MULTIPLE LINEAR REGRESSION

```
fit<- lm(rating~bpm+nrgy+dnce+dB+val+dur+acous+spch,data = data_clea
n)
summary(fit)
```

```
## Call:
## lm(formula = rating ~ bpm + nrgy + dnce + dB + val + dur + acous
+
##     spch, data = data_clean)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.0684 -0.1588  0.1418  0.2854  1.4438
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  5.0729840  0.4549944  11.150  < 2e-16 ***
## bpm          0.0006058  0.0012819   0.473 0.636706
## nrgy        -0.0099612  0.0028328  -3.516 0.000471 ***
## dnce         0.0035088  0.0028024   1.252 0.211032
## dB           0.0601839  0.0136253   4.417 1.19e-05 ***
## val         -0.0003163  0.0017381  -0.182 0.855654
## dur         -0.0021127  0.0009286  -2.275 0.023259 *
## acous       -0.0003267  0.0018587  -0.176 0.860553
## spch        -0.0009379  0.0041604  -0.225 0.821725
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7446 on 593 degrees of freedom
## Multiple R-squared:  0.059,  Adjusted R-squared:  0.0463
## F-statistic: 4.647 on 8 and 593 DF,  p-value: 1.587e-05
```

```
coefficients(fit)
```

```
##   (Intercept)           bpm          nrgy          dnce
dB
##  5.0729840484  0.0006057746 -0.0099611954  0.0035088480  0.060183
8831
##           val           dur         acous          spch
## -0.0003163147 -0.0021126753 -0.0003266664 -0.0009378581
```

```
library(GGally)
```

```
confint(fit,level=0.95)
```

```
##                    2.5 %        97.5 %
## (Intercept)  4.179387646  5.9665804510
## bpm         -0.001911876  0.0031234256
## nrgy        -0.015524755 -0.0043976362
## dnce        -0.001994987  0.0090126835
## dB           0.033424245  0.0869435216
## val         -0.003729900  0.0030972710
## dur         -0.003936471 -0.0002888796
## acous       -0.003977183  0.0033238503
## spch        -0.009108726  0.0072330102

# Predicted Values
fitted(fit)

##         1         2         3         4         5         6
7         8
## 3.7458413 3.5562510 3.9336673 3.5840761 3.7410124 3.7272929 3.927
8802 3.7335346
##         9        10        11        12        13        14
15        16
## 3.9599573 3.9447971 3.7455732 3.7350415 3.8236817 3.7568027 3.459
2303 3.7291370
##        17        18        19        20        21        22
23        24
## 4.0930899 3.4764473 3.5405644 4.1597275 3.7643827 3.8629393 3.946
1250 3.7900417
##        25        26        27        28        29        30
31        32
## 3.6237872 3.6681350 3.7081134 3.7420871 3.7957417 3.9242591 4.091
4590 3.8281834
##        33        34        35        36        37        38
39        40
## 3.9978524 3.8013570 3.6389334 4.0607846 3.9748719 3.7158894 3.528
8588 3.6793646
##        41        42        43        44        45        46
47        48
## 3.8010693 3.9713729 3.7581985 3.8667744 3.8534561 3.8907832 3.674
2832 3.8412884
##        49        50        51        52        53        54
55        56
## 3.3694824 3.7688554 3.8079718 3.8547484 3.8982124 3.6989465 3.741
0124 3.8295675
##        57        58        59        60        61        62
63        64
## 3.7330589 3.9560987 3.7142941 3.9207044 3.8357552 3.7008105 3.647
6228 3.4987133
##        65        66        67        68        69        70
71        72
## 3.7350415 3.8842333 3.8567833 3.8298573 3.8255487 3.6204266 3.698
3124 3.7015630
```

```
##        73        74        75        76        77        78
79        80
## 3.8201277 3.8065652 4.0537785 3.8244589 3.5326135 3.6875769 3.802
4394 3.9557991
##        81        82        83        84        85        86
87        88
## 3.9467763 3.6615055 3.6674119 3.7441728 3.8340883 3.9209860 3.671
5535 3.8142766
##        89        90        91        92        93        94
95        96
## 3.8632847 3.8846055 3.7778766 3.5967382 3.8734081 3.6742832 3.980
1438 3.3694824
##        97        98        99       100       101       102
103       104
## 3.8166924 3.7948420 3.8582821 3.8362624 3.5603378 3.8152403 3.733
4547 3.8493477
##       105       106       107       108       109       110
111       112
## 3.7934124 3.9531848 3.7064833 3.8414349 4.0399708 3.9576645 3.987
6294 4.0939373
##       113       114       115       116       117       118
119       120
## 3.9054028 3.8674362 3.6658156 3.7780806 4.0927214 3.8954148 3.767
9437 3.8759663
##       121       122       123       124       125       126
127       128
## 3.7193125 3.8384017 3.6121949 4.0977104 3.6885415 4.0498513 3.659
6167 3.8796093
##       129       130       131       132       133       134
135       136
## 3.8474728 3.7397592 3.6496004 3.7511013 3.7573180 3.8246690 3.731
5158 3.9075884
##       137       138       139       140       141       142
143       144
## 3.8966934 3.5332865 3.6872717 3.7286527 3.6492283 3.7992903 3.891
6493 3.7077722
##       145       146       147       148       149       150
151       152
## 3.8155375 3.8504370 3.8756763 3.5157365 4.0579933 3.8470462 3.957
2698 3.7927219
##       153       154       155       156       157       158
159       160
## 3.8674362 3.9235667 3.7858492 3.7173707 3.8251940 3.7719678 4.073
8049 3.8720266
##       161       162       163       164       165       166
167       168
## 3.8199337 3.6982050 3.5085653 3.5624128 3.8046059 3.6339691 3.873
3671 3.8480915
##       169       170       171       172       173       174
```

```
175       176
## 3.7294212 3.9063662 3.7520478 3.7670257 3.8530546 3.8526660 3.950
6514 3.8890795
##       177       178       179       180       181       182
183       184
## 3.9190723 3.7396361 3.8968986 3.9004508 3.9021217 3.7415003 3.805
8848 3.7493327
##       185       186       187       188       189       190
191       192
## 3.8338509 3.7953029 4.0910731 3.5390443 3.3378632 3.7732598 3.812
2235 3.6864398
##       193       194       195       196       197       198
199       200
## 3.7984279 3.7148772 3.6139405 3.8985291 3.7301841 3.6930839 3.847
1700 3.8684394
##       201       202       203       204       205       206
207       208
## 3.6843343 3.9106586 3.9525350 3.7016640 3.8418899 3.8285287 3.803
4022 3.7904843
##       209       210       211       212       213       214
215       216
## 3.8359441 3.6831861 3.9990428 4.0975560 3.7656550 3.7335580 3.862
5993 3.7898550
##       217       218       219       220       221       222
223       224
## 3.9601094 3.7057857 3.9042727 4.0473212 3.7777111 3.8146785 3.833
7025 3.9416099
##       225       226       227       228       229       230
231       232
## 3.6198521 3.7203541 3.7886623 3.7896717 3.7319448 3.7019220 4.047
8362 3.9088222
##       233       234       235       236       237       238
239       240
## 3.8970495 3.9192156 3.7803395 3.8728149 3.7212476 3.9129956 3.716
3834 3.8968986
##       241       242       243       244       245       246
247       248
## 3.8973584 3.4615230 3.9433286 3.7458248 3.9630282 3.8245888 3.735
2349 3.8773525
##       249       250       251       252       253       254
255       256
## 3.8929193 4.1055232 3.7288297 3.8424493 3.8394528 3.5193741 3.689
1726 4.1016995
##       257       258       259       260       261       262
263       264
## 3.6258706 3.9407850 3.9345245 3.8662573 4.0912938 3.9184495 3.878
6008 3.9886115
##       265       266       267       268       269       270
271       272
```

```
## 3.8502434 3.7683629 3.7924462 3.6528629 3.9525694 3.9705638 3.843
1639 3.7877169
##       273       274       275       276       277       278
279       280
## 3.8078198 3.8423205 3.6715310 3.9189310 4.3295413 3.6941716 4.075
7667 3.9088469
##       281       282       283       284       285       286
287       288
## 3.7900550 3.9110009 3.9394507 3.9294868 3.8581909 3.8305576 3.813
1238 3.8405680
##       289       290       291       292       293       294
295       296
## 3.6811901 3.7274339 3.9301773 3.9275442 3.8872622 3.6474633 3.909
9275 3.8814315
##       297       298       299       300       301       302
303       304
## 3.8293126 3.9280237 3.7483845 3.9212899 3.6712614 3.7768278 3.984
5654 3.9288647
##       305       306       307       308       309       310
311       312
## 3.9615003 3.9315080 3.6278194 3.8569254 3.7401873 3.8260153 3.601
3051 4.0378093
##       313       314       315       316       317       318
319       320
## 3.8032951 3.8801861 3.8506137 3.7786070 3.6918065 3.6222984 3.691
6309 3.6354377
##       321       322       323       324       325       326
327       328
## 3.8005055 3.8567342 3.6715310 3.6288739 3.8850693 3.7973767 4.050
4516 3.7678750
##       329       330       331       332       333       334
335       336
## 3.7522044 3.9136777 4.1436255 3.6794350 3.4475733 3.9643792 3.858
9009 3.7302063
##       337       338       339       340       341       342
343       344
## 3.7651226 3.8081710 3.7992659 3.8895864 3.8822799 3.7399900 3.735
8684 3.8050913
##       345       346       347       348       349       350
351       352
## 3.8060340 3.6739291 3.8099737 4.0866493 3.8768868 3.6666133 3.918
1484 3.7029429
##       353       354       355       356       357       358
359       360
## 3.6392233 3.8071149 3.7275938 3.8427557 3.8356079 3.7354687 3.964
7426 3.8514848
##       361       362       363       364       365       366
367       368
## 3.7130535 4.0619651 4.0684367 3.8431639 3.7877169 3.8665100 3.714
```

```
4416 4.0237083
##       369       370       371       372       373       374
375       376
## 3.7295195 3.7689871 4.0293851 4.1438247 4.0609575 3.6610218 3.990
6912 3.7201951
##       377       378       379       380       381       382
383       384
## 3.9047793 4.0043710 3.7900550 3.7664826 3.7860664 3.9740014 4.112
6983 3.8775504
##       385       386       387       388       389       390
391       392
## 3.5993225 3.7980330 3.7137339 3.6672411 3.8328470 4.0043873 3.901
9512 3.8641798
##       393       394       395       396       397       398
399       400
## 3.9349736 3.6493487 3.8042936 3.8440669 3.7768278 4.0539993 4.169
2306 3.8499603
##       401       402       403       404       405       406
407       408
## 3.7939471 3.7575509 3.8140644 3.6013051 3.7786070 3.7960283 3.965
1654 3.5505769
##       409       410       411       412       413       414
415       416
## 3.8794206 3.9012051 3.8868614 4.1558967 3.7261709 3.7156750 3.736
8455 3.7200520
##       417       418       419       420       421       422
423       424
## 3.7291097 3.9154629 4.0297597 3.8560028 3.7052864 3.8037267 3.449
3253 3.7097445
##       425       426       427       428       429       430
431       432
## 4.0100855 3.7535633 3.8134097 3.8741604 3.9062042 3.8764783 3.682
5198 3.6802314
##       434       435       436       437       438       439
440       441
