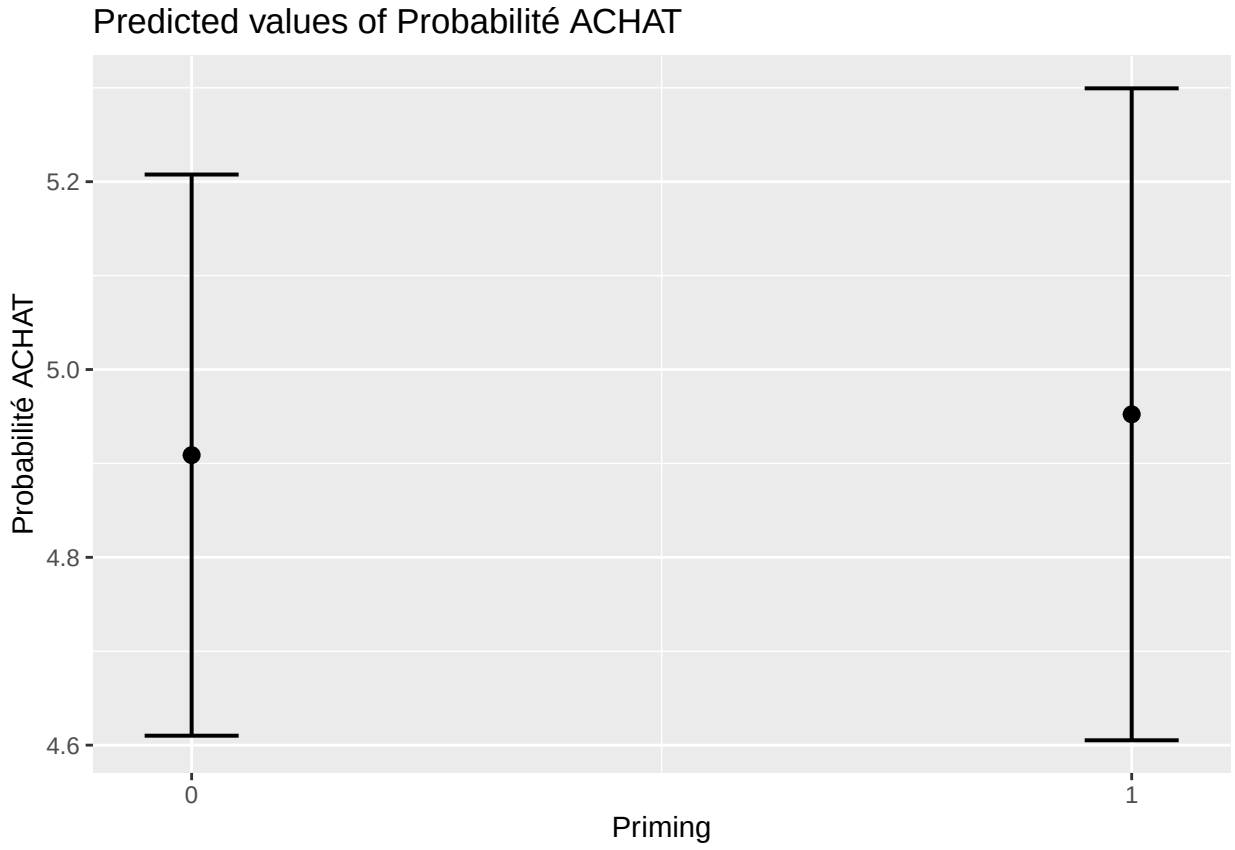
```
## Analysis of Variance Table
##
## Response: ProbabilitéACHAT
##                            Df Sum Sq Mean Sq F value    Pr(>F)
## Priming                     1   0.19  0.1936  0.0993 0.7528975
## Product                     1  20.70 20.6990 10.6185 0.0012562 **
## Age                         1  21.62 21.6172 11.0896 0.0009833 ***
## Comp_Enviro                 1  19.52 19.5247 10.0161 0.0017210 **
## Priming:Product             1   0.75  0.7473  0.3834 0.5363057
## Product:Age                 1   0.00  0.0003  0.0002 0.9893856
## Product:Comp_Enviro         1  23.42 23.4225 12.0157 0.0006094 ***
## Age:Comp_Enviro             1   1.58  1.5757  0.8083 0.3693760
## Product:Age:Comp_Enviro     1   6.58  6.5803  3.3757 0.0672139 .
## Residuals                 283 551.66  1.9493
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
sjPlot::plot_model(final)
```

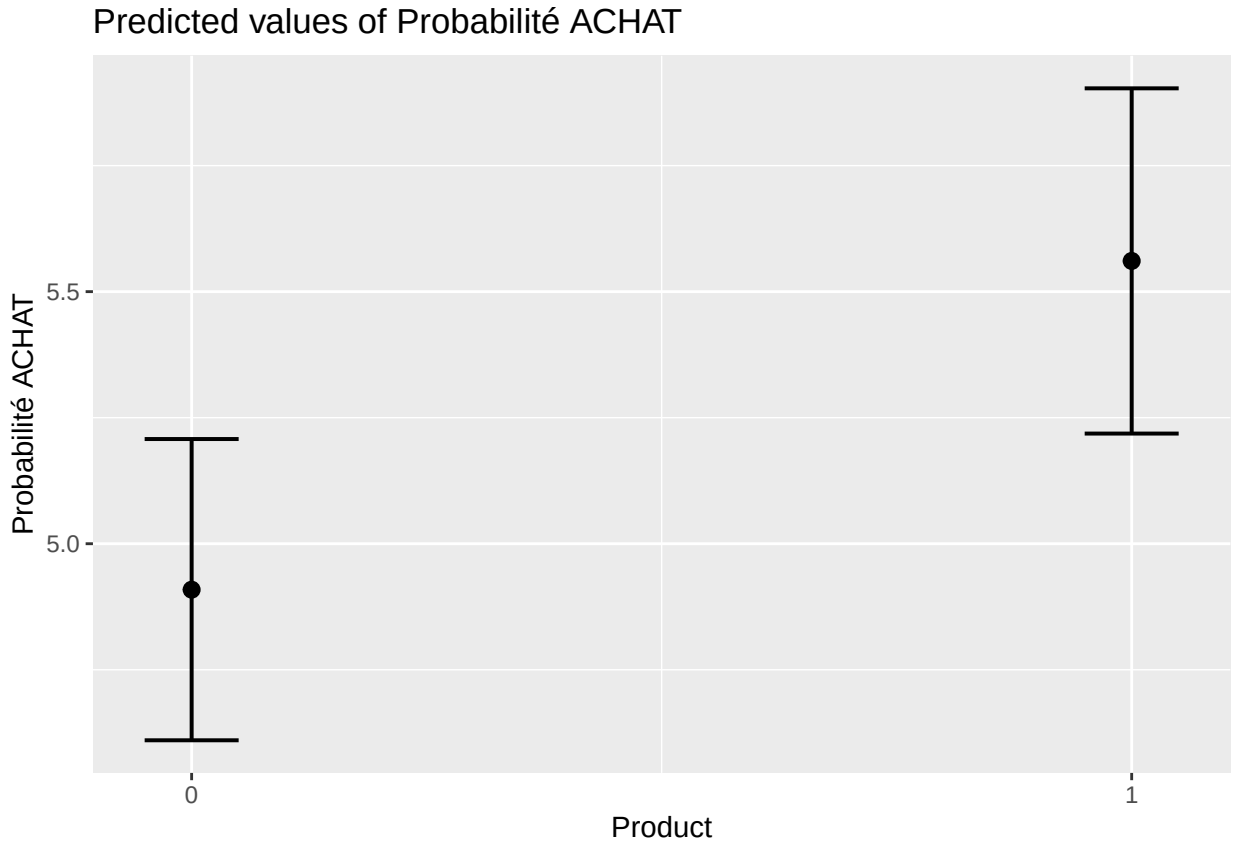



```
sjPlot::plot_model(final, type = "pred")
```

