Quantitative Research Methods:history 5

sn0wfree

11/12/2016

Contents

1 history 5 for QRM **1**

1.1 all 1

1 history 5 for QRM

1.1 all

```
# history5.R
# a cleaned-up version that follows the outline of the lecture, if not the detail

#xx=read.table("clipboard",header=TRUE)
xx=read.csv("/Users/sn0wfree/Dropbox/PhD(1st)/BST 215Quantitative Research Methods term 1/r code/attend$
attach(xx)
head(xx)
```

```
##   ACT priorGPA termGPA attendPC  hwPC year final
## 1  23     2.64    3.19   84.375 100.0    2    28
## 2  25     3.52    2.73   68.750  87.5    3    26
## 3  24     2.46    3.00   93.750  87.5    3    30
## 4  20     2.61    2.04   96.875 100.0    2    27
## 5  23     3.32    3.68  100.000 100.0    2    34
## 6  26     2.93    3.23   90.625 100.0    2    25
```

```
xx[3,4] # third row, fourth column
```

```
## [1] 93.75
```

```
xx[4,3] # fourth row, third column
```

```
## [1] 2.04
```

```
xx[,3] # all of third column
```

```
##   [1] 3.190 2.730 3.000 2.040 3.680 3.230 1.540 2.000 2.250 3.000 3.210
##  [12] 2.050 2.130 3.580 2.500 2.100 1.270 2.770 3.150 2.380 1.770 2.330
##  [23] 2.330 3.880 3.290 3.800 3.500 2.140 2.880 3.270 3.290 2.560 3.250
##  [34] 2.710 2.860 2.500 2.150 3.500 2.160 2.400 3.540 3.650 2.500 2.120
##  [45] 2.500 3.810 3.100 3.140 3.000 1.210 2.180 2.810 2.100 2.070 1.360
```

```
##  [56] 3.000 1.960 2.860 2.610 2.710 2.890 2.860 2.350 2.640 3.290 1.540
##  [67] 3.320 4.000 2.630 2.380 1.300 2.760 2.330 2.640 2.310 2.230 2.310
##  [78] 3.880 2.380 3.220 2.260 0.750 2.850 1.650 2.920 2.500 2.140 3.220
##  [89] 2.390 3.150 1.750 1.750 2.810 3.050 2.270 2.920 2.500 3.710 1.500
## [100] 2.110 3.280 1.600 3.330 2.040 2.860 0.821 2.460 4.000 1.360 0.000
## [111] 1.830 3.750 1.650 3.000 2.670 2.870 2.310 2.630 1.830 2.000 3.590
## [122] 2.880 1.930 2.700 2.690 3.380 2.500 3.530 2.150 2.680 2.710 2.620
## [133] 2.190 2.680 2.750 1.600 2.380 2.300 3.360 3.250 1.500 2.960 3.100
## [144] 2.040 3.210 3.120 1.500 1.960 3.340 2.900 3.650 3.030 2.680 2.430
## [155] 1.500 2.970 3.710 2.270 2.680 3.630 2.590 2.770 3.300 2.130 2.350
## [166] 3.460 2.080 3.050 3.550 2.130 2.380 3.730 2.130 3.710 2.550 3.130
## [177] 3.190 2.590 2.790 3.000 2.750 3.250 0.700 3.210 1.810 3.210 3.000
## [188] 1.850 2.000 1.350 3.040 3.180 3.360 3.000 2.880 3.040 2.730 2.780
## [199] 2.960 2.250 2.110 3.270 2.230 2.940 4.000 2.320 3.410 2.290 1.540
## [210] 3.560 1.000 2.940 3.140 2.750 2.230 3.800 3.540 3.750 3.500 2.620
## [221] 1.760 2.360 2.460 3.730 3.230 2.610 2.630 3.080 1.380 3.540 3.150
## [232] 2.210 2.180 3.100 2.620 2.400 3.600 2.040 3.120 3.190 1.970 3.000
## [243] 3.360 1.790 2.970 2.670 3.160 2.500 1.710 2.730 3.580 2.210 1.750
## [254] 2.110 4.000 3.140 2.920 2.290 2.960 2.070 1.800 3.730 2.310 2.390
## [265] 2.960 3.620 3.120 2.310 1.710 2.690 2.430 2.550 2.770 3.400 2.500
## [276] 3.000 2.250 2.500 2.050 1.380 2.730 3.300 2.790 3.310 1.790 2.970
## [287] 2.130 3.040 2.040 2.750 3.400 2.820 0.545 1.430 