## 3.6883364 3.7630008 3.9687045 3.8211138 3.7806848 3.9010605 3.737
2589 3.9371863
##       442       443       444       445       446       447
448       449
## 3.8276090 0.9823738 4.0441106 3.9599217 3.8830140 3.7637120 4.125
0586 3.8974854
##       450       451       452       453       454       455
456       457
## 3.6093079 3.9360899 3.7791817 3.9838334 3.9150626 3.7105844 3.735
8467 3.8178523
##       458       459       460       461       462       463
464       465
## 3.9463559 3.8599338 3.7860598 3.9960874 3.8181361 3.8437134 3.749
5752 3.8224442
```

```
##       466       467       468       469       470       471
472       473
## 3.7398341 3.9541891 3.8930094 3.8964411 3.7119239 3.7751380 3.685
4819 3.7966275
##       474       475       476       477       478       479
480       481
## 4.1692306 3.8913453 4.1025907 3.7367166 3.8963265 3.6954433 3.844
8230 3.8942793
##       482       483       484       485       486       487
488       489
## 3.8820210 4.1881064 3.8388052 3.7798145 3.7618541 3.7433108 3.768
0693 3.8582783
##       490       491       492       493       494       495
496       497
## 4.1159924 3.6302101 3.8450604 3.9892586 4.1115490 3.9142533 3.743
0476 3.8641226
##       498       499       500       501       502       503
504       505
## 3.8817317 3.9661300 3.5125971 3.6283829 3.7234760 4.0068274 3.759
7828 3.5539087
##       506       507       508       509       510       511
512       513
## 3.8800269 3.8245496 3.5285808 3.9035738 4.1685736 3.9046660 3.884
1300 3.9354206
##       514       515       516       517       518       519
520       521
## 3.8709438 4.0410369 3.7770101 3.8677410 3.8985631 4.0235624 3.799
0194 3.9254574
##       522       523       524       525       526       527
528       529
## 4.0201876 3.9953602 3.8691783 4.0972952 3.8351303 4.0776752 3.726
7278 4.0284552
##       530       531       532       533       534       535
536       537
## 3.9887789 3.6606500 3.9454999 4.0610324 3.9855277 3.7114761 3.869
6042 3.9074890
##       538       539       540       541       542       543
544       545
## 3.8705495 3.8573809 4.2270409 3.8499471 3.7201203 3.9004886 3.728
5711 3.7695268
##       546       547       548       549       550       551
552       553
## 3.9978856 4.0730913 4.0240549 3.8913453 3.9202595 3.8582687 3.825
3366 3.7105587
##       554       555       556       557       558       559
560       561
## 3.8686009 3.8443541 4.0556555 3.7428088 3.8582783 3.8759934 3.540
1175 3.9652925
##       562       563       564       565       566       567
```

```
568       569
## 3.9724857 3.9016947 4.0344900 3.7999315 3.9435816 4.0171492 3.963
9673 3.6172819
##       570       571       572       573       574       575
576       577
## 3.7936578 3.8306070 3.8526718 4.2052817 3.9726327 4.1194947 4.080
1595 3.8791969
##       578       579       580       581       582       583
584       585
## 3.9908318 4.1224928 3.9239844 4.2308162 3.9326076 3.7816372 4.127
1743 3.7674923
##       586       587       588       589       590       591
592       593
## 4.0038596 3.9037124 3.9391498 4.0878567 3.7963207 3.8682454 3.899
6517 3.9516314
##       594       595       596       597       598       599
600       601
## 3.7982612 3.9315749 3.9199874 3.8918417 3.9304739 3.8912661 3.773
0379 3.6793382
##       602       603
## 3.7316017 3.9646598
```

```
residuals(fit)
```

```
##           1           2           3           4           5
6
##  1.254158731  1.443749024  1.066332694  0.415923913  0.258987616
0.272707106
##           7           8           9          10          11
12
##  0.072119785  0.266465362  0.040042660  0.055202947  0.254426819
0.264958539
##          13          14          15          16          17
18
##  0.176318345  0.243197265  0.540769662  0.270863006 -0.093089945
0.523552670
##          19          20          21          22          23
24
##  0.459435624 -0.159727490  0.235617285  0.137060678  0.053874975
0.209958320
##          25          26          27          28          29
30
##  0.376212804  0.331865007  0.291886605  0.257912948  0.204258291
0.075740896
##          31          32          33          34          35
36
## -0.091459019  0.171816623  0.002147606  0.198643027  0.361066570
-0.060784556
##          37          38          39          40          41
42
```

```
##  0.025128118 -0.715889393 -0.528858846 -0.679364639 -0.801069269
-0.971372878
##           43           44           45           46           47
48
## -0.758198483 -0.866774363 -0.853456110 -0.890783175 -0.674283204
-0.841288380
##           49           50           51           52           53
54
## -0.369482396 -1.768855359 -2.807971830  1.145251587  1.101787558
0.301053475
##           55           56           57           58           59
60
##  0.258987616  0.170432550  0.266941093  0.043901332  0.285705904
0.079295636
##           61           62           63           64           65
66
##  0.164244814  0.299189506  0.352377232  0.501286735  0.264958539
0.115766731
##           67           68           69           70           71
72
##  0.143216652  0.170142676  0.174451311  0.379573416  0.301687610
0.298437025
##           73           74           75           76           77
78
##  0.179872255  0.193434773 -0.053778523  0.175541065  0.467386498
0.312423066
##           79           80           81           82           83
84
##  0.197560586  0.044200926  0.053223683  0.338494545  0.332588052
0.255827186
##           85           86           87           88           89
90
##  0.165911745  0.079013979  0.328446542  0.185723431 -0.863284690
-0.884605524
##           91           92           93           94           95
96
## -0.777876556 -0.596738219 -0.873408076 -0.674283204 -0.980143834
-0.369482396
##           97           98           99          100          101
102
## -0.816692429 -1.794842041 -1.858282145 -1.836262360 -1.560337767
-1.815240324
##          103          104          105          106          107
108
## -1.733454694 -2.849347709  1.206587577  0.046815201  0.293516668
0.158565131
##          109          110          111          112          113
114
## -0.039970836  0.042335493  0.012370570 -0.093937258  0.094597174
```

```
0.132563821
##          115          116          117          118          119
120
##  0.334184449  0.221919426 -0.092721356  0.104585179  0.232056254
0.124033681
##          121          122          123          124          125
126
##  0.280687548  0.161598342  0.387805076 -0.097710379  0.311458510
-0.049851254
##          127          128          129          130          131
132
##  0.340383322  0.120390745  0.152527225  0.260240759  0.350399624
0.248898731
##          133          134          135          136          137
138
##  0.242681990  0.175330996 -0.731515792 -0.907588426 -0.896693357
-1.533286547
##          139          140          141          142          143
144
## -2.687271695  1.271347334  1.350771727  1.200709732  1.108350706
1.292227753
##          145          146          147          148          149
150
##  0.184462520  0.149563010  0.124323670  0.484263516 -0.057993289
0.152953770
##          151          152          153          154          155
156
##  0.042730203  0.207278092  0.132563821  0.076433316  0.214150791
0.282629276
##          157          158          159          160          161
162
##  0.174806019  0.228032191 -0.073804936  0.127973377  0.180066333
0.301795030
##          163          164          165          166          167
168
##  0.491434689  0.437587198  0.195394070  0.366030925  0.126632880
0.151908536
##          169          170          171          172          173
174
##  0.270578763  0.093633782  0.247952194  0.232974279  0.146945379
0.147334001
##          175          176          177          178          179
180
##  0.049348641  0.110920481  0.080927699  0.260363878  0.103101442
0.099549240
##          181          182          183          184          185
186
##  0.097878294  0.258499670  0.194115239  0.250667279  0.166149075
0.204697073
```

```
##          187          188          189          190          191
192
## -0.091073131 -0.539044293 -0.337863191 -0.773259808 -0.812223547
-0.686439789
##          193          194          195          196          197
198
## -0.798427891 -0.714877179 -0.613940487 -0.898529110 -0.730184095
-0.693083904
##          199          200          201          202          203
204
## -0.847170020 -0.868439351 -0.684334333 -0.910658590 -0.952535009
-0.701664028
##          205          206          207          208          209
210
## -0.841889857 -0.828528733 -0.803402246 -1.790484257 -1.835944105
-1.683186064
##          211          212          213          214          215
216
##  1.000957241  0.902444014  1.234345046  0.266441994  0.137400684
0.210144999
##          217          218          219          220          221
222
##  0.039890581  0.294214253  0.095727324 -0.047321225  0.222288884
0.185321481
##          223          224          225          226          227
228
##  0.166297495  0.058390095  0.380147873  0.279645893  0.211337736
0.210328333
##          229          230          231          232          233
234
##  0.268055201  0.298077973 -0.047836180  0.091177781  0.102950515
0.080784434
##          235          236          237          238          239
240
##  0.219660540  0.127185145  0.278752355  0.087004441  0.283616594
0.103101442
##          241          242          243          244          245
246
##  0.102641581  0.538476959  0.056671429  0.254175178  0.036971810
0.175411220
##          247          248          249          250          251
252
##  0.264765099  0.122647498  0.107080658 -0.105523201  0.271170330
-0.842449347
##          253          254          255          256          257
258
## -0.839452815 -0.519374088 -0.689172621 -1.101699490 -0.625870560
-0.940784990
##          259          260          261          262          263
```

```
264
## -0.934524537 -0.866257267 -1.091293773 -0.918449549 -1.878600819
-1.988611544
##          265          266          267          268          269
270
## -1.850243376 -1.768362927 -1.792446218 -2.652862886  1.047430600
1.029436209
##          271          272          273          274          275
276
##  1.156836146  1.212283135  1.192180172  1.157679545  1.328468977
1.081069014
##          277          278          279          280          281
282
##  0.670458672  0.305828444 -0.075766661  0.091153115  0.209945040
0.088999135
##          283          284          285          286          287
288