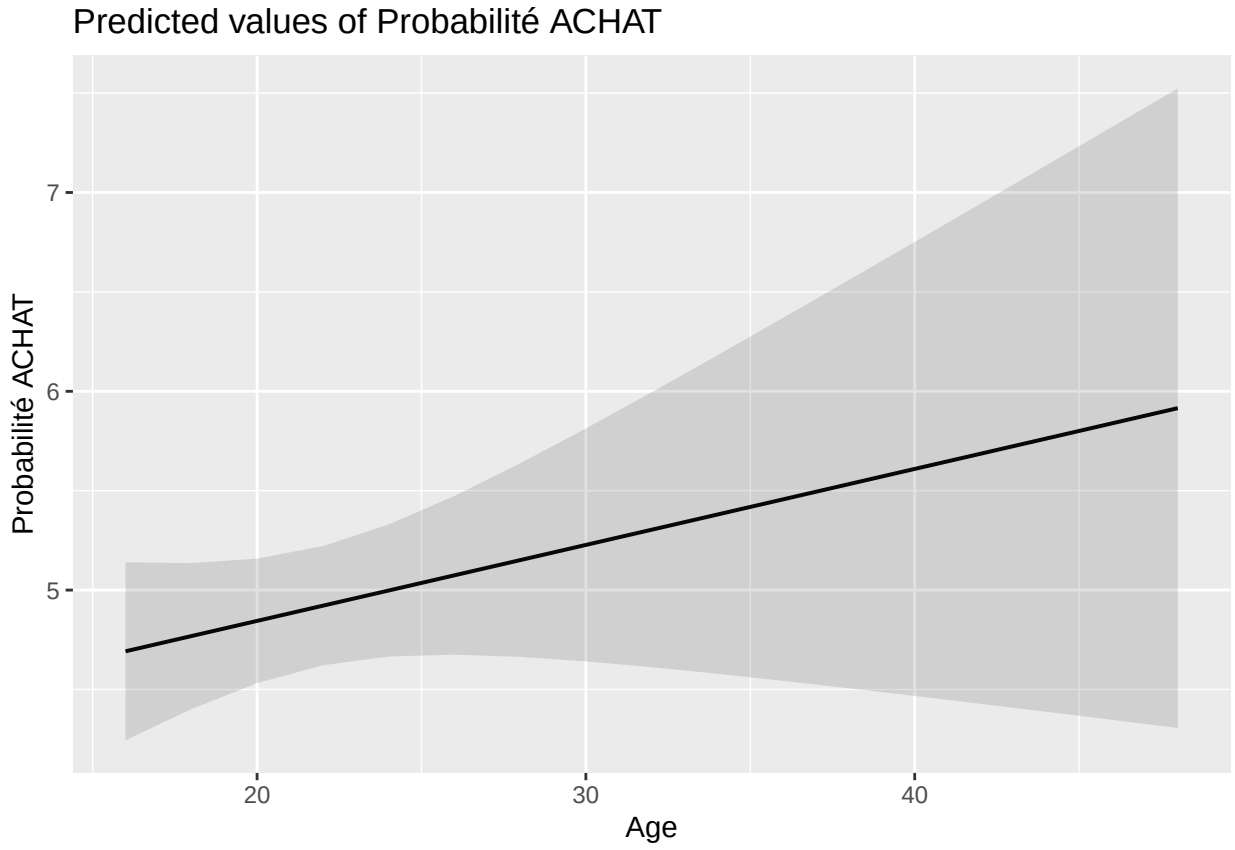
```
## $Priming
```


Predicted values of Probabilité ACHAT
Probabilité ACHAT
5.2
5.0
4.8
4.6
0
1
Priming