2.150 2.540 2.500
## [298] 2.380 1.670 3.210 2.750 2.500 2.900 2.650 3.430 2.850 3.210 2.250
## [309] 2.440 2.770 3.400 3.460 3.340 2.430 2.710 2.110 4.000 2.100 2.380
## [320] 2.120 4.000 3.040 1.110 3.130 3.000 1.800 1.680 3.000 2.250 3.250
## [331] 1.140 2.970 1.890 2.670 3.200 2.500 1.790 2.000 3.620 2.500 3.050
## [342] 3.640 3.540 2.860 3.680 3.230 3.150 3.110 2.590 2.790 3.040 2.180
## [353] 2.810 2.900 3.500 2.170 1.350 0.792 3.190 3.380 1.850 2.630 2.040
## [364] 4.000 3.860 3.070 2.650 2.500 3.630 1.630 2.650 2.810 2.380 1.650
## [375] 2.670 1.680 2.310 3.000 2.640 2.000 1.620 2.690 3.950 1.620 2.430
## [386] 2.500 3.460 3.090 2.330 1.230 3.250 1.770 4.000 2.630 3.700 1.960
## [397] 1.170 2.880 2.330 2.000 2.150 1.880 2.900 3.500 2.410 2.380 3.040
## [408] 2.410 2.450 3.660 1.530 1.890 3.700 4.000 2.330 2.850 2.000 3.620
## [419] 2.400 3.710 3.540 3.570 3.110 2.130 3.500 3.310 2.250 2.380 1.460
## [430] 3.040 2.680 1.110 0.692 2.960 2.370 2.250 2.250 2.500 2.000 3.000
## [441] 2.130 1.230 2.000 3.500 2.000 2.320 1.900 2.500 3.290 2.000 3.410
## [452] 1.500 3.500 0.567 3.190 1.880 2.000 2.620 2.820 3.140 2.850 2.130
## [463] 2.640 2.120 3.350 2.730 3.000 1.750 2.880 3.230 2.960 2.320 2.540
## [474] 0.333 1.820 3.340 2.900 2.920 3.160 3.050 2.540 2.100 3.770 1.250
## [485] 2.650 2.300 1.070 2.560 2.540 2.910 3.000 2.430 3.210 1.600 2.850
## [496] 3.030 3.040 1.690 1.950 1.930 1.810 2.860 3.250 2.500 2.390 2.530
## [507] 2.650 3.420 2.680 1.790 1.350 3.380 0.450 3.880 2.850 2.310 2.650
## [518] 2.860 1.630 3.070 2.120 4.000 1.960 1.770 2.690 2.970 3.270 2.310
## [529] 1.880 2.250 2.750 1.790 3.860 2.080 2.960 2.230 2.460 1.700 3.130
## [540] 2.380 2.750 2.640 2.460 0.667 2.820 0.000 2.680 0.625 2.890 1.960
## [551] 2.470 3.100 2.150 0.321 2.700 3.130 3.120 2.630 2.960 2.800 3.860
## [562] 2.900 2.430 2.890 2.380 0.867 2.500 3.550 3.500 1.610 2.690 2.650
## [573] 2.850 2.250 2.960 3.640 2.630 3.460 2.000 2.500 2.900 2.770 2.290
## [584] 2.500 2.830 3.070 3.250 3.620 2.810 3.000 2.690 1.180 1.930 0.923
## [595] 3.500 2.790 0.600 2.800 2.900 2.500 2.600 2.630 2.330 3.640 2.790
## [606] 1.230 2.650 2.390 2.630 3.080 1.940 2.630 3.040 1.850 2.930 2.920
## [617] 2.200 0.800 2.250 3.470 2.050 3.420 2.110 2.470 1.140 0.625 3.210
## [628] 3.770 2.860 3.270 2.790 3.270 2.740 3.890 2.070 3.880 2.810 2.540
## [639] 3.750 1.750 2.800 3.370 3.250 3.700 3.040 1.770 1.880 2.390 2.970
```

```
## [650] 2.420 0.462 3.110 2.880 2.100 1.320 1.770 2.640 3.350 1.250 3.180
## [661] 3.110 3.000 2.650 2.050 3.770 3.570 2.970 3.270 2.460 2.750 3.430
## [672] 2.730 0.850 2.610 3.410 1.000 2.690 3.660 3.170 1.800
```

```
xx[6,] # all of sixth row
```

```
##   ACT priorGPA termGPA attendPC hwPC year final
## 6  26     2.93    3.23   90.625  100    2    25
```

```
xx[,6] # all of sixth column
```

```