##  0.060549288  0.070513250  0.141809085  0.169442442  0.186876180
0.159431982
##          289          290          291          292          293
294
##  0.318809895  0.272566091  0.069822676  0.072455793  0.112737764
0.352536735
##          295          296          297          298          299
300
##  0.090072465  0.118568523  0.170687447  0.071976253  0.251615505
0.078710129
##          301          302          303          304          305
306
##  0.328738586  0.223172187  0.015434643  0.071135265  0.038499691
0.068492023
##          307          308          309          310          311
312
##  0.372180564  0.143074596  0.259812700  0.173984696  0.398694944
-0.037809317
##          313          314          315          316          317
318
##  0.196704860  0.119813868  0.149386293  0.221393014  0.308193486
0.377701649
##          319          320          321          322          323
324
##  0.308369055  0.364562298  0.199494534  0.143265763  0.328468977
0.371126105
##          325          326          327          328          329
330
##  0.114930657  0.202623324 -0.050451642  0.232125042  0.247795608
0.086322328
##          331          332          333          334          335
336
```

```
## -0.143625483  0.320564986  0.552426674  0.035620811  0.141099145
0.269793703
##          337          338          339          340          341
342
##  0.234877354  0.191828996 -0.799265883 -0.889586434 -0.882279914
-0.739989991
##          343          344          345          346          347
348
## -0.735868419 -0.805091348 -0.806033956 -0.673929080 -0.809973735
-1.086649349
##          349          350          351          352          353
354
## -0.876886834 -0.666613309 -0.918148416 -0.702942901 -0.639223281
-0.807114942
##          355          356          357          358          359
360
## -0.727593777 -0.842755740 -0.835607908 -0.735468656 -1.964742577
-1.851484841
##          361          362          363          364          365
366
## -1.713053505 -3.061965083 -3.068436652  1.156836146  1.212283135
1.133490046
##          367          368          369          370          371
372
##  1.285558417  0.976291686  1.270480472  1.231012908  0.970614950
0.856175299
##          373          374          375          376          377
378
##  0.939042546  0.338978195  0.009308781  0.279804874  0.095220655
-0.004370994
##          379          380          381          382          383
384
##  0.209945040  0.233517395  0.213933557  0.025998588 -0.112698342
0.122449597
##          385          386          387          388          389
390
##  0.400677505  0.201966994  0.286266113  0.332758905  0.167152996
-0.004387276
##          391          392          393          394          395
396
##  0.098048795  0.135820225  0.065026443  0.350651340  0.195706433
0.155933129
##          397          398          399          400          401
402
##  0.223172187 -0.053999277 -0.169230593  0.150039706  0.206052880
0.242449065
##          403          404          405          406          407
408
##  0.185935567  0.398694944  0.221393014  0.203971725  0.034834552
```

```
0.449423149
##          409          410          411          412          413
414
##  0.120579436  0.098794878  0.113138636 -0.155896743  0.273829120
0.284325045
##          415          416          417          418          419
420
##  0.263154470  0.279947980  0.270890264  0.084537090 -1.029759743
-0.856002834
##          421          422          423          424          425
426
## -0.705286364 -0.803726720 -0.449325322 -0.709744475 -1.010085539
-0.753563336
##          427          428          429          430          431
432
## -0.813409679 -0.874160448 -0.906204244 -0.876478324 -0.682519753
-0.680231396
##          434          435          436          437          438
439
## -0.688336375 -0.763000762 -0.968704460 -1.821113801 -1.780684788
-1.901060479
##          440          441          442          443          444
445
## -1.737258932 -1.937186348 -2.827609013  0.017626234  0.955889355
1.040078336
##          446          447          448          449          450
451
##  1.116986016  1.236287968  0.874941379  1.102514576  1.390692113
1.063910129
##          452          453          454          455          456
457
##  1.220818310  1.016166574  0.084937365  0.289415561  0.264153278
0.182147668
##          458          459          460          461          462
463
##  0.053644082  0.140066208  0.213940188  0.003912639  0.181863869
0.156286595
##          464          465          466          467          468
469
##  0.250424840  0.177555751  0.260165886  0.045810898  0.106990575
0.103558856
##          470          471          472          473          474
475
##  0.288076096  0.224862039  0.314518088  0.203372488 -0.169230593
0.108654697
##          476          477          478          479          480
481
## -0.102590731  0.263283428  0.103673476  0.304556689  0.155177009
0.105720742
```

```
##         482         483         484         485         486
487
##  0.117979005 -0.188106412  0.161194828  0.220185485  0.238145883
0.256689166
##         488         489         490         491         492
493
##  0.231930663  0.141721698 -0.115992368  0.369789911  0.154939586
-0.989258627
##         494         495         496         497         498
499
## -1.111549041 -0.914253273 -0.743047600 -0.864122607 -0.881731716
-0.966129989
##         500         501         502         503         504
505
## -0.512597141 -0.628382869 -0.723476037 -1.006827388 -0.759782768
-0.553908717
##         506         507         508         509         510
511
## -0.880026852 -0.824549583 -0.528580805  1.096426224  0.831426397
1.095333991
##         512         513         514         515         516
517
##  1.115869966  1.064579412  1.129056203  0.958963086  1.222989900
1.132259012
##         518         519         520         521         522
523
##  1.101436895  0.976437614  1.200980635  1.074542574  0.979812359
1.004639766
##         524         525         526         527         528
529
##  1.130821725  0.902704796  1.164869676 -0.077675199  0.273272198
-0.028455167
##         530         531         532         533         534
535
##  0.011221069  0.339350010  0.054500120 -0.061032442  0.014472266
0.288523881
##         536         537         538         539         540
541
##  0.130395782  0.092510974  0.129450516  0.142619120 -0.227040895
0.150052885
##         542         543         544         545         546
547
##  0.279879681  0.099511367  0.271428918  0.230473206  0.002114440
-0.073091300
##         548         549         550         551         552
553
## -0.024054921  0.108654697  0.079740482  0.141731339  0.174663378
0.289441349
##         554         555         556         557         558
```

```
559
##  0.131399114  0.155645888 -0.055655522  0.257191213  0.141721698
0.124006628
##          560          561          562          563          564
565
##  0.459882532  0.034707467  0.027514332  0.098305312 -0.034490039
0.200068519
##          566          567          568          569          570
571
## -0.943581609 -1.017149236 -0.963967251 -0.617281922 -0.793657756
-0.830606990
##          572          573          574          575          576
577
## -0.852671763  0.794718281  1.027367312  0.880505272  0.919840547
1.120803114
##          578          579          580          581          582
583
##  1.009168230  0.877507167  1.076015615  0.769183770  1.067392432
1.218362814
##          584          585          586          587          588
589
##  0.872825660  1.232507726  0.996140441  1.096287600  1.060850233
0.912143259
##          590          591          592          593          594
595
##  1.203679290  1.131754642  1.100348310  1.048368584  1.201738819
1.068425056
##          596          597          598          599          600
601
##  0.080012581  0.108158270  0.069526080  0.108733873  0.226962099
0.320661802
##          602          603
##  0.268398270  0.035340170
```

```
#Anova Table
anova(fit)
```

```
## Analysis of Variance Table
##
## Response: rating
##            Df Sum Sq Mean Sq F value    Pr(>F)
## bpm         1   0.28  0.2844  0.5130   0.47413
## nrgy        1   1.82  1.8160  3.2756   0.07082 .
## dnce        1   4.17  4.1702  7.5218   0.00628 **
## dB          1  11.34 11.3374 20.4495 7.396e-06 ***
## val         1   0.01  0.0142  0.0256   0.87293
## dur         1   2.94  2.9404  5.3036   0.02163 *
## acous       1   0.02  0.0210  0.0379   0.84562
## spch        1   0.03  0.0282  0.0508   0.82173
## Residuals 593 328.77  0.5544
```

```
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

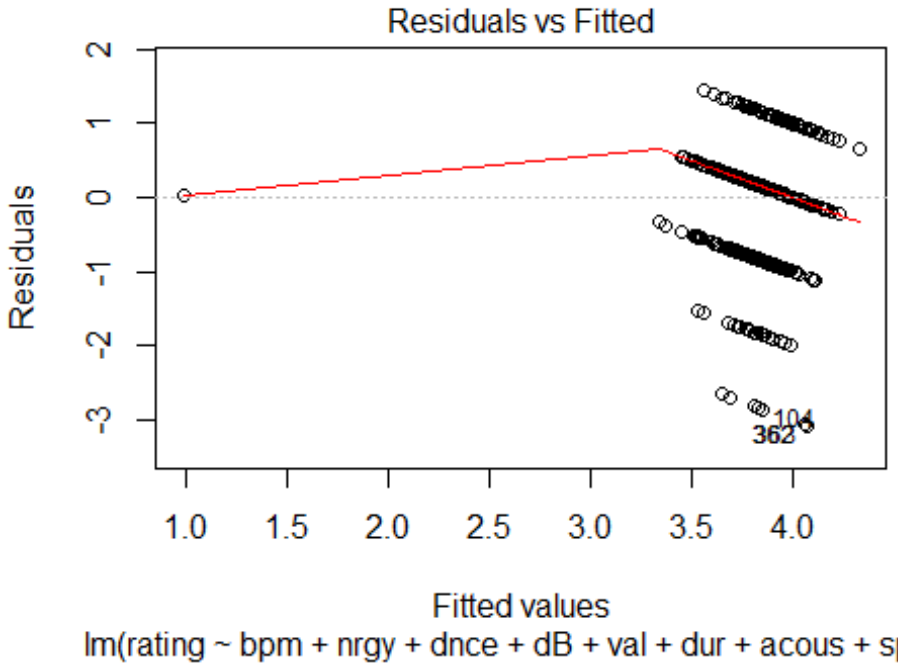
```
vcov(fit)
```

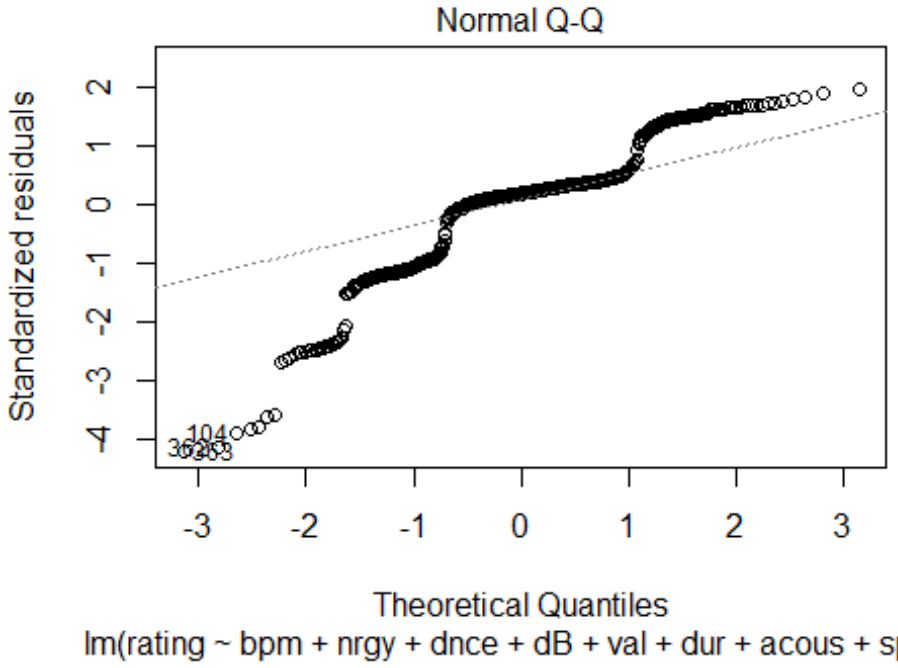
```
##               (Intercept)           bpm          nrgy           dn
ce
## (Intercept)  2.070199e-01 -2.796029e-04 -7.902573e-04 -6.939011e-
04
## bpm         -2.796029e-04  1.643313e-06  1.875027e-07  7.121814e-
07
## nrgy        -7.902573e-04  1.875027e-07  8.024808e-06  1.721499e-
06
## dnce        -6.939011e-04  7.121814e-07  1.721499e-06  7.853443e-
06
## dB           3.404769e-03 -3.422102e-06 -1.979914e-05 -8.137665e-
06
## val          4.754108e-05 -7.671228e-08 -1.434999e-06 -2.276277e-
06
## dur         -2.287651e-04  3.983176e-08  1.130329e-07  1.475965e-
07
## acous       -3.905811e-04  2.999826e-07  2.927088e-06  1.230435e-
06
## spch         1.095720e-04 -3.185587e-07 -1.350512e-06  6.577942e-
07
##                        dB           val           dur          aco
us
## (Intercept)  3.404769e-03  4.754108e-05 -2.287651e-04 -3.905811e-
04
## bpm         -3.422102e-06 -7.671228e-08  3.983176e-08  2.999826e-
07
## nrgy        -1.979914e-05 -1.434999e-06  1.130329e-07  2.927088e-
06
## dnce        -8.137665e-06 -2.276277e-06  1.475965e-07  1.230435e-
06
## dB           1.856477e-04  3.019156e-07 -8.925313e-08 -5.609375e-
06
## val          3.019156e-07  3.021001e-06  2.852947e-07 -2.179137e-
07
## dur         -8.925313e-08  2.852947e-07  8.623461e-07  2.393589e-
08
## acous       -5.609375e-06 -2.179137e-07  2.393589e-08  3.454919e-
06
## spch         4.936074e-06 -9.525799e-07 -3.433234e-07 -6.311856e-
07
##                      spch
## (Intercept)  1.095720e-04
## bpm         -3.185587e-07
## nrgy        -1.350512e-06
## dnce         6.577942e-07
```

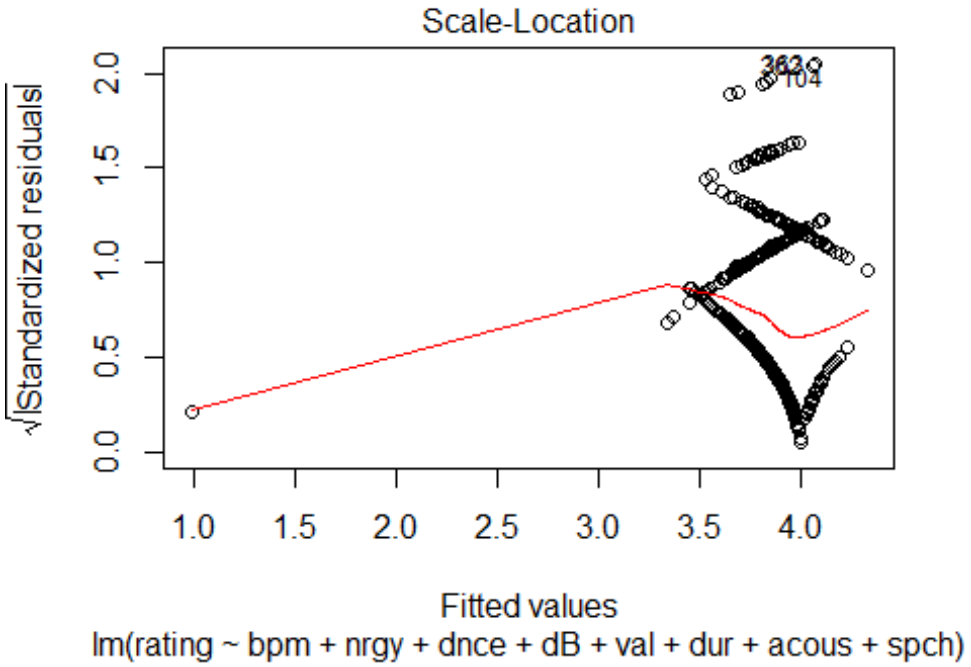
```
## dB           4.936074e-06
## val         -9.525799e-07
## dur         -3.433234e-07
## acous       -6.311856e-07
## spch         1.730875e-05
```

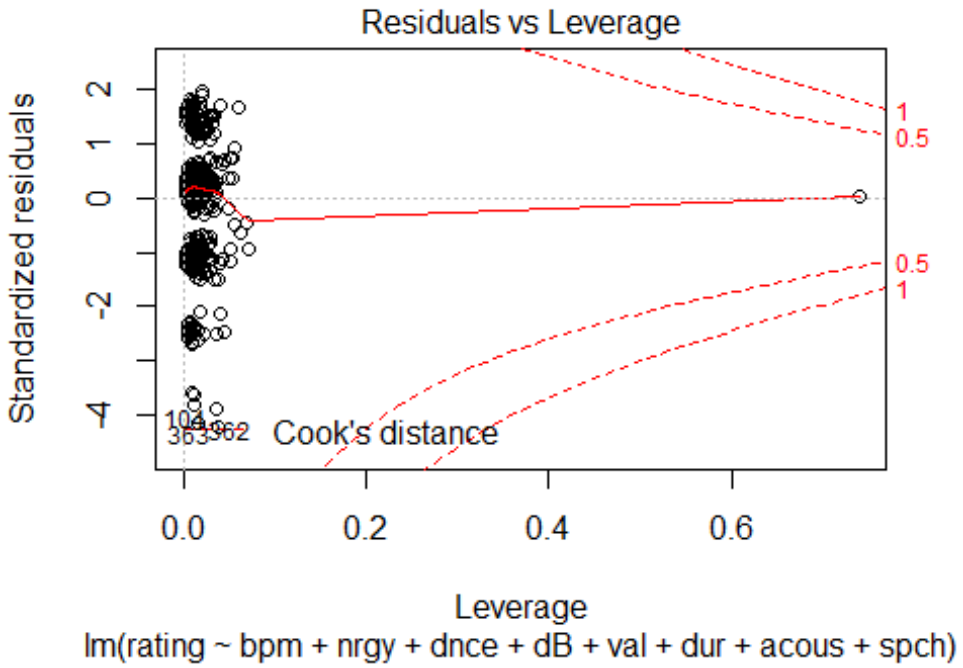
```
library(car)
```