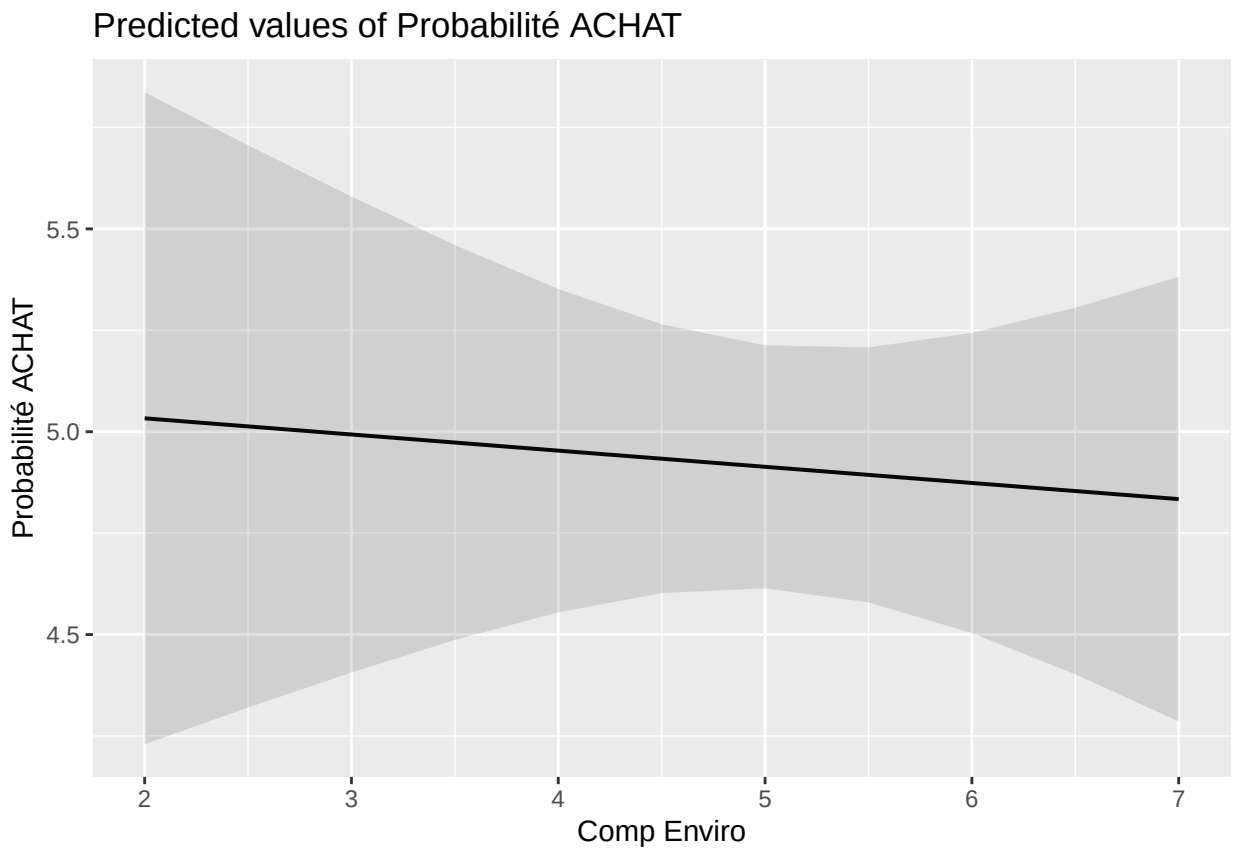
```
##
## $Product
```


Predicted values of Probabilité ACHAT
Probabilité ACHAT
5.5
5.0
0
1
Product

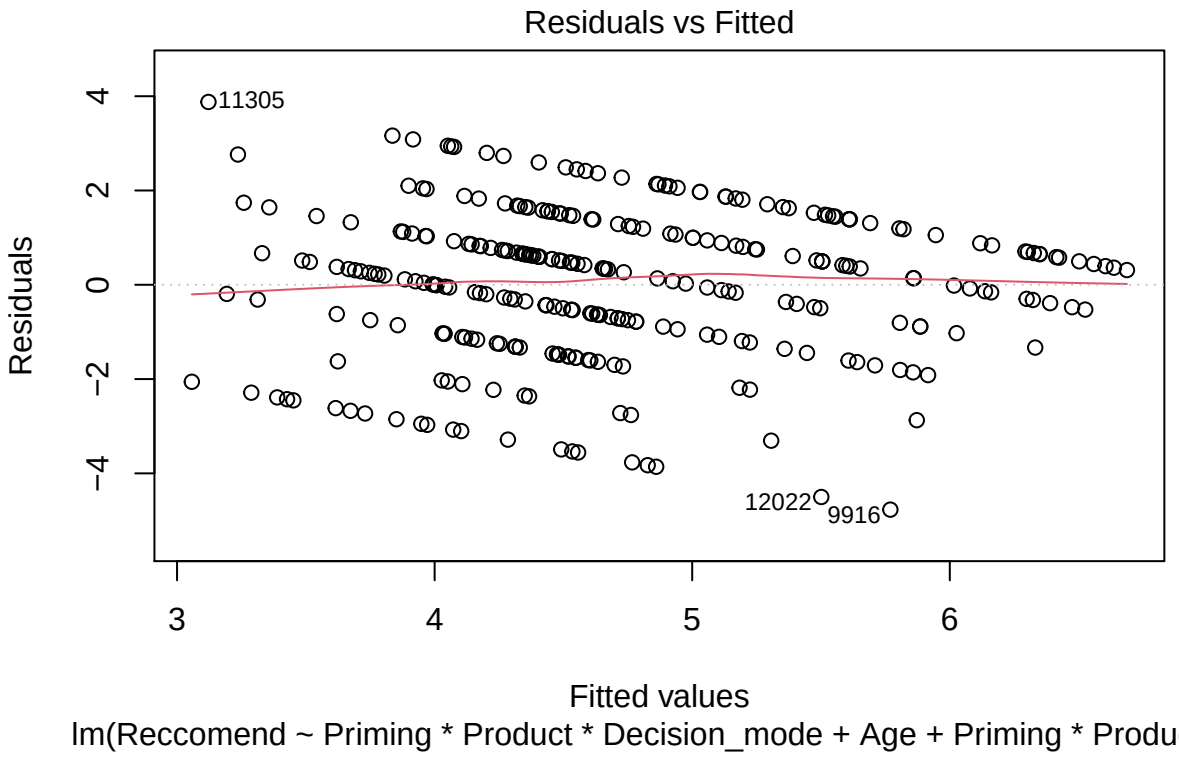
```
##
## $Age
```

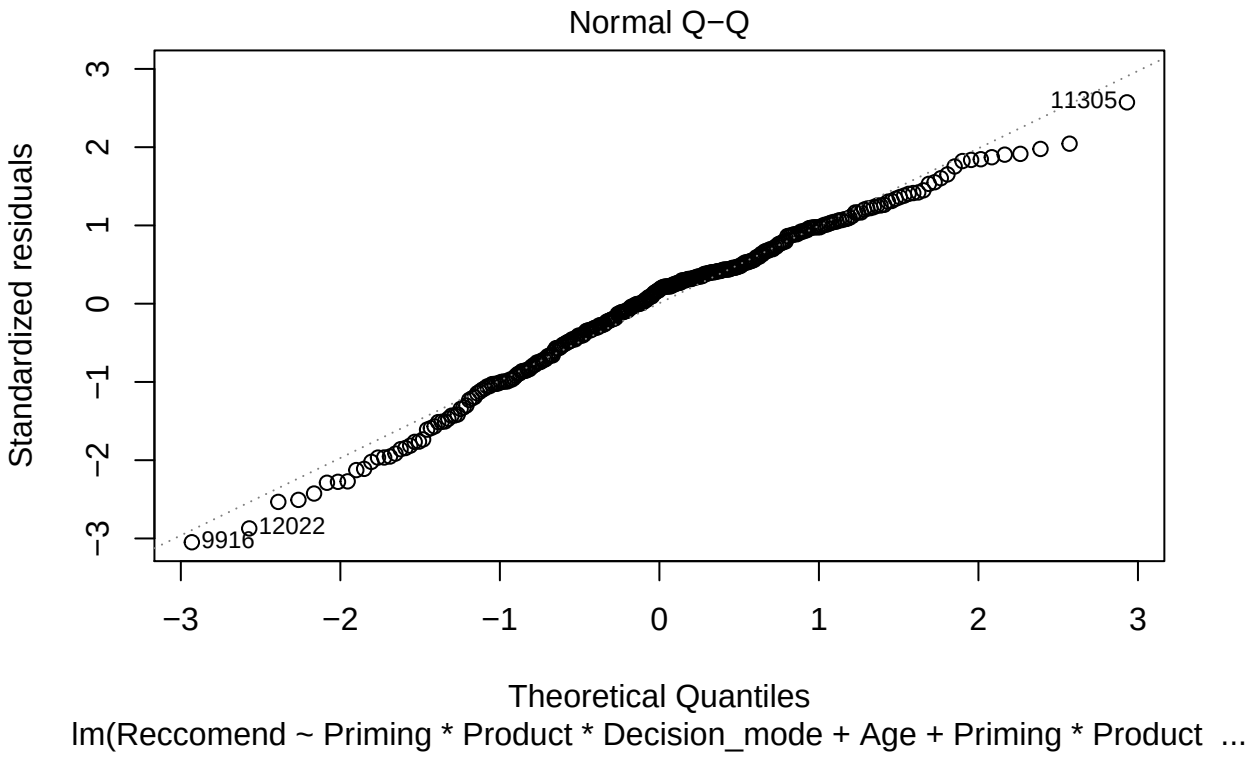

Predicted values of Probabilité ACHAT
Probabilité ACHAT
7
6
5
20
30
40
Age

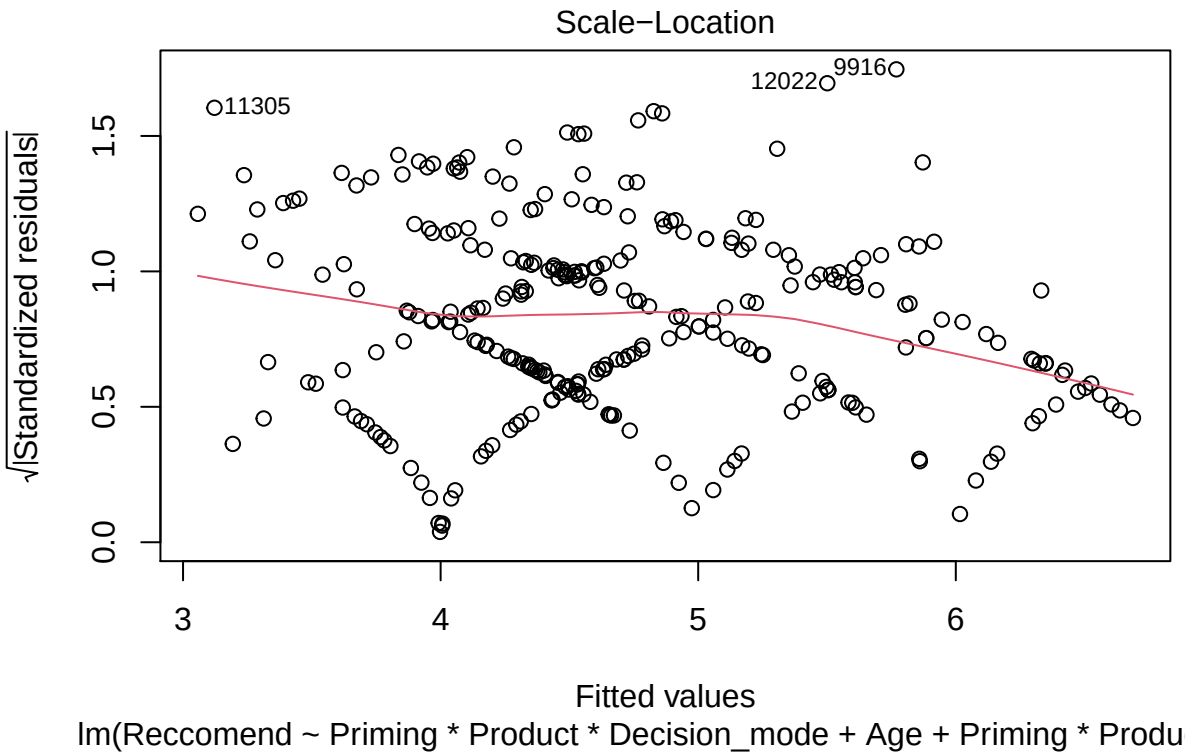
```
##
## $Comp_Enviro
```

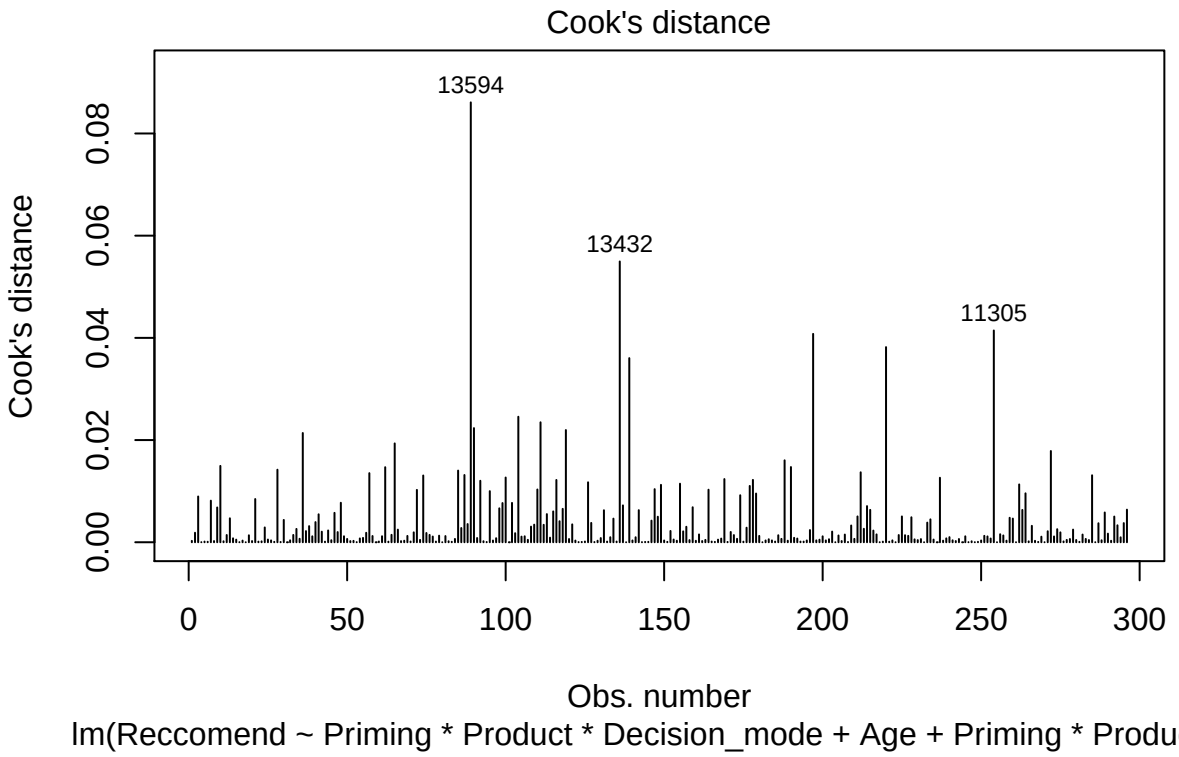


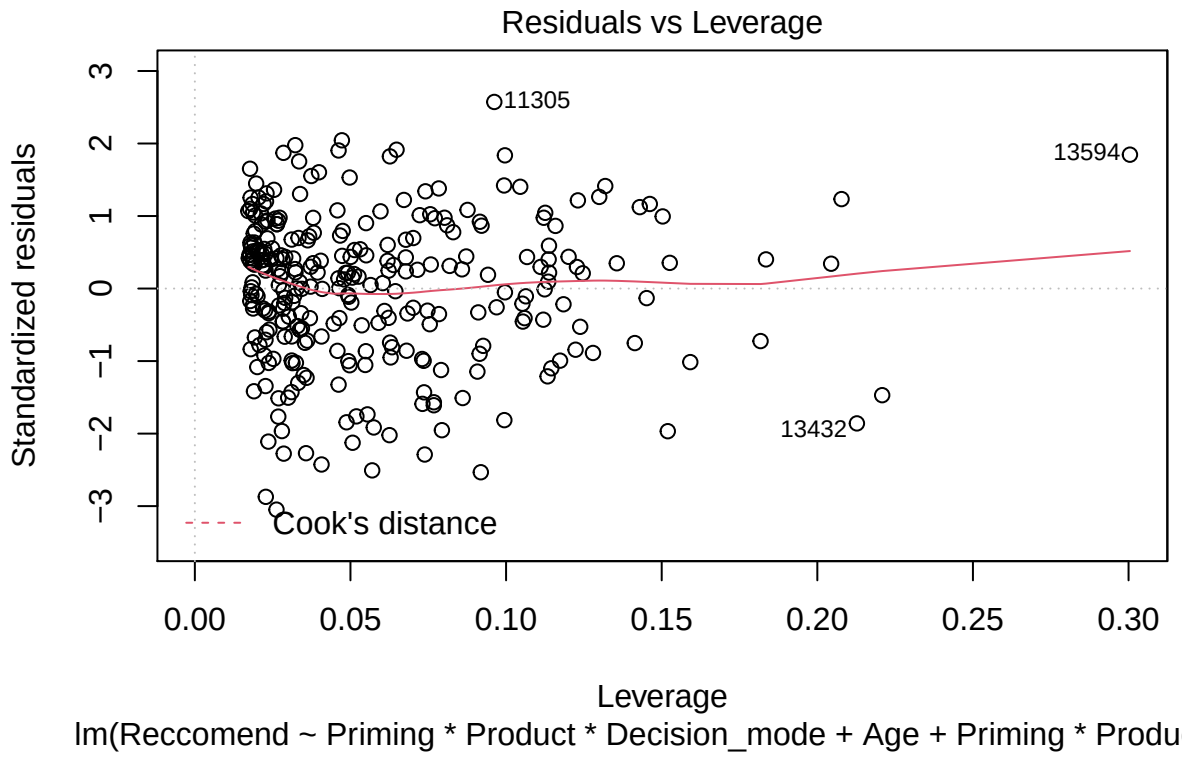

```