##   [1] 2 3 3 2 2 2 1 2 1 2 3 1 3 2 2 1 2 2 1 2 1 2 2 2 3 2 3 2 1 2 1 3 3 2 2
##  [36] 2 2 2 1 2 2 2 3 2 2 2 1 2 2 1 2 2 2 2 1 2 2 1 1 2 2 3 2 2 2 2 1 2 2 1
##  [71] 2 1 3 1 2 2 2 3 1 2 3 2 2 1 2 2 2 2 2 2 2 2 3 2 2 2 2 2 1 3 2 3 2 2 1 2
## [106] 1 2 2 3 2 3 3 1 2 2 3 1 2 2 2 2 2 2 2 2 2 2 3 2 1 2 1 1 2 2 3 3 3 1 2
## [141] 1 2 2 2 2 2 3 1 2 2 3 2 1 1 2 2 2 2 1 2 2 3 1 1 3 2 2 3 2 2 3 3 2 2 1
## [176] 3 1 2 1 2 1 2 1 1 1 2 2 3 1 1 1 1 2 2 2 2 1 1 2 1 2 3 1 1 3 1 3 2 2 2
## [211] 1 3 2 2 1 2 1 2 2 2 2 2 1 2 2 2 2 2 2 2 1 2 3 3 2 1 2 2 3 2 2 2 1 1 2
## [246] 2 2 2 2 2 3 2 2 2 2 2 2 2 2 1 3 2 1 2 2 2 2 2 2 3 2 1 2 2 3 2 3 2 2 1
## [281] 1 3 2 2 2 1 3 3 1 2 2 2 1 2 1 1 2 2 2 1 2 2 1 3 2 1 2 2 3 2 3 2 2 2 1
## [316] 2 3 2 2 2 2 2 2 2 2 1 2 2 1 2 2 2 2 2 2 1 3 1 2 2 2 3 2 2 2 1 2 2 2 2 2 2
## [351] 2 1 3 2 2 2 2 1 1 2 3 3 2 2 2 2 2 2 3 2 2 2 1 1 1 2 2 1 2 3 2 1 2 3 3
## [386] 3 1 3 3 3 2 2 2 2 2 2 3 3 2 2 2 1 1 3 3 3 3 2 2 2 2 1 2 3 1 2 3 2 2 2
## [421] 3 2 1 2 2 1 2 1 3 3 2 1 2 2 2 1 2 1 3 2 3 3 2 1 2 1 2 2 2 3 2 2 1 1 2
## [456] 2 2 1 1 2 2 3 1 3 3 2 1 1 3 2 2 2 2 3 2 2 3 2 2 3 2 3 3 2 2 2 1 3 1 1
## [491] 3 1 2 2 2 2 2 3 1 2 2 2 2 2 1 2 1 3 1 2 1 2 3 3 1 1 2 3 3 3 2 2 1 1 2
## [526] 3 2 2 2 1 2 1 2 3 1 2 2 1 1 2 2 1 2 1 2 2 1 3 2 3 3 2 1 3 3 2 1 3 2 2
## [561] 3 2 2 1 1 2 1 2 1 2 2 1 3 2 3 2 2 3 3 1 2 2 2 3 2 2 2 1 1 2 2 2 1 1 2
## [596] 2 2 1 3 3 2 2 2 2 1 2 2 1 1 1 1 3 2 2 2 2 2 2 3 2 1 1 3 1 2 2 2 2 2 2
## [631] 3 2 3 2 1 3 2 1 1 3 2 2 1 2 2 1 1 1 2 3 3 2 2 3 2 2 2 2 3 3 2 3 2 2 2
## [666] 2 2 2 3 3 2 2 3 2 2 2 2 2 2 1
```

```
xx[6] # all of sixth column; notice that this is the same result as the last line
```

```
##    year
## 1     2
## 2     3
## 3     3
## 4     2
## 5     2
## 6     2
## 7     1
## 8     2
## 9     1
## 10    2
## 11    3
## 12    1
## 13    3
## 14    2
## 15    2
## 16    1
## 17    2
```

```
## 18     2
## 19     1
## 20     2
## 21     1
## 22     2
## 23     2
## 24     2
## 25     3
## 26     2
## 27     3
## 28     2
## 29     1
## 30     2
## 31     1
## 32     3
## 33     3
## 34     2
## 35     2
## 36     2
## 37     2
## 38     2
## 39     1
## 40     2
## 41     2
## 42     2
## 43     3
## 44     2
## 45     2
## 46     2
## 47     1
## 48     2
## 49     2
## 50     1
## 51     2
## 52     2
## 53     2
## 54     2
## 55     1
## 56     2
## 57     2
## 58     1
## 59     1
## 60     2
## 61     2
## 62     3
## 63     2
## 64     2
## 65     2
## 66     2
## 67     1
## 68     2
## 69     2
## 70     1
## 71     2
```

```
## 72     1
## 73     3
## 74     1
## 75     2
## 76     2
## 77     2
## 78     3
## 79     1
## 80     2
## 81     3
## 82     2
## 83     2
## 84     1
## 85     2
## 86     2
## 87     2
## 88     2
## 89     2
## 90     2
## 91     2
## 92     3
## 93     2
## 94     2
## 95     2
## 96     2
## 97     2
## 98     1
## 99     3
## 100    2
## 101    3
## 102    2
## 103    2
## 104    1
## 105    2
## 106    1
## 107    2
## 108    2
## 109    3
## 110    2
## 111    3
## 112    3
## 113    1
## 114    2
## 115    2
## 116    3
## 117    1
## 118    2
## 119    2
## 120    2
## 121    2
## 122    2
## 123    2
## 124    2
## 125    2
```