```
#diagnostic plots
plot(fit)
```


Residuals vs Fitted
Residuals
Fitted values
lm(rating ~ bpm + nrgy + dnce + dB + val + dur + acous + spch)


Normal Q-Q
Standardized residuals
Theoretical Quantiles
lm(rating ~ bpm + nrgy + dnce + dB + val + dur + acous + spch)

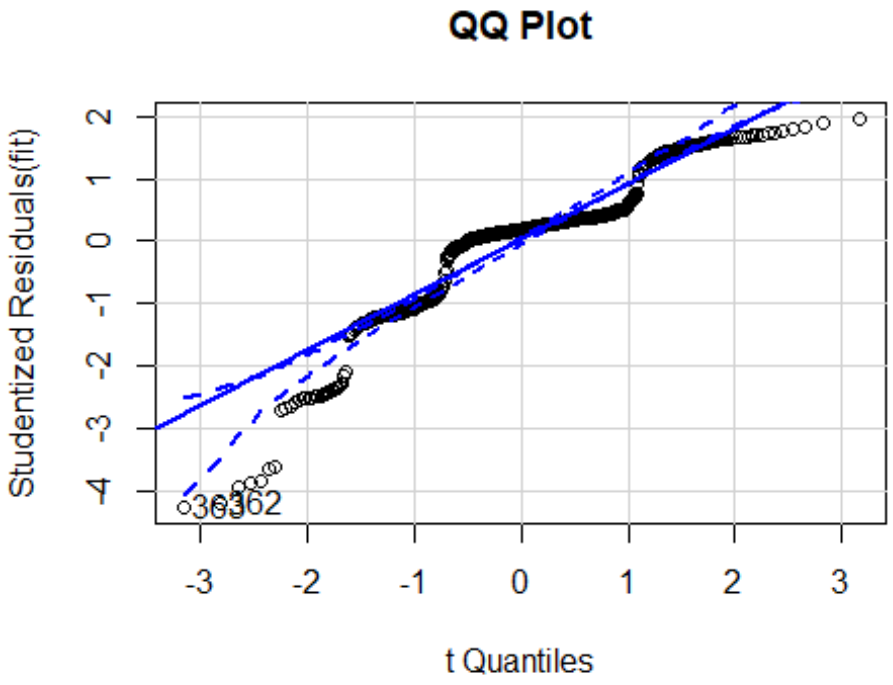