# Reccomend ------------------------------------------------------------------

modrecco = lm(Reccomend ~ Priming*Product*Decision_mode +Age+ Priming*Product*Comp_Enviro, data = base_

plot(modrecco, 1:5, labels.id = base_clean$id )
```


Residuals vs Fitted
Residuals
Fitted values
lm(Reccomend ~ Priming * Product * Decision_mode + Age + Priming * Product ...
11305
12022
9916
4
2
0
−2
−4
3
4
5
6

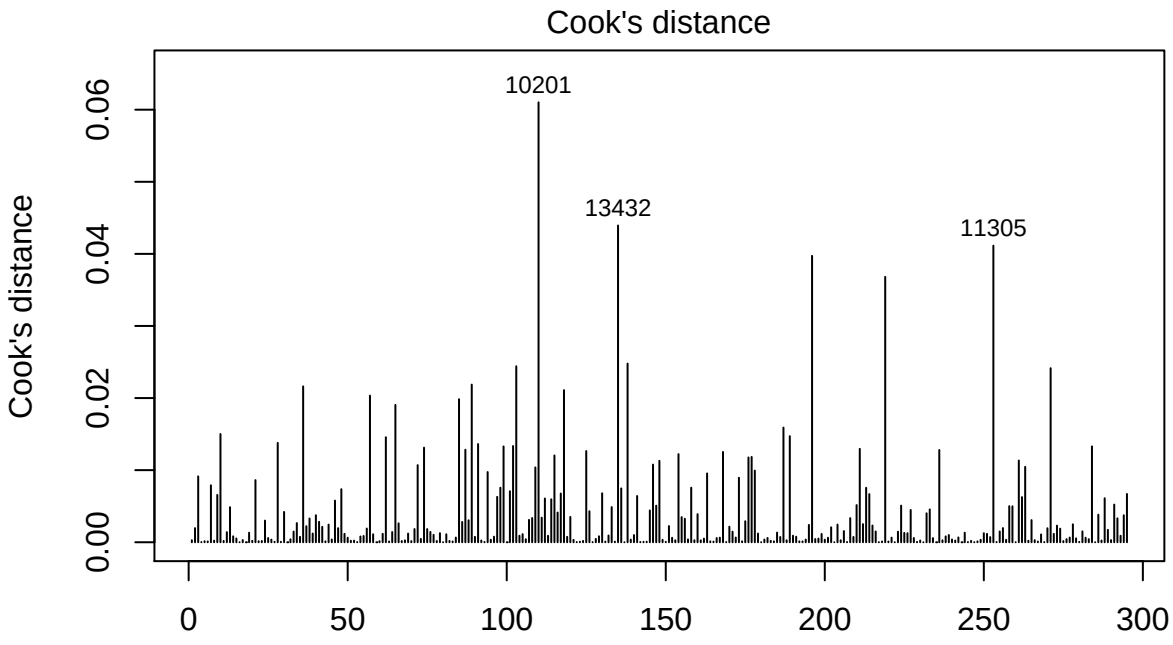

Normal Q−Q
Standardized residuals
Theoretical Quantiles
lm(Reccomend ~ Priming * Product * Decision_mode + Age + Priming * Product ...
11305
12022
9916
−3
−2
−1
0
1
2
3


Scale−Location
11305
12022
9916
√|Standardized residuals|
0.0
0.5
1.0
1.5
3
4
5
6
Fitted values
lm(Reccomend ~ Priming * Product * Decision_mode + Age + Priming * Product ...


Cook's distance
13594
13432
11305
Cook's distance
0.00
0.02
0.04
0.06
0.08
0
50
100
150
200
250
300
Obs. number
lm(Reccomend ~ Priming * Product * Decision_mode + Age + Priming * Product ...




```
base_recco = filter(base_clean, id %notin% c("13594"))

modrecco = lm(Reccomend ~Priming*Product*Decision_mode +Age+ Priming*Product*Comp_Enviro, data = base_r

plot(modrecco, which = 4, labels.id = base_recco$id )
```