```
## 126    2
## 127    2
## 128    3
## 129    2
## 130    1
## 131    2
## 132    1
## 133    1
## 134    2
## 135    2
## 136    3
## 137    3
## 138    3
## 139    1
## 140    2
## 141    1
## 142    2
## 143    2
## 144    2
## 145    2
## 146    2
## 147    3
## 148    1
## 149    2
## 150    2
## 151    3
## 152    2
## 153    1
## 154    1
## 155    2
## 156    2
## 157    2
## 158    2
## 159    1
## 160    2
## 161    2
## 162    3
## 163    1
## 164    1
## 165    3
## 166    2
## 167    2
## 168    3
## 169    2
## 170    2
## 171    3
## 172    3
## 173    2
## 174    2
## 175    1
## 176    3
## 177    1
## 178    2
## 179    1
```

```
## 180    2
## 181    1
## 182    2
## 183    1
## 184    1
## 185    1
## 186    2
## 187    2
## 188    3
## 189    1
## 190    1
## 191    1
## 192    1
## 193    2
## 194    2
## 195    2
## 196    2
## 197    1
## 198    1
## 199    2
## 200    1
## 201    2
## 202    3
## 203    1
## 204    1
## 205    3
## 206    1
## 207    3
## 208    2
## 209    2
## 210    2
## 211    1
## 212    3
## 213    2
## 214    2
## 215    1
## 216    2
## 217    1
## 218    2
## 219    2
## 220    2
## 221    2
## 222    2
## 223    1
## 224    2
## 225    2
## 226    2
## 227    2
## 228    2
## 229    2
## 230    2
## 231    1
## 232    2
## 233    3
```

```
## 234    3
## 235    2
## 236    1
## 237    2
## 238    2
## 239    3
## 240    2
## 241    2
## 242    2
## 243    1
## 244    1
## 245    2
## 246    2
## 247    2
## 248    2
## 249    2
## 250    2
## 251    3
## 252    2
## 253    2
## 254    2
## 255    2
## 256    2
## 257    2
## 258    2
## 259    2
## 260    1
## 261    3
## 262    2
## 263    1
## 264    2
## 265    2
## 266    2
## 267    2
## 268    2
## 269    2
## 270    3
## 271    2
## 272    1
## 273    2
## 274    2
## 275    3
## 276    2
## 277    3
## 278    2
## 279    2
## 280    1
## 281    1
## 282    3
## 283    2
## 284    2
## 285    2
## 286    1
## 287    3
```

```
## 288    3
## 289    1
## 290    2
## 291    2
## 292    2
## 293    1
## 294    2
## 295    1
## 296    1
## 297    2
## 298    2
## 299    2
## 300    1
## 301    2
## 302    2
## 303    1
## 304    3
## 305    2
## 306    1
## 307    2
## 308    2
## 309    3
## 310    2
## 311    3
## 312    2
## 313    2
## 314    2
## 315    1
## 316    2
## 317    3
## 318    2
## 319    2
## 320    2
## 321    2
## 322    2
## 323    2
## 324    2
## 325    1
## 326    2
## 327    2
## 328    1
## 329    2
## 330    2
## 331    2
## 332    2
## 333    2
## 334    1
## 335    3
## 336    1
## 337    2
## 338    2
## 339    2
## 340    3
## 341    2
```

```