```r
# Assessing Outliers
outlierTest(fit)
```

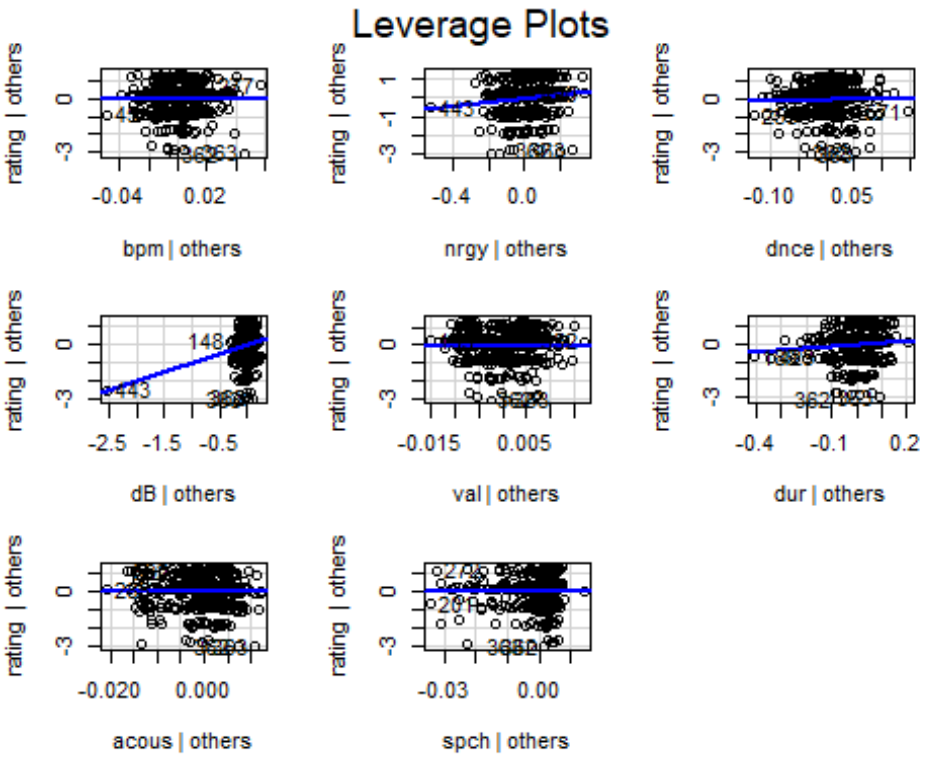
```
##      rstudent unadjusted p-value Bonferroni p
## 363 -4.265552         2.3211e-05     0.013973
## 362 -4.205441         3.0092e-05     0.018115
```

