

# Medical Student Attitudes Toward Personalized Medicine Report

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Note: This analysis is conducted in R using R Markdown for report generation. The raw data as well as the source code for every table, figure, and calculation is accessible at <https://www.github.com/kippjohnson/PMQ/>

Begin by calling packages which will be used later in the report:

```
library(knitr)
library(psych)
```

Reading in the data from the Github Repository (/kippjohnson/PMQ):

```
tmp <- tempfile()
download.file("https://raw.githubusercontent.com/kippjohnson/PMQ/master/SurveyResponses.csv", destfile=
infile <- read.csv(tmp,header=TRUE)
```

## Demographics

	Number of Students	PercentTotal
Male	109	0.51
Female	101	0.48
No Sex Given	2	0.01
MS1	65	0.31
MS2	64	0.30
MS3	64	0.30
MS4	17	0.08
No Year Given	2	0.01
Total Dual Degree	178	0.84
Total with Research Interest	33	0.16

## EBPAS Statistics

The first step is to compute EBPAS total score, along with its subsets for scores of openness, divergence, and education. Questions 1-12 define the EBPAS scale on the survey, with its three subsets of openness, divergence, and education. There are a number of people who did not completely fill out the first 12 questions of the survey, and for this analysis they will be dropped.

Number of people who did not completely fill out the first 12 questions of the survey: **17**

Questions:

- Should the divergence Likert scores be reversed?\_\_\_
- We will drop all of these individuals from the rest of the study?

- Should we also compute Cronbach's alpha for questions 18-21 (comfort in knowledge of genomic testing) and questions 22-25 (comfort in ability to use genomic testing) **or** should these be incorporated into the EBPAS?

Computing Cronbach's Alpha: We use the `alpha()` function from the `psych` package in R. The EBPAS cronbach's alpha is taken from the literature (Overby et al., J Pers. Med. 2014), as was done in the paper on which we are modeling this.

	N	Mean	SD	Min	Max	Range	Alpha
EBPAS	195	35.410	5.118	23	51	28	0.780
education	195	10.610	2.490	5	17	12	0.545
divergence	195	9.713	2.561	4	18	14	0.545
openness	195	15.087	2.949	5	20	15	0.814

## Analysis Plan

**Step 1: Frequencies** *Question Response Frequencies:* Tables of each question's (13-25) response frequency. These questions include:

- Attitudes toward DTC (13-15)
- Comfort using technology (16, 17)
- Knowledge of genomic testing concepts (18-21)
- Ability to understand genomic testing concepts (22-25)