## 342    2
## 343    2
## 344    1
## 345    2
## 346    2
## 347    2
## 348    2
## 349    2
## 350    2
## 351    2
## 352    1
## 353    3
## 354    2
## 355    2
## 356    2
## 357    2
## 358    1
## 359    1
## 360    2
## 361    3
## 362    3
## 363    2
## 364    2
## 365    2
## 366    2
## 367    2
## 368    2
## 369    3
## 370    2
## 371    2
## 372    2
## 373    1
## 374    1
## 375    1
## 376    2
## 377    2
## 378    1
## 379    2
## 380    3
## 381    2
## 382    1
## 383    2
## 384    3
## 385    3
## 386    3
## 387    1
## 388    3
## 389    3
## 390    3
## 391    2
## 392    2
## 393    2
## 394    2
## 395    2
```

```
## 396    2
## 397    3
## 398    3
## 399    2
## 400    2
## 401    2
## 402    1
## 403    1
## 404    3
## 405    3
## 406    3
## 407    3
## 408    2
## 409    2
## 410    2
## 411    2
## 412    1
## 413    2
## 414    3
## 415    1
## 416    2
## 417    3
## 418    2
## 419    2
## 420    2
## 421    3
## 422    2
## 423    1
## 424    2
## 425    2
## 426    1
## 427    2
## 428    1
## 429    3
## 430    3
## 431    2
## 432    1
## 433    2
## 434    2
## 435    2
## 436    1
## 437    2
## 438    1
## 439    3
## 440    2
## 441    3
## 442    3
## 443    2
## 444    1
## 445    2
## 446    1
## 447    2
## 448    2
## 449    2
```

```
## 450    3
## 451    2
## 452    2
## 453    1
## 454    1
## 455    2
## 456    2
## 457    2
## 458    1
## 459    1
## 460    2
## 461    2
## 462    3
## 463    1
## 464    3
## 465    3
## 466    2
## 467    1
## 468    1
## 469    3
## 470    2
## 471    2
## 472    2
## 473    2
## 474    3
## 475    2
## 476    2
## 477    3
## 478    2
## 479    2
## 480    3
## 481    2
## 482    3
## 483    3
## 484    2
## 485    2
## 486    2
## 487    1
## 488    3
## 489    1
## 490    1
## 491    3
## 492    1
## 493    2
## 494    2
## 495    2
## 496    2
## 497    2
## 498    3
## 499    1
## 500    2
## 501    2
## 502    2
## 503    2
```

```
## 504    2
## 505    1
## 506    2
## 507    1
## 508    3
## 509    1
## 510    2
## 511    1
## 512    2
## 513    3
## 514    3
## 515    1
## 516    1
## 517    2
## 518    3
## 519    3
## 520    3
## 521    2
## 522    2
## 523    1
## 524    1
## 525    2
## 526    3
## 527    2
## 528    2
## 529    2
## 530    1
## 531    2
## 532    1
## 533    2
## 534    3
## 535    1
## 536    2
## 537    2
## 538    1
## 539    1
## 540    2
## 541    2
## 542    1
## 543    2
## 544    1
## 545    2
## 546    2
## 547    1
## 548    3
## 549    2
## 550    3
## 551    3
## 552    2
## 553    1
## 554    3
## 555    3
## 556    2
## 557    1
```

```
## 558    3
## 559    2
## 560    2
## 561    3
## 562    2
## 563    2
## 564    1
## 565    1
## 566    2
## 567    1
## 568    2
## 569    1
## 570    2
## 571    2
## 572    1
## 573    3
## 574    2
## 575    3
## 576    2
## 577    2
## 578    3
## 579    3
## 580    1
## 581    2
## 582    2
## 583    2
## 584    3
## 585    2
## 586    2
## 587    2
## 588    1
## 589    1
## 590    2
## 591    2
## 592    2
## 593    1
## 594    1
## 595    2
## 596    2
## 597    2
## 598    1
## 599    3
## 600    3
## 601    2
## 602    2
## 603    2
## 604    2
## 605    1
## 606    2
## 607    2
## 608    1
## 609    1
## 610    1
## 611    1
```