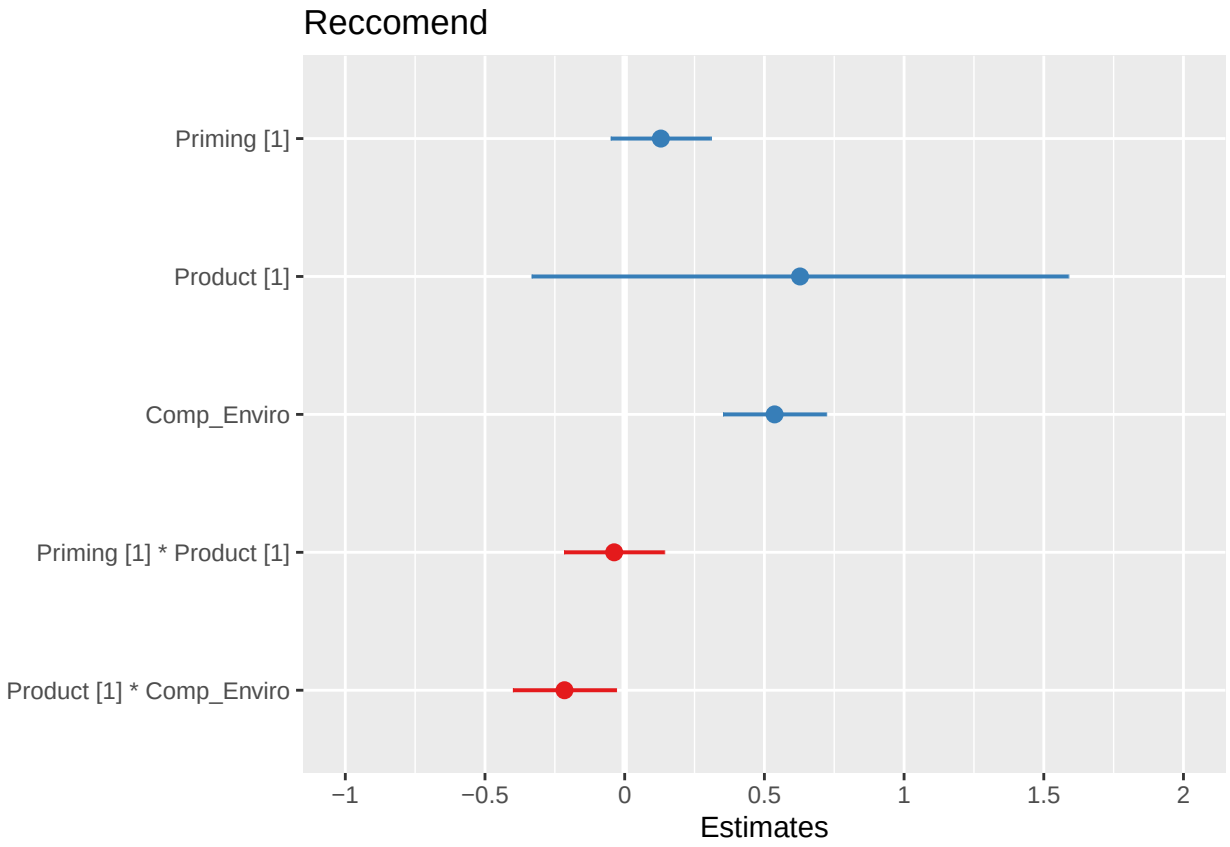

```
MS = MASS::stepAIC(modrecco, direction = "both", trace = FALSE)
MS$anova
```

```
## Stepwise Model Path
## Analysis of Deviance Table
##
## Initial Model:
## Reccomend ~ Priming * Product * Decision_mode + Age + Priming *
##     Product * Comp_Enviro
##
## Final Model:
## Reccomend ~ Priming + Product + Comp_Enviro + Product:Comp_Enviro
##
##
##                              Step Df  Deviance Resid. Df Resid. Dev      AIC
## 1                                                   278   692.7823 285.8534
## 2   - Priming:Product:Comp_Enviro  1 0.0759900       279   692.8583 283.8858
## 3           - Priming:Comp_Enviro  1 0.4011644       280   693.2595 282.0566
## 4                           - Age  1 0.7227732       281   693.9822 280.3640
## 5 - Priming:Product:Decision_mode  2 9.1291304       283   703.1114 280.2193
## 6         - Priming:Decision_mode  2 0.8794319       285   703.9908 276.5880
## 7         - Product:Decision_mode  2 1.9276497       287   705.9185 273.3947
## 8                 - Decision_mode  2 0.3486657       289   706.2671 269.5404
## 9               - Priming:Product  1 0.1328127       290   706.3999 267.5958
```

```
final = lm(Reccomend ~Priming*Product + Comp_Enviro + Product:Comp_Enviro,  data = base_achat)
anova(final)
```

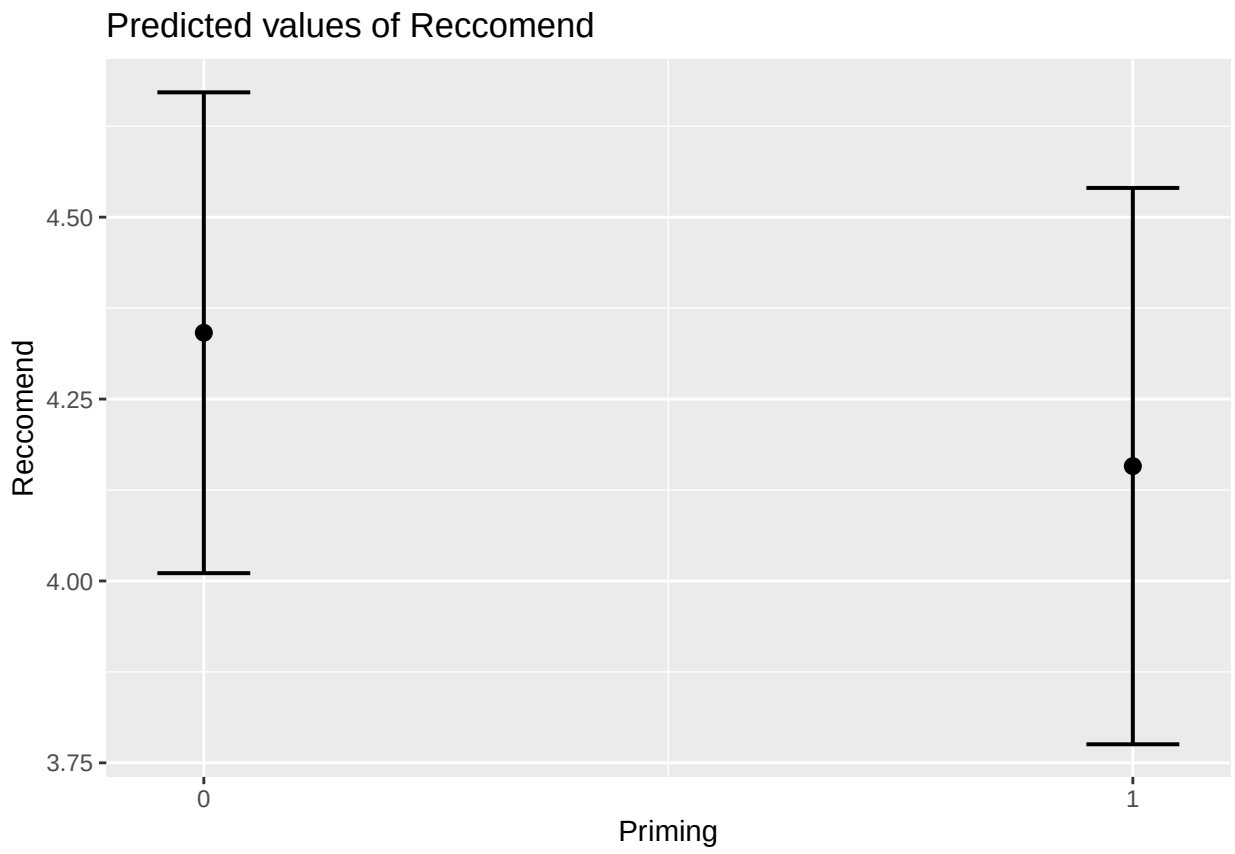
```
## Analysis of Variance Table
##
## Response: Reccomend
##                       Df Sum Sq Mean Sq F value        Pr(>F)
## Priming                1   0.86   0.859  0.3601        0.5489
## Product                1  73.43  73.429 30.7653 0.00000006613 ***
## Comp_Enviro            1  80.98  80.977 33.9276 0.00000001532 ***
## Priming:Product        1   0.38   0.375  0.1573        0.6920
## Product:Comp_Enviro    1  12.60  12.600  5.2790        0.0223 *
## Residuals            287 685.00   2.387
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
sjPlot::plot_model(final)
```