```
qqPlot(fit, main="QQ Plot")
```



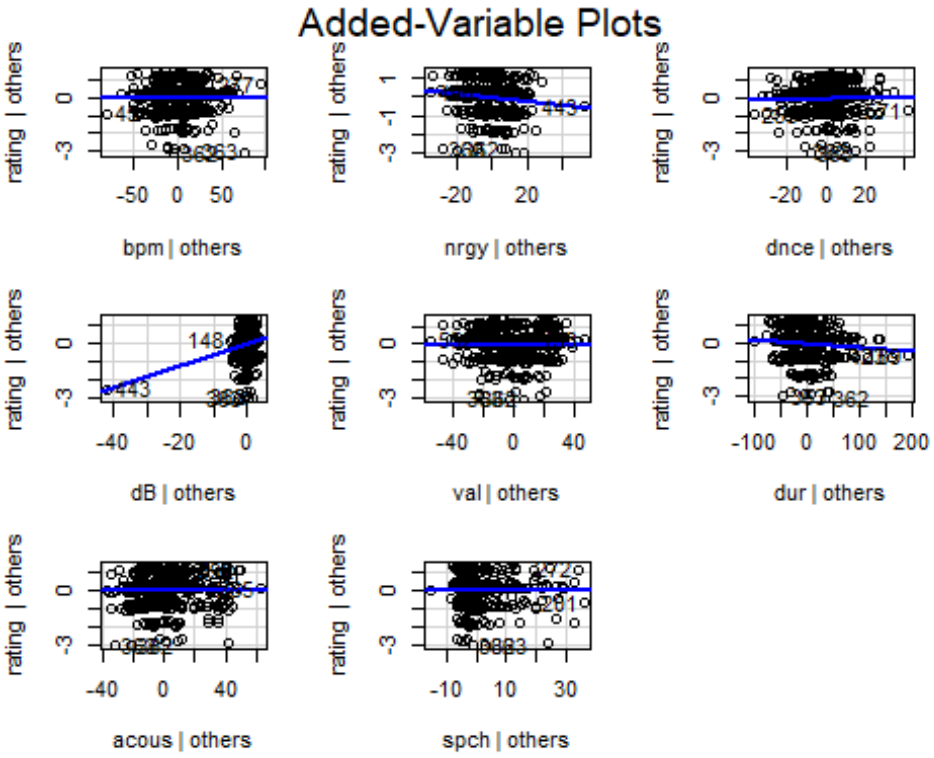

```
## [1] 362 363
```

```
leveragePlots(fit) # Leverage plots
```

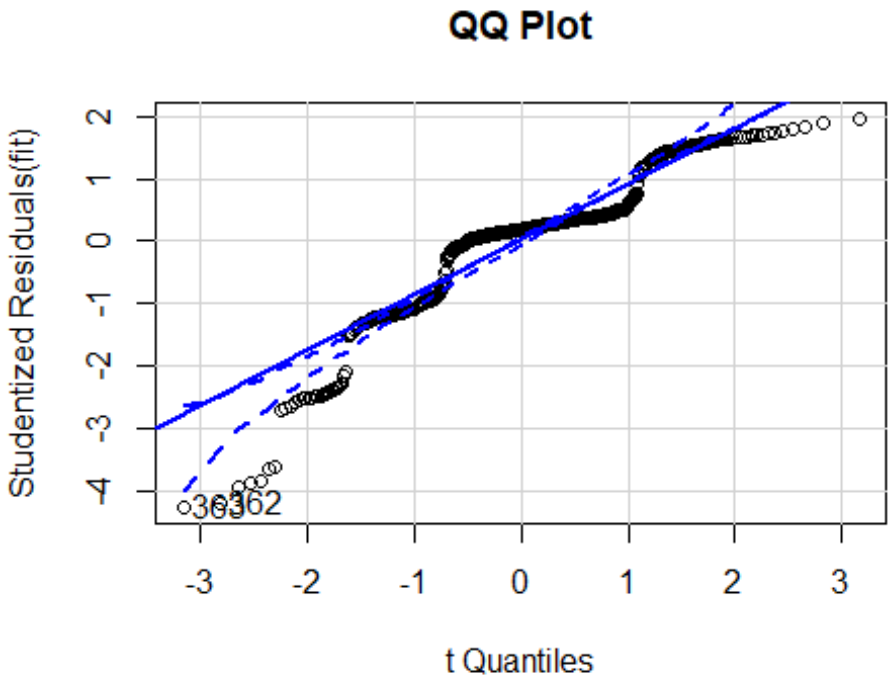



```
# Influential Observations
```

```r
# added variable plots
avPlots(fit)
```

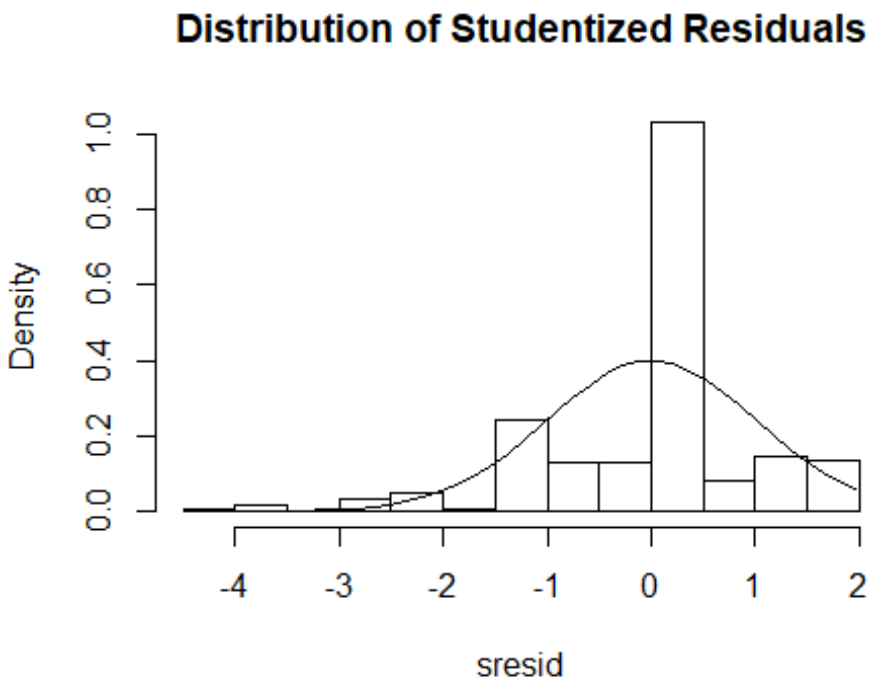



```r
# Normality of Residuals
# qq plot for studentized resid
qqPlot(fit, main="QQ Plot")
```