```
## 612    3
## 613    2
## 614    2
## 615    2
## 616    2
## 617    2
## 618    2
## 619    3
## 620    2
## 621    1
## 622    1
## 623    3
## 624    1
## 625    2
## 626    2
## 627    2
## 628    2
## 629    2
## 630    2
## 631    3
## 632    2
## 633    3
## 634    2
## 635    1
## 636    3
## 637    2
## 638    1
## 639    1
## 640    3
## 641    2
## 642    2
## 643    1
## 644    2
## 645    2
## 646    1
## 647    1
## 648    1
## 649    2
## 650    3
## 651    3
## 652    2
## 653    2
## 654    3
## 655    2
## 656    2
## 657    2
## 658    2
## 659    3
## 660    3
## 661    2
## 662    3
## 663    2
## 664    2
## 665    2
```

```
## 666    2
## 667    2
## 668    2
## 669    3
## 670    3
## 671    2
## 672    2
## 673    3
## 674    2
## 675    2
## 676    2
## 677    2
## 678    2
## 679    2
## 680    1
```

```
      # notice also, that you CANNOT refer to the 6th row in this more economical way
#Alternatiely, because the 6th column is "year", we get the same results by typing:
year
```

```
##   [1] 2 3 3 2 2 2 1 2 1 2 3 1 3 2 2 1 2 2 1 2 1 2 2 2 3 2 3 2 1 2 1 3 3 2 2
##  [36] 2 2 2 1 2 2 2 3 2 2 2 1 2 2 1 2 2 2 2 1 2 2 1 1 2 2 3 2 2 2 2 1 2 2 1
##  [71] 2 1 3 1 2 2 2 3 1 2 3 2 2 1 2 2 2 2 2 2 2 3 2 2 2 2 2 1 3 2 3 2 2 1 2
## [106] 1 2 2 3 2 3 3 1 2 2 3 1 2 2 2 2 2 2 2 2 2 3 2 1 2 1 1 2 2 3 3 3 1 2
## [141] 1 2 2 2 2 2 3 1 2 2 3 2 1 1 2 2 2 2 1 2 2 3 1 1 3 2 2 3 2 2 3 3 2 2 1
## [176] 3 1 2 1 2 1 2 1 1 1 2 2 3 1 1 1 1 2 2 2 2 1 1 2 1 2 3 1 1 3 1 3 2 2 2
## [211] 1 3 2 2 1 2 1 2 2 2 2 2 1 2 2 2 2 2 2 2 2 1 2 3 3 2 1 2 2 3 2 2 2 1 1 2
## [246] 2 2 2 2 2 3 2 2 2 2 2 2 2 2 1 3 2 1 2 2 2 2 2 2 3 2 1 2 2 3 2 3 2 2 1
## [281] 1 3 2 2 2 1 3 3 1 2 2 2 1 2 1 1 2 2 2 1 2 2 1 3 2 1 2 2 3 2 3 2 2 2 1
## [316] 2 3 2 2 2 2 2 2 2 2 1 2 2 1 2 2 2 2 2 1 3 1 2 2 2 3 2 2 2 1 2 2 2 2 2 2
## [351] 2 1 3 2 2 2 2 1 1 2 3 3 2 2 2 2 2 2 3 2 2 2 1 1 1 2 2 1 2 3 2 1 2 3 3
## [386] 3 1 3 3 3 2 2 2 2 2 2 3 3 2 2 2 1 1 3 3 3 3 2 2 2 2 1 2 3 1 2 3 2 2 2
## [421] 3 2 1 2 2 1 2 1 3 3 2 1 2 2 2 1 2 1 3 2 3 3 2 1 2 1 2 2 2 3 2 2 1 1 2
## [456] 2 2 1 1 2 2 3 1 3 3 2 1 1 3 2 2 2 2 3 2 2 3 2 2 3 2 3 3 2 2 2 1 3 1 1
## [491] 3 1 2 2 2 2 2 2 3 1 2 2 2 2 2 1 2 1 3 1 2 1 2 3 3 1 1 2 3 3 3 2 2 1 1 2
## [526] 3 2 2 2 1 2 1 2 3 1 2 2 1 1 2 2 1 2 1 2 2 1 3 2 3 3 2 1 3 3 2 1 3 2 2
## [561] 3 2 2 1 1 2 1 2 1 2 2 1 3 2 3 2 2 3 3 1 2 2 2 3 2 2 2 1 1 2 2 2 1 1 2
## [596] 2 2 1 3 3 2 2 2 2 1 2 2 1 1 1 1 3 2 2 2 2 2 2 3 2 1 1 3 1 2 2 2 2 2 2
## [631] 3 2 3 2 1 3 2 1 1 3 2 2 1 2 2 1 1 1 2 3 3 2 2 3 2 2 2 2 3 3 2 3 2 2 2
## [666] 2 2 2 3 3 2 2 3 2 2 2 2 2 2 1
```

```
year[2]  # this picks out second row in year; same result as:
```

```
## [1] 3
```

```
xx[2,6]
```

```
## [1] 3
```

```
# We can choose all data (that is, all columns) for all year 1 students and put it in Y1 by doing:
```

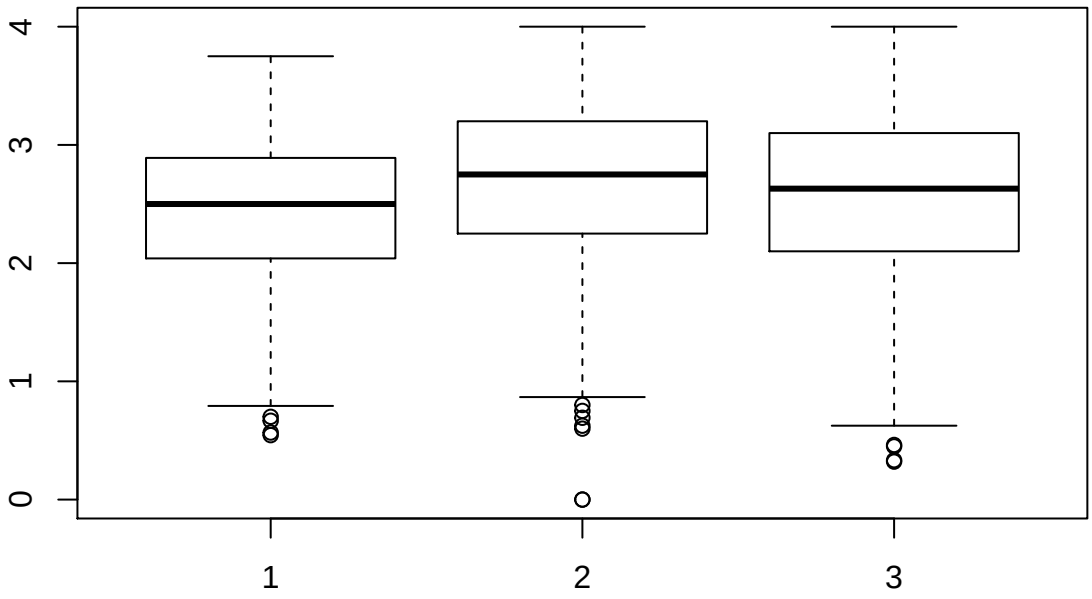
```r
Y1= xx[year==1,]
#or
Y1=xx[xx[,6]==1,]   # I thought I was doing this in the class, but obviously not...