Question 13	Frequency
0	50
1	161

Question 14	Frequency
1	73
2	121
3	9

Question 15	Frequency
1	35
2	30
3	72
4	58
5	14

Question 16	Frequency
1	1
2	3
3	6

Question 16	Frequency
4	61
5	140

Question 17	Frequency
1	38
2	26
3	38
4	72
5	35

Question 18	Frequency
1	17
2	29
3	52
4	97
5	17

Question 19	Frequency
1	35
2	46
3	62
4	61
5	8

Question 20	Frequency
1	29
2	35
3	57
4	76
5	14

Question 21	Frequency
1	45
2	49
3	49
4	59
5	9

Question 22	Frequency
1	71
2	59

Question 22	Frequency
3	54
4	23
5	4

Question 23	Frequency
1	49
2	58
3	55
4	45
5	5

Question 24	Frequency
1	60
2	53
3	59
4	34
5	6

Question 25	Frequency
1	79
2	63
3	47
4	19
5	4

*Should we also calculate these frequencies by covariate?*

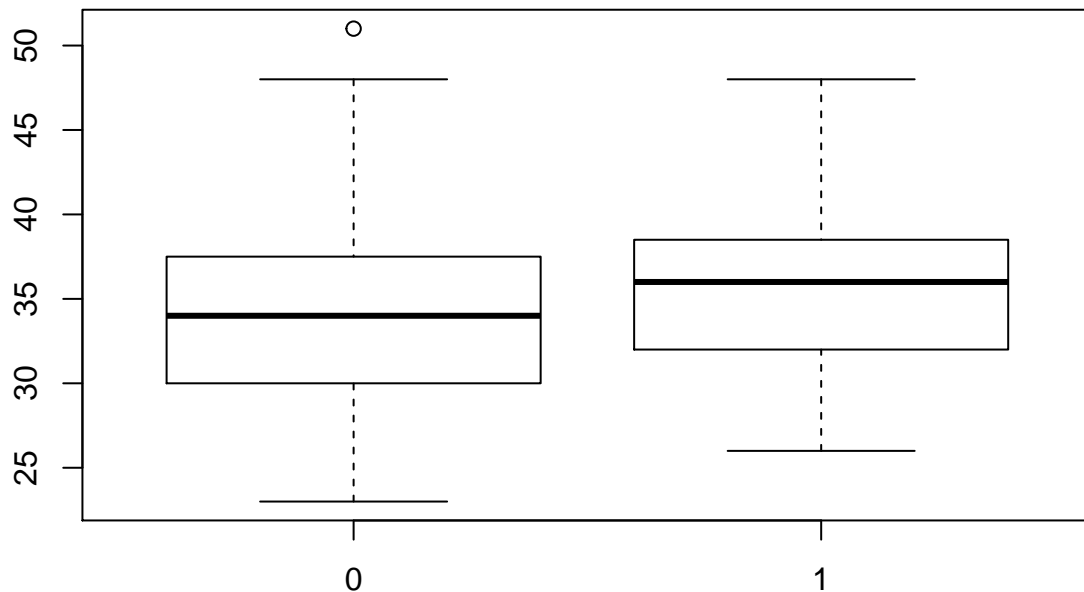
**Step 2: T-Tests** Answers for questions 13-15 were tested for an association with EBPAS Score (Questions 1-12) using ANOVA followed by Tukey Honest Significant Differences. ANOVA+Tukey Results are not currently shown in the table following the code output.

Second, the answers were collapsed into binary categories and T-tests for association with EBPAS score were performed.

### Question 13

```
##
## Welch Two Sample t-test
##
## data:  infile3$EBPAS by infile3$Q13
## t = -0.7686, df = 50.594, p-value = 0.4457
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -3.00062  1.33933
## sample estimates:
```

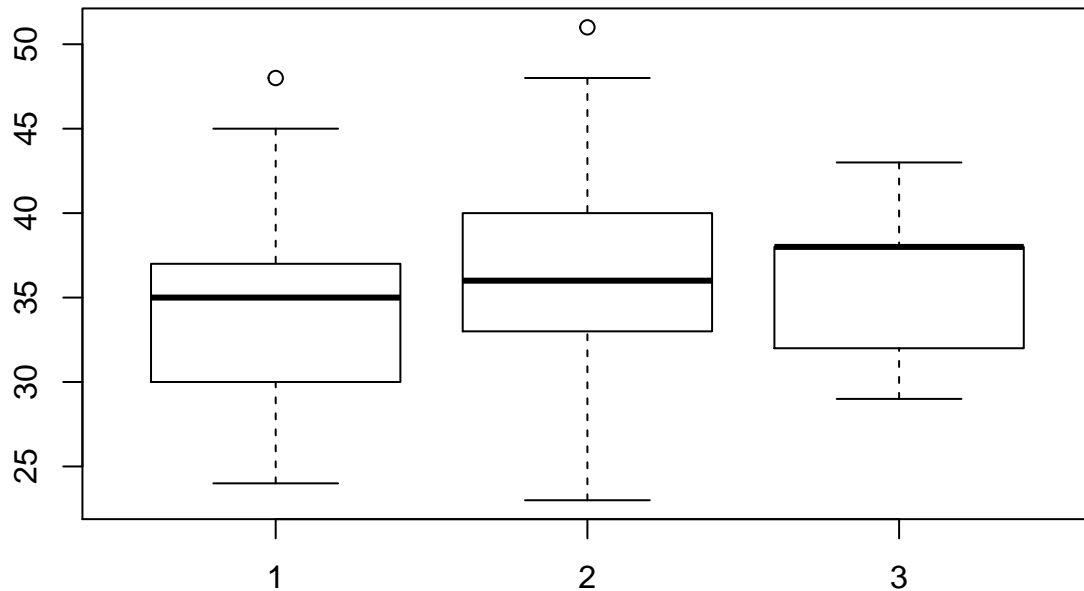
```
## mean in group 0 mean in group 1
##      34.75000      35.58065
```