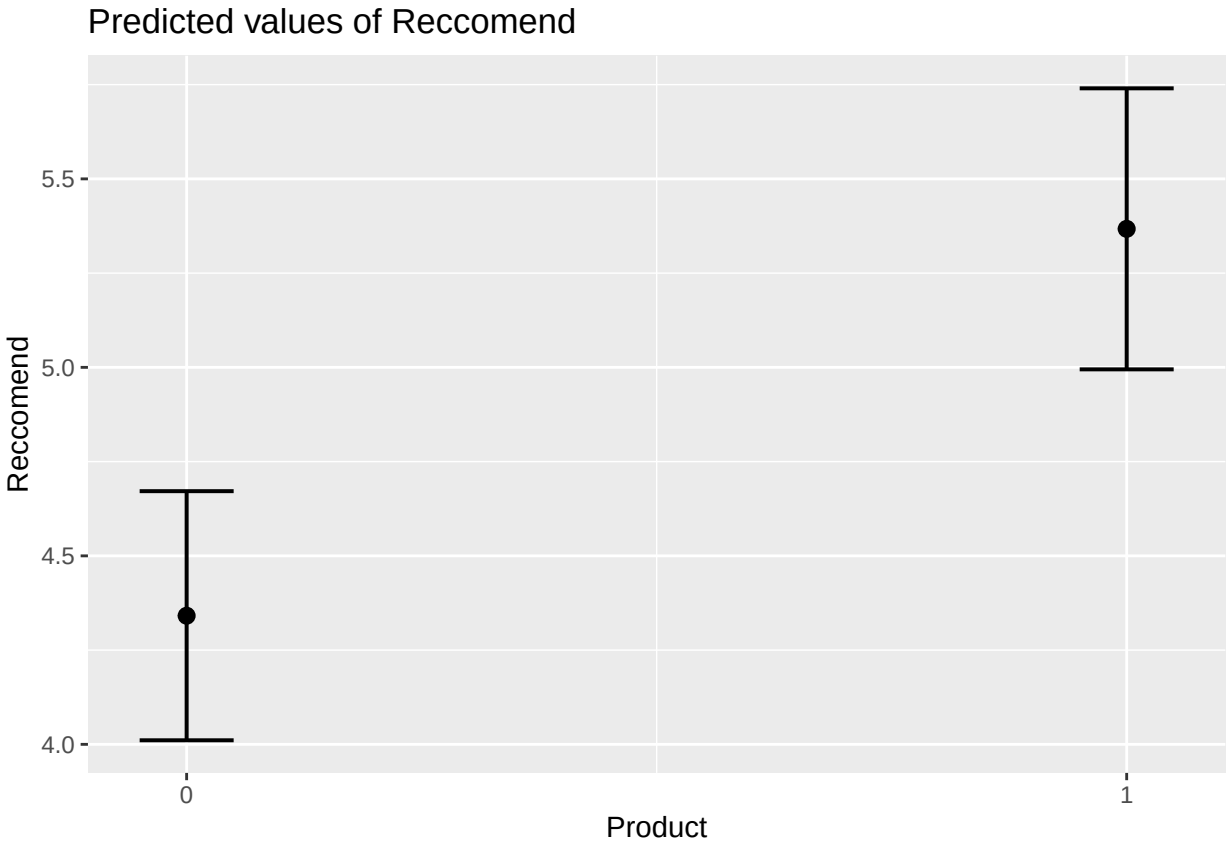



```
sjPlot::plot_model(final, type = "pred")
```