#or
Y1=xx[xx[6]==1,]

# similarly we could isolate subsets for Y2 and Y3
Y2=xx[xx[6]==2,]
Y3=xx[xx[6]==3,]

# Now, we wish to pick out just "termGPA", for instance, which is column 3
Ty1=xx[xx[6]==1,3]  # for year 1. The open-ended   ,] has becom a specific ,3]
Ty2=xx[xx[6]==2,3]  # for year 2
Ty3=xx[xx[6]==3,3]  # for year 3

t.test(Ty1,Ty2)
```

```
##
##  Welch Two Sample t-test
##
## data:  Ty1 and Ty2
## t = -3.9509, df = 303.25, p-value = 9.689e-05
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.3871071 -0.1297023
## sample estimates:
## mean of x mean of y
##  2.426044  2.684449
```

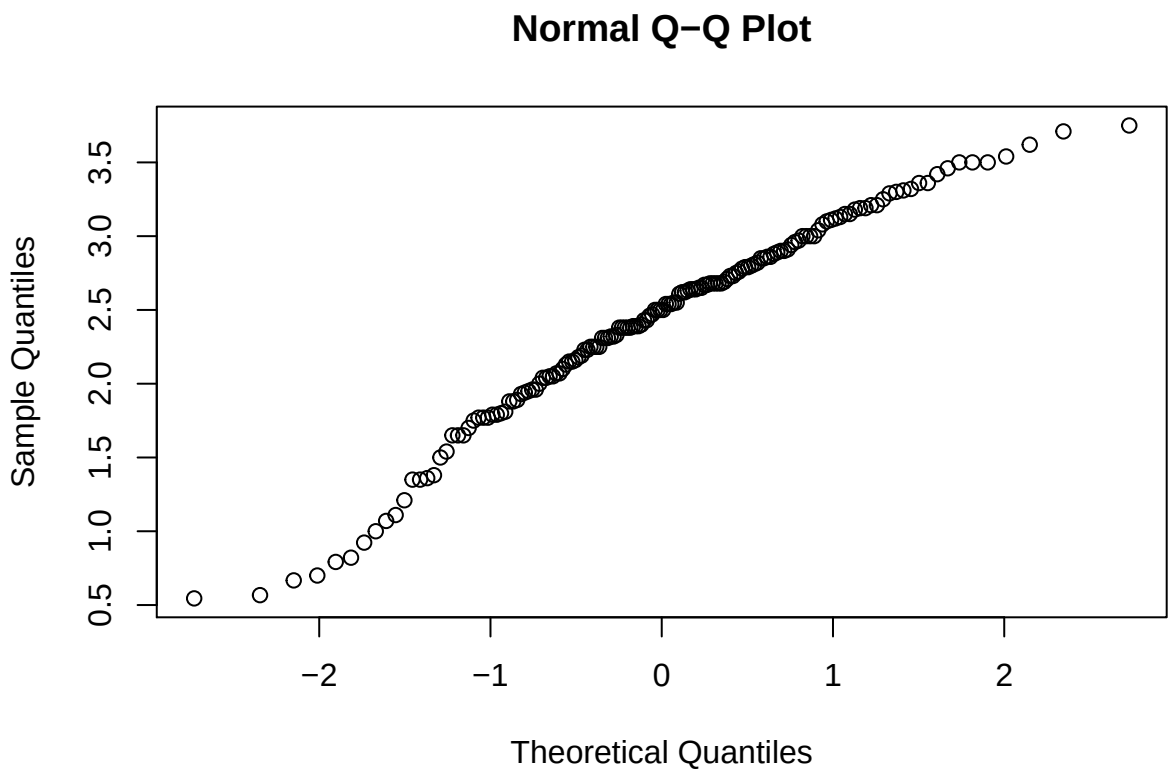
```r
wilcox.test(Ty1,Ty2)
```

```
##
##  Wilcoxon rank sum test with continuity correction
##
## data:  Ty1 and Ty2
## W = 24358, p-value = 8.86e-05
## alternative hypothesis: true location shift is not equal to 0
```

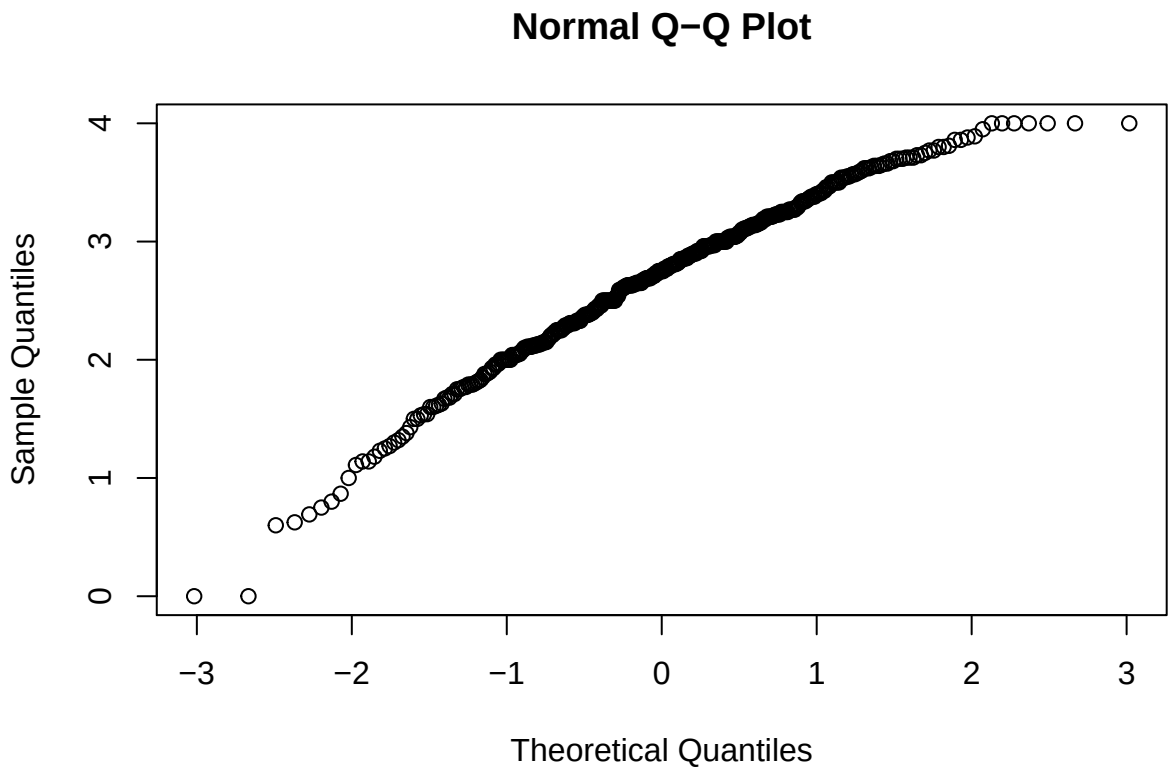
```r
# ... and similarly for Ty1 versus Ty2; and Ty2 versus Ty3

# but firts, we should have done:
boxplot(Ty1,Ty2,Ty3)
```



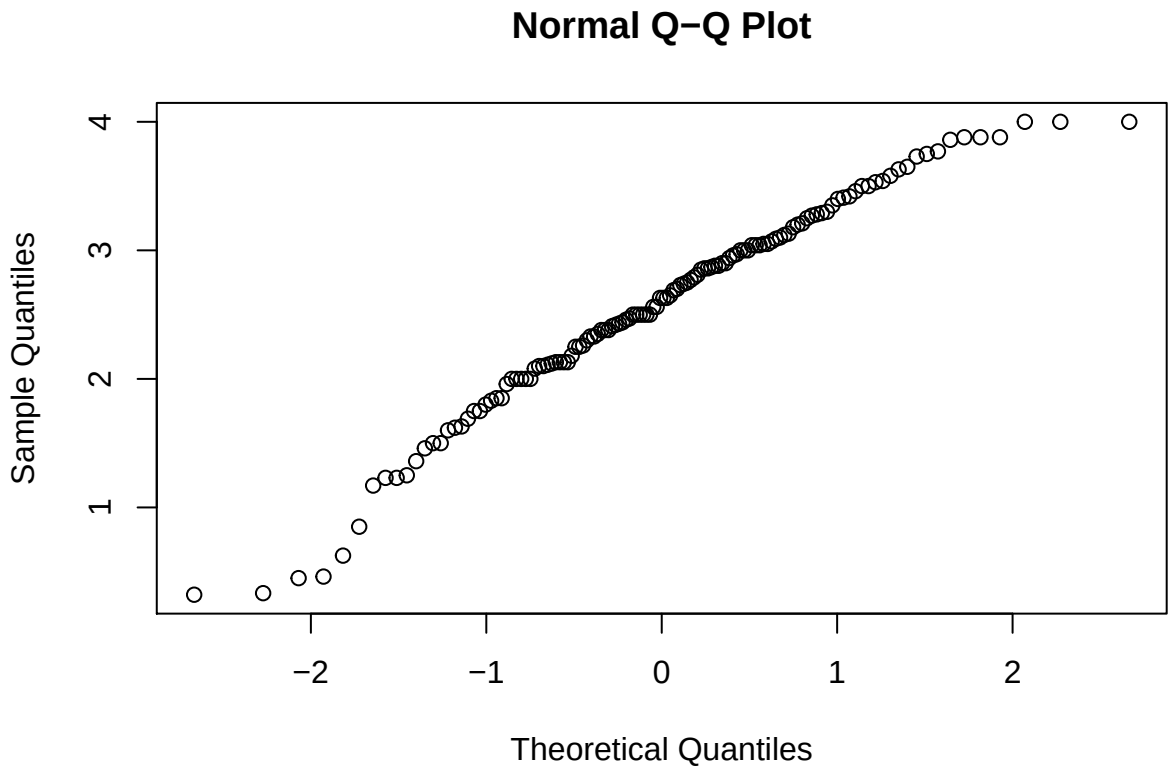

```
# and even:
qqnorm(Ty1)
```




```
qqnorm(Ty2)
```


Normal Q−Q Plot
Sample Quantiles
Theoretical Quantiles
0
1
2
3
4
−3
−2
−1
0
1
2