#### Question 14

```
##              Df Sum Sq Mean Sq F value Pr(>F)
## as.factor(infile3$Q14)  2    158   79.05   3.006 0.0519 .
## Residuals          186   4892   26.30
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 6 observations deleted due to missingness

## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = infile3$EBPAS ~ as.factor(infile3$Q14))
##
## $`as.factor(infile3$Q14)`
##      diff      lwr      upr      p adj
## 2-1  1.9142186  0.05679307  3.771644 0.0417224
## 3-1  1.6859903 -2.60801606  5.979997 0.6235130
## 3-2 -0.2282282 -4.42745245  3.970996 0.9909511
```



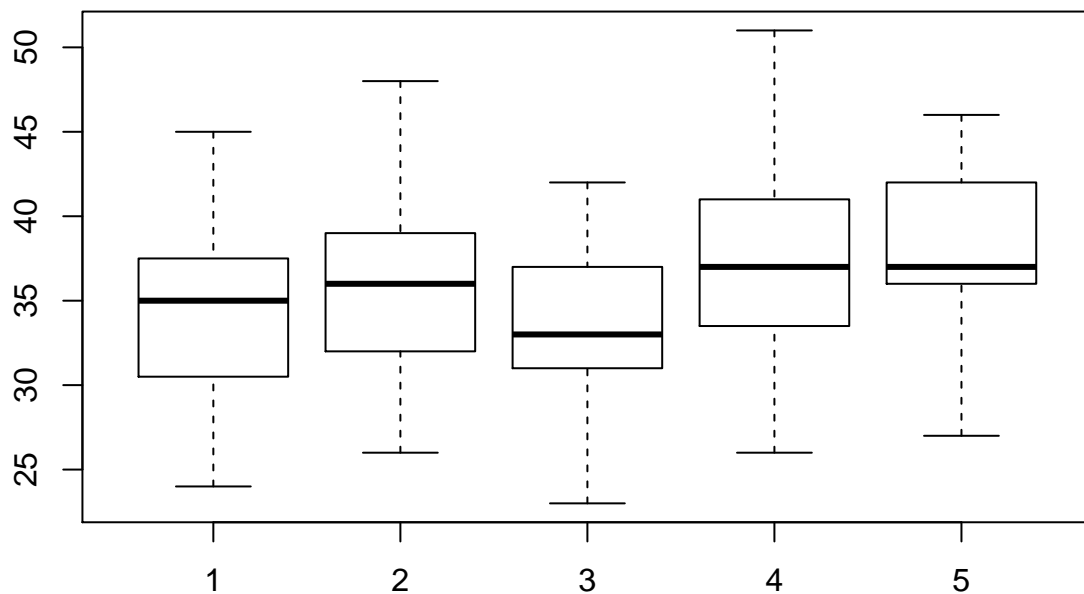
```
##
## Welch Two Sample t-test
##
## data: infile3$EBPAS by infile3$Q14c
## t = -2.4226, df = 136.229, p-value = 0.01672
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -3.445649 -0.348554
## sample estimates:
## mean in group 1 mean in group 2
##      34.2029      36.1000
```

### Question 15

```
##              Df Sum Sq Mean Sq F value    Pr(>F)
## as.factor(infile3$Q15)    4     552   138.12    5.762 0.000214 ***
## Residuals              188    4507    23.97
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 2 observations deleted due to missingness

## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = infile3$EBPAS ~ as.factor(infile3$Q15))
```

```
##
## $`as.factor(infile3$Q15)`
##      diff      lwr      upr      p adj
## 2-1  1.0727969 -2.53377517 4.679369 0.9244222
## 3-1 -0.8120915 -3.87974958 2.255567 0.9494875
## 4-1  3.1191919 -0.04982958 6.288213 0.0560471
## 5-1  2.9841270 -1.45735102 7.425605 0.3478604
## 3-2 -1.8848884 -4.87587112 1.106094 0.4146113
## 4-2  2.0463950 -1.04846344 5.141253 0.3644024
## 5-2  1.9113300 -2.47753976 6.300200 0.7516559
## 4-3  3.9312834  1.48561125 6.376956 0.0001559
## 5-3  3.7962185 -0.16172819 7.754165 0.0669886
## 5-4 -0.1350649 -4.17208278 3.901953 0.9999836
```



```
##
## 1 2 3 4 5
## 27 29 68 55 14
```

```
##
## 1 2
## 124 69
```

```
##
## Welch Two Sample t-test
##
```