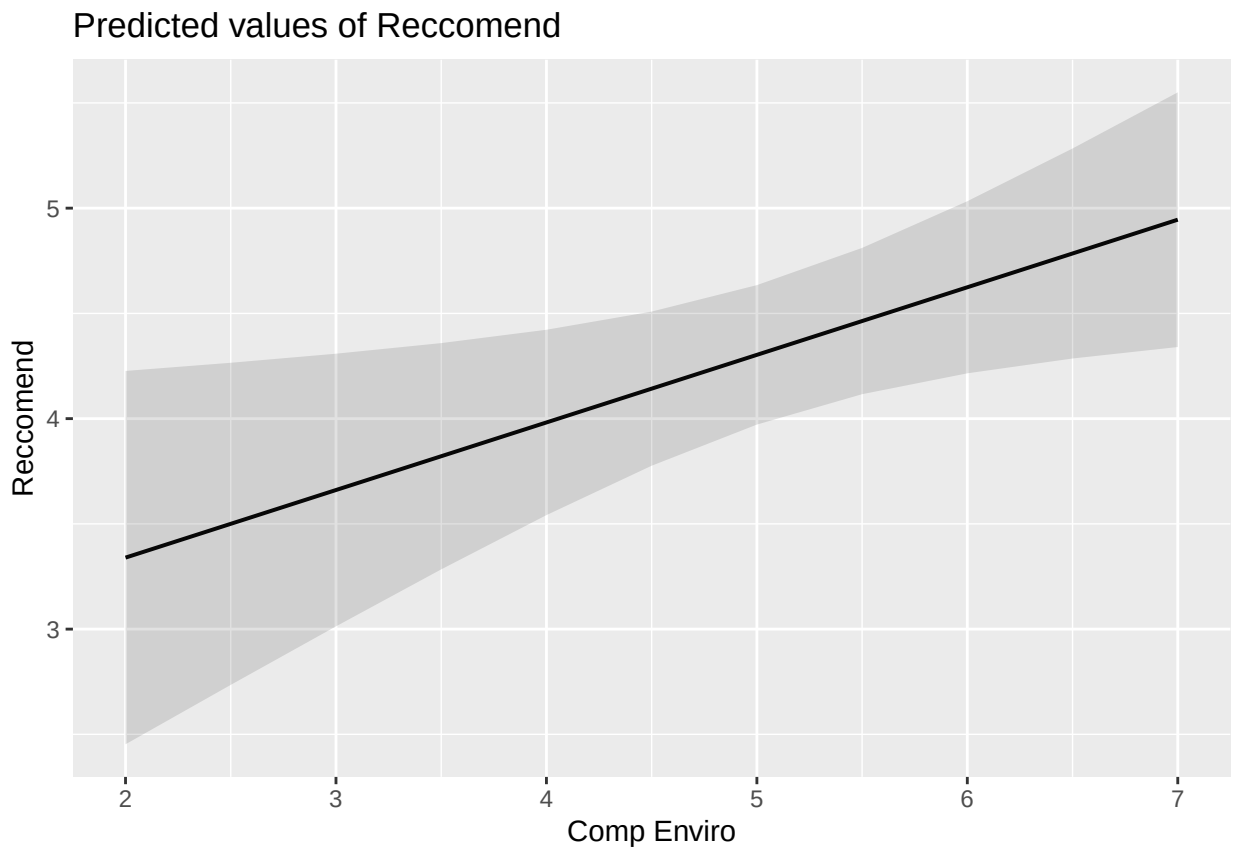
```
## $Priming
```


Predicted values of Reccomend
Reccomend
4.50
4.25
4.00
3.75
0
1
Priming

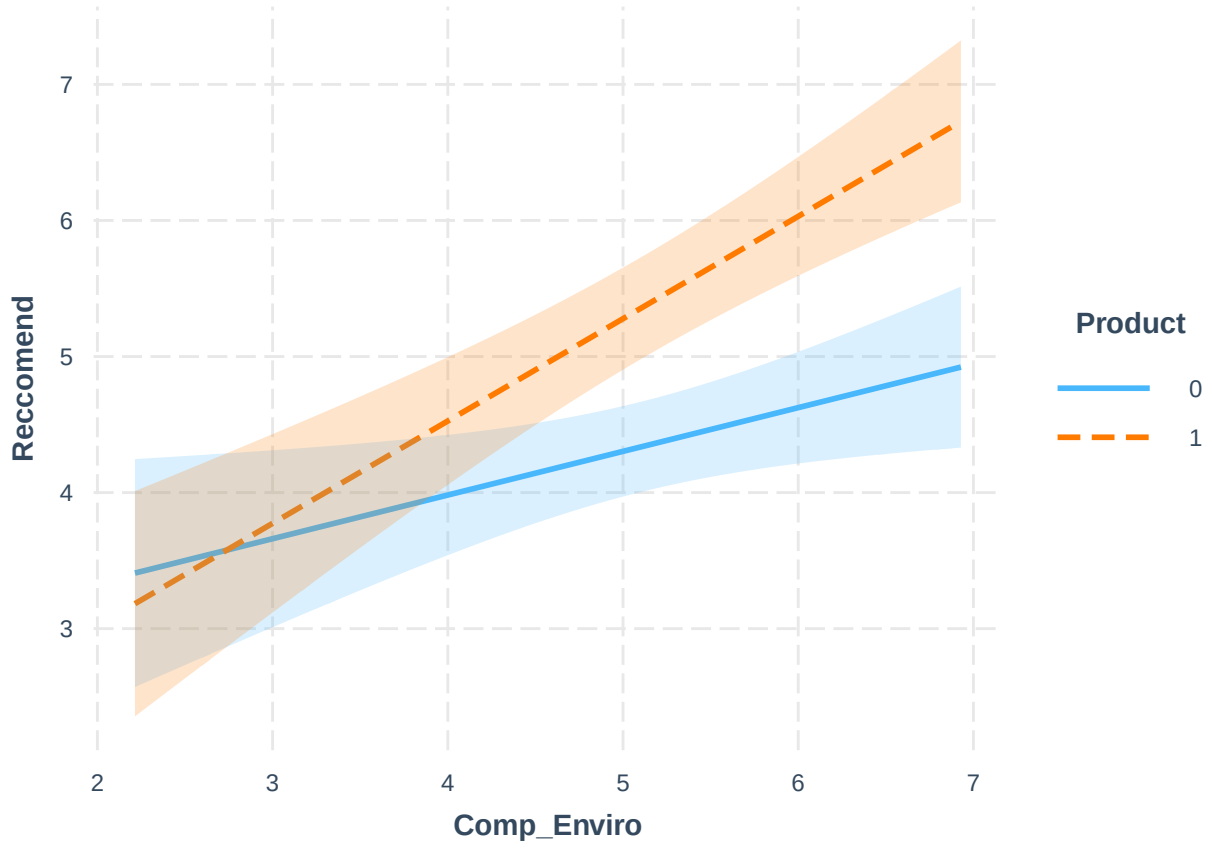
```
##
## $Product
```


Predicted values of Reccomend
Reccomend
5.5
5.0
4.5
4.0
0
1
Product

```
##
## $Comp_Enviro
```




```
interactions::interact_plot(final, pred = Comp_Enviro, modx = Product, interval = TRUE)
```

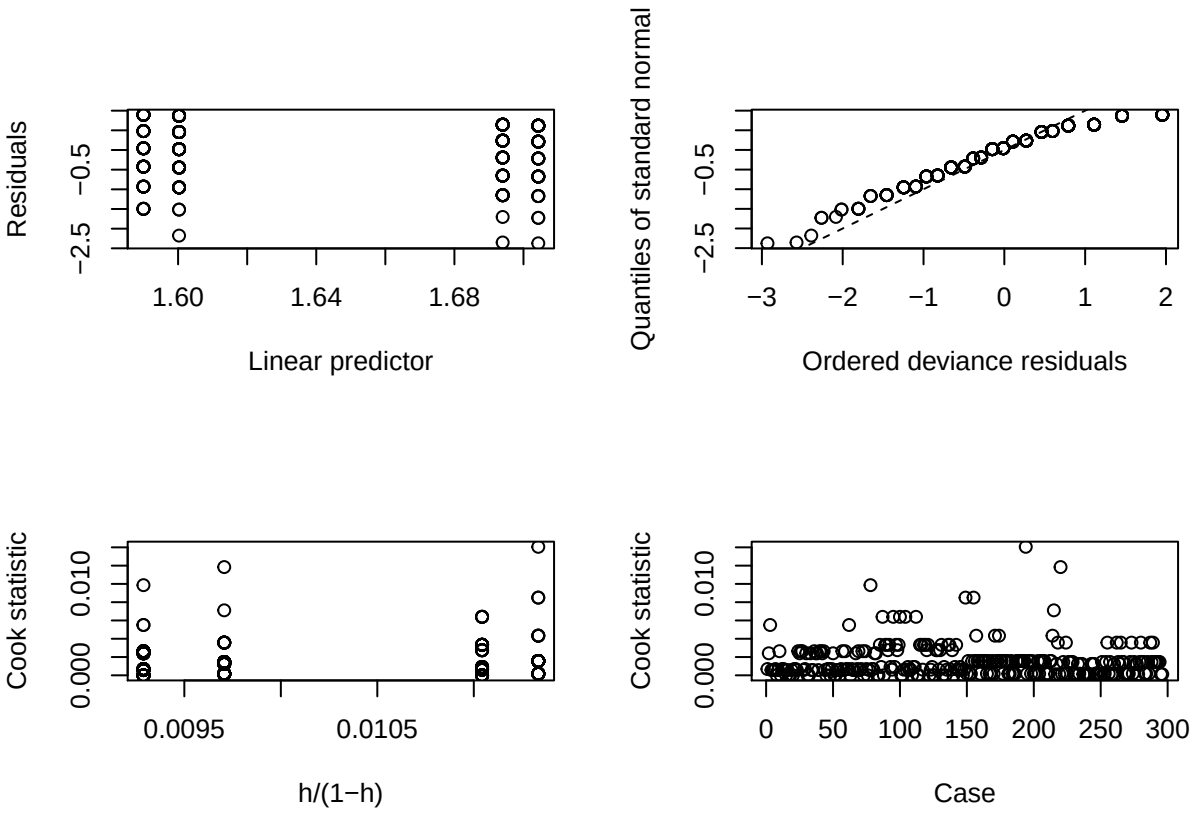



```
# Eval eco ----------------------------------------------------------------------

#more model
final = glm(ProbabilitéACHAT ~ Priming+Product, data = base_clean, family="poisson")

library(boot)
```

```
##
## Attaching package: 'boot'
```

```
## The following object is masked from 'package:car':
##
##     logit
```

```
diag <- glm.diag(final)
glm.diag.plots(final, diag)
```


Residuals
−2.5
−0.5
1.60
1.64
1.68
Linear predictor
Quantiles of standard normal
−2.5
−0.5
−3
−2
−1
0
1
2
Ordered deviance residuals
Cook statistic
0.000
0.010
0.0095
0.0105
h/(1−h)
Cook statistic
0.000
0.010
0
50
100
150
200
250
300
Case