3

```
qqnorm(Ty3)
```


Normal Q−Q Plot
Sample Quantiles
Theoretical Quantiles
1
2
3
4
−2
−1
0
1
2

```r
# three equivalent ways of finding out the numbers of students in each year
table(year)
```

```
## year
##   1   2   3
## 158 392 130
```

```r
table(xx[,6])
```

```
##
##   1   2   3
## 158 392 130
```

```r
table(xx[6])
```

```
##
##   1   2   3
## 158 392 130
```

```r
# Note, however, that that believing that
# year is interchangeably the same as xx[,6], and xx[6]
# is not necessarily the case.
# For instance, if we want breakdown of students who "pass" (with termGPA >=2)
# then these all work the same:

table(termGPA >=2, year)
```

```
##        year
##           1   2   3
##   FALSE  37  58  25
##   TRUE  121 334 105
```

```r
table(xx[3] >= 2, year)
```

```
##        year
##           1   2   3
##   FALSE  37  58  25
##   TRUE  121 334 105
```

```r
table(xx[3] >= 2, xx[,6])
```

```
##
##           1   2   3
##   FALSE  37  58  25
##   TRUE  121 334 105
```

```r
table(xx[3] >= 2, xx[,6])
```

```
##
##           1   2   3
##   FALSE  37  58  25
##   TRUE  121 334 105
```

```
# BUT THESE DON'T:
#table(xx[3] >= 2, xx[6])
#table(xx[3,] >= 2, year)

#... and I don't know why...
```