```
## [1] 362 363
```

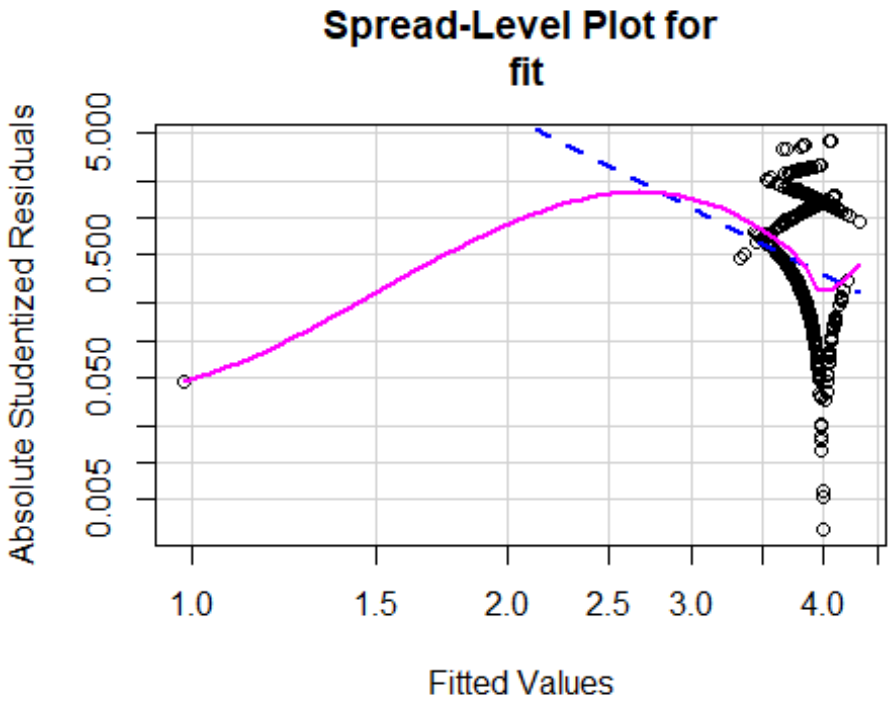
```
# distribution of studentized residuals
library(MASS)
sresid <- studres(fit)
hist(sresid, freq=FALSE,
     main="Distribution of Studentized Residuals")
xfit<-seq(min(sresid),max(sresid),length=40)
yfit<-dnorm(xfit)
lines(xfit, yfit)
```



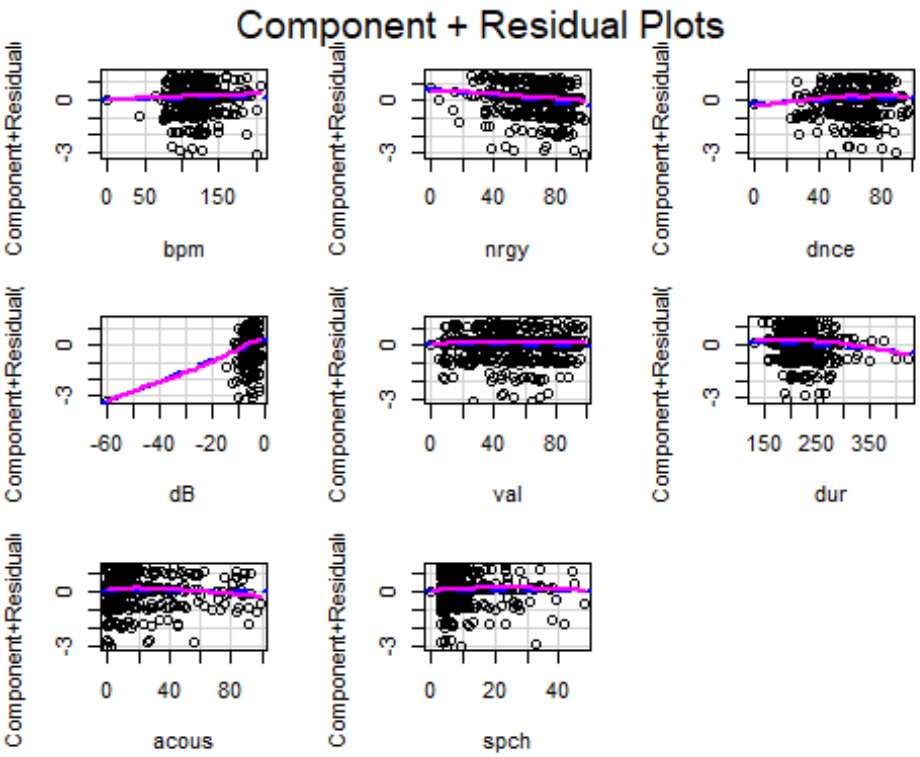

```
#Non-constant Error Variance
# Evaluate homoscedasticity
# non-constant error variance test
ncvTest(fit)
```

```
## Non-constant Variance Score Test
## Variance formula: ~ fitted.values
## Chisquare = 1.648805, Df = 1, p = 0.19912
```

```
# plot studentized residuals vs. fitted values
spreadLevelPlot(fit)
```




```
##
## Suggested power transformation:  5.341688

#Multi-collinearity
# Evaluate Collinearity
vif(fit) # variance inflation factors

##      bpm     nrgy     dnce       dB      val      dur    acous
spch
## 1.094630 2.317866 1.521431 1.577344 1.660351 1.088451 1.617399 1.
052035

sqrt(vif(fit)) > 2 # problem?   ##tells disp and wt are correlated a
nd one can be dropped

##   bpm  nrgy  dnce    dB   val   dur acous  spch
## FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE

#Nonlinearity
# component + residual plot
crPlots(fit)
```




```
library(gvlma)
gvmodel <- gvlma(fit)
summary(gvmodel)

##
## Call:
## lm(formula = rating ~ bpm + nrgy + dnce + dB + val + dur + acous
+
##     spch, data = data_clean)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.0684 -0.1588  0.1418  0.2854  1.4438
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  5.0729840  0.4549944  11.150  < 2e-16 ***
## bpm          0.0006058  0.0012819   0.473 0.636706
## nrgy        -0.0099612  0.0028328  -3.516 0.000471 ***
## dnce         0.0035088  0.0028024   1.252 0.211032
## dB           0.0601839  0.0136253   4.417 1.19e-05 ***
## val         -0.0003163  0.0017381  -0.182 0.855654
## dur         -0.0021127  0.0009286  -2.275 0.023259 *
## acous       -0.0003267  0.0018587  -0.176 0.860553
## spch        -0.0009379  0.0041604  -0.225 0.821725
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
```

```
## Residual standard error: 0.7446 on 593 degrees of freedom
## Multiple R-squared:  0.059,  Adjusted R-squared:  0.0463
## F-statistic: 4.647 on 8 and 593 DF,  p-value: 1.587e-05
##
##
## ASSESSMENT OF THE LINEAR MODEL ASSUMPTIONS
## USING THE GLOBAL TEST ON 4 DEGREES-OF-FREEDOM:
## Level of Significance =  0.05
##
## Call:
##  gvlma(x = fit)
##
##                       Value p-value                   Decision
## Global Stat        216.11503  0.0000 Assumptions NOT satisfied!
## Skewness           105.55254  0.0000 Assumptions NOT satisfied!
## Kurtosis           109.48132  0.0000 Assumptions NOT satisfied!
## Link Function        0.04449  0.8329    Assumptions acceptable.
## Heteroscedasticity   1.03668  0.3086    Assumptions acceptable.
```

```
fit
```

```
##
## Call:
## lm(formula = rating ~ bpm + nrgy + dnce + dB + val + dur + acous
+
##     spch, data = data_clean)
##
## Coefficients:
## (Intercept)          bpm         nrgy         dnce           dB
val
##   5.0729840    0.0006058   -0.0099612    0.0035088    0.0601839
-0.0003163
##         dur        acous         spch
##  -0.0021127   -0.0003267   -0.0009379
```

```
summary(fit)
```

```
##
## Call:
## lm(formula = rating ~ bpm + nrgy + dnce + dB + val + dur + acous
+
##     spch, data = data_clean)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.0684 -0.1588  0.1418  0.2854  1.4438
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  5.0729840  0.4549944  11.150  < 2e-16 ***
```

```
## bpm          0.0006058  0.0012819   0.473 0.636706
## nrgy        -0.0099612  0.0028328  -3.516 0.000471 ***
## dnce         0.0035088  0.0028024   1.252 0.211032
## dB           0.0601839  0.0136253   4.417 1.19e-05 ***
## val         -0.0003163  0.0017381  -0.182 0.855654
## dur         -0.0021127  0.0009286  -2.275 0.023259 *
## acous       -0.0003267  0.0018587  -0.176 0.860553
## spch        -0.0009379  0.0041604  -0.225 0.821725
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7446 on 593 degrees of freedom
## Multiple R-squared:  0.059,  Adjusted R-squared:  0.0463
## F-statistic: 4.647 on 8 and 593 DF,  p-value: 1.587e-05
```

```
fit1 <- fit
fit2 <- lm(rating~bpm+nrgy+dnce+dB+val+dur+spch,data = data_clean)
summary(fit2)
```

```
##
## Call:
## lm(formula = rating ~ bpm + nrgy + dnce + dB + val + dur + spch,
##     data = data_clean)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.0579 -0.1595  0.1426  0.2875  1.4353
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  5.0360542  0.4032353  12.489  < 2e-16 ***
## bpm          0.0006341  0.0012707   0.499   0.6179
## nrgy        -0.0096844  0.0023528  -4.116 4.40e-05 ***
## dnce         0.0036252  0.0027209   1.332   0.1833
## dB           0.0596535  0.0132760   4.493 8.43e-06 ***
## val         -0.0003369  0.0017327  -0.194   0.8459
## dur         -0.0021104  0.0009278  -2.275   0.0233 *
## spch        -0.0009975  0.0041431  -0.241   0.8098
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.744 on 594 degrees of freedom
## Multiple R-squared:  0.05895,    Adjusted R-squared:  0.04786
## F-statistic: 5.315 on 7 and 594 DF,  p-value: 6.532e-06
```

```
fit3 <- lm(rating~bpm+nrgy+dnce+dB+dur+spch,data = data_clean)
summary(fit3)
```

```
##
## Call:
```

```
## lm(formula = rating ~ bpm + nrgy + dnce + dB + dur + spch, data =
data_clean)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.0567 -0.1639  0.1426  0.2873  1.4374
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  5.0386204  0.4026932  12.512  < 2e-16 ***
## bpm          0.0006277  0.0012692   0.495   0.6211
## nrgy        -0.0098245  0.0022380  -4.390 1.34e-05 ***
## dnce         0.0033789  0.0024060   1.404   0.1607
## dB           0.0596477  0.0132652   4.497 8.31e-06 ***
## dur         -0.0020783  0.0009122  -2.278   0.0231 *
## spch        -0.0011087  0.0041001  -0.270   0.7869
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7434 on 595 degrees of freedom
## Multiple R-squared:  0.05889,    Adjusted R-squared:  0.0494
## F-statistic: 6.205 on 6 and 595 DF,  p-value: 2.484e-06
```

```
fit4 <- lm(rating~bpm+nrgy+dnce+dB+dur,data = data_clean)
summary(fit4)
```

```
##
## Call:
## lm(formula = rating ~ bpm + nrgy + dnce + dB + dur, data = data_c
lean)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.0576 -0.1620  0.1412  0.2872  1.4227
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  5.0416295  0.4022263  12.534  < 2e-16 ***
## bpm          0.0006091  0.0012664   0.481   0.6307
## nrgy        -0.0099053  0.0022163  -4.469 9.39e-06 ***
## dnce         0.0033892  0.0024038   1.410   0.1591
## dB           0.0599037  0.0132211   4.531 7.10e-06 ***
## dur         -0.0020943  0.0009096  -2.303   0.0216 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7428 on 596 degrees of freedom
## Multiple R-squared:  0.05877,    Adjusted R-squared:  0.05088
## F-statistic: 7.443 on 5 and 596 DF,  p-value: 8.704e-07
```

```r
fit5 <- lm(rating~nrgy+dnce+dB+dur,data = data_clean)
summary(fit5)
```

```
##
## Call:
## lm(formula = rating ~ nrgy + dnce + dB + dur, data = data_clean)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.0543 -0.1643  0.1431  0.2912  1.4047
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  5.1340372  0.3531439  14.538  < 2e-16 ***
## nrgy        -0.0098632  0.0022131  -4.457 9.94e-06 ***
## dnce         0.0031754  0.0023608   1.345   0.1791
## dB           0.0609888  0.0130188   4.685 3.48e-06 ***
## dur         -0.0021091  0.0009085  -2.322   0.0206 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7423 on 597 degrees of freedom
## Multiple R-squared:  0.05841,    Adjusted R-squared:  0.0521
## F-statistic: 9.258 on 4 and 597 DF,  p-value: 2.91e-07
```

```r
fit6 <- lm(rating~nrgy+dB+dur,data = data_clean)
summary(fit6)
```

```
##
## Call:
## lm(formula = rating ~ nrgy + dB + dur, data = data_clean)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.0543 -0.1450  0.1479  0.2858  1.4418
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  5.3903496  0.2975144  18.118  < 2e-16 ***
## nrgy        -0.0097587  0.0022133  -4.409 1.23e-05 ***
## dB           0.0639368  0.0128417   4.979 8.38e-07 ***
## dur         -0.0023001  0.0008979  -2.562   0.0107 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.7428 on 598 degrees of freedom
## Multiple R-squared:  0.05555,    Adjusted R-squared:  0.05081
## F-statistic: 11.72 on 3 and 598 DF,  p-value: 1.791e-07
```

```r
# compare models

anova(fit1, fit6)
```

```
## Analysis of Variance Table
##
## Model 1: rating ~ bpm + nrgy + dnce + dB + val + dur + acous + sp
ch
## Model 2: rating ~ nrgy + dB + dur
##   Res.Df    RSS Df Sum of Sq     F Pr(>F)
## 1    593 328.77
## 2    598 329.97 -5   -1.2029 0.434  0.825
```

```r
step <- stepAIC(fit1, direction="both")
```

```
## Start:  AIC=-346.16
## rating ~ bpm + nrgy + dnce + dB + val + dur + acous + spch
##
##         Df Sum of Sq    RSS     AIC
## - acous  1    0.0171 328.78 -348.13
## - val    1    0.0184 328.78 -348.12
## - spch   1    0.0282 328.79 -348.11
## - bpm    1    0.1238 328.89 -347.93
## - dnce   1    0.8692 329.63 -346.57
## <none>               328.77 -346.16
## - dur    1    2.8696 331.63 -342.93
## - nrgy   1    6.8552 335.62 -335.73
## - dB     1   10.8169 339.58 -328.67
##
## Step:  AIC=-348.13
## rating ~ bpm + nrgy + dnce + dB + val + dur + spch
##
##         Df Sum of Sq    RSS     AIC
## - val    1    0.0209 328.80 -350.09
## - spch   1    0.0321 328.81 -350.07
## - bpm    1    0.1379 328.92 -349.87
## - dnce   1    0.9826 329.76 -348.33
## <none>               328.78 -348.13
## + acous  1    0.0171 328.77 -346.16
## - dur    1    2.8640 331.65 -344.91
## - nrgy   1    9.3775 338.16 -333.20
## - dB     1   11.1753 339.96 -330.00
##
## Step:  AIC=-350.09
## rating ~ bpm + nrgy + dnce + dB + dur + spch
##
##         Df Sum of Sq    RSS     AIC
## - spch   1    0.0404 328.84 -352.01
## - bpm    1    0.1351 328.94 -351.84
## - dnce   1    1.0898 329.89 -350.10
```

```
## <none>               328.80 -350.09
## + val    1    0.0209 328.78 -348.13
## + acous  1    0.0197 328.78 -348.12
## - dur    1    2.8684 331.67 -346.86
## - nrgy   1   10.6492 339.45 -332.90
## - dB     1   11.1732 339.98 -331.97
##
## Step:  AIC=-352.01
## rating ~ bpm + nrgy + dnce + dB + dur
##
##         Df Sum of Sq    RSS     AIC
## - bpm    1    0.1276 328.97 -353.78
## <none>               328.84 -352.01
## - dnce   1    1.0968 329.94 -352.01
## + spch   1    0.0404 328.80 -350.09
## + val    1    0.0292 328.81 -350.07
## + acous  1    0.0250 328.82 -350.06
## - dur    1    2.9253 331.77 -348.68
## - nrgy   1   11.0212 339.86 -334.17
## - dB     1   11.3270 340.17 -333.63
##
## Step:  AIC=-353.78
## rating ~ nrgy + dnce + dB + dur
##
##         Df Sum of Sq    RSS     AIC
## - dnce   1    0.9969 329.97 -353.96
## <none>               328.97 -353.78
## + bpm    1    0.1276 328.84 -352.01
## + acous  1    0.0398 328.93 -351.85
## + spch   1    0.0329 328.94 -351.84
## + val    1    0.0253 328.95 -351.83
## - dur    1    2.9702 331.94 -350.37
## - nrgy   1   10.9448 339.92 -336.08
## - dB     1   12.0932 341.06 -334.05
##
## Step:  AIC=-353.96
## rating ~ nrgy + dB + dur
##
##         Df Sum of Sq    RSS     AIC
## <none>               329.97 -353.96
## + dnce   1    0.9969 328.97 -353.78
## + acous  1    0.1669 329.80 -352.26
## + val    1    0.1028 329.87 -352.15
## + spch   1    0.0431 329.93 -352.04
## + bpm    1    0.0277 329.94 -352.01
## - dur    1    3.6210 333.59 -349.39
## - nrgy   1   10.7273 340.70 -336.70
## - dB     1   13.6782 343.65 -331.51
```

```r
step$anova # display results
```

```
## Stepwise Model Path
## Analysis of Deviance Table
##
## Initial Model:
## rating ~ bpm + nrgy + dnce + dB + val + dur + acous + spch
##
## Final Model:
## rating ~ nrgy + dB + dur
##
##
##      Step Df   Deviance Resid. Df Resid. Dev       AIC
## 1                             593   328.7652 -346.1579
## 2 - acous  1 0.01712388       594   328.7824 -348.1266
## 3   - val  1 0.02092719       595   328.8033 -350.0882
## 4  - spch  1 0.04040772       596   328.8437 -352.0143
## 5   - bpm  1 0.12763240       597   328.9713 -353.7807
## 6  - dnce  1 0.99685615       598   329.9682 -353.9592
```

```r
attach(data_clean)
predict.lm(fit6,data.frame(nrgy=86, dB = -3,dur=120))
```

```
##        1
## 4.083278
```

```r
#As we can observe that the multiple regression model gives best val
ue for f-stat when we take
# independent variables as energy, dB as in loudness and duration, t
he p-value obtained for these
# independent variables is also less than the significant level of a
lso the standard error values
# are nearer to 0 which is good as we can see in summary of fit6 mod
el
# Though the value of adjusted R-squared value is less 0.05 the f-st
at value is higher than rest of
# the models that is 11.72.
# furthermore when we observe the QQ plot for residuals they don't f
orm any pattern
# model fit6 is the best fit model for multiple regression analysis
on our data, It can be
# further proved by doing stepAIC on the fit1 model having all indep
endent variables which
# gives lease AIC value for variables with fit6 model
# If we predict the value of rating using energy= 86, dB = -3 and du
ration =120 then we get
# predicted value of rating as 4
# adjusted r square value can be improved by doing logistic analysis
further
```