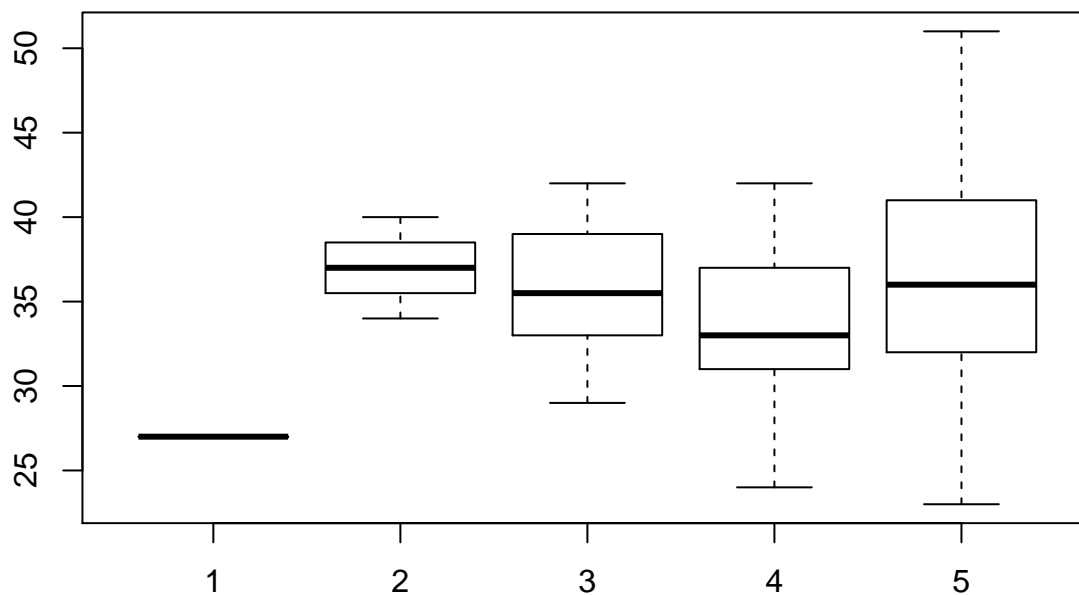
```
## data: infile3$EBPAS by infile3$Q15c
## t = -4.2826, df = 124.076, p-value = 3.665e-05
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -4.805023 -1.767441
## sample estimates:
## mean in group 1 mean in group 2
## 34.25000 37.53623
```

## Question 16

```
##              Df Sum Sq Mean Sq F value Pr(>F)
## as.factor(infile3$Q16) 4    368   92.08   3.712 0.0062 **
## Residuals          190   4713   24.80
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = infile3$EBPAS ~ as.factor(infile3$Q16))
##
## $`as.factor(infile3$Q16)`
##      diff      lwr      upr      p adj
## 2-1 10.0000000 -5.8387964 25.838796 0.4127454
## 3-1  8.6666667 -6.1491707 23.482504 0.4921742
## 4-1  6.5932203 -7.2393353 20.425776 0.6836375
## 5-1  9.2777778 -4.4933464 23.048902 0.3451185
## 3-2 -1.3333333 -11.0325756  8.365909 0.9956046
## 4-2 -3.4067797 -11.5250221  4.711463 0.7764000
## 5-2 -0.7222222 -8.7353443  7.290900 0.9991558
## 4-3 -2.0734463 -7.9511523  3.804260 0.8676726
## 5-3  0.6111111 -5.1205285  6.342751 0.9983659
## 5-4  2.6845574  0.5207062  4.848409 0.0068643
```





```
##
## 1 2 3 4 5
## 1 3 6 59 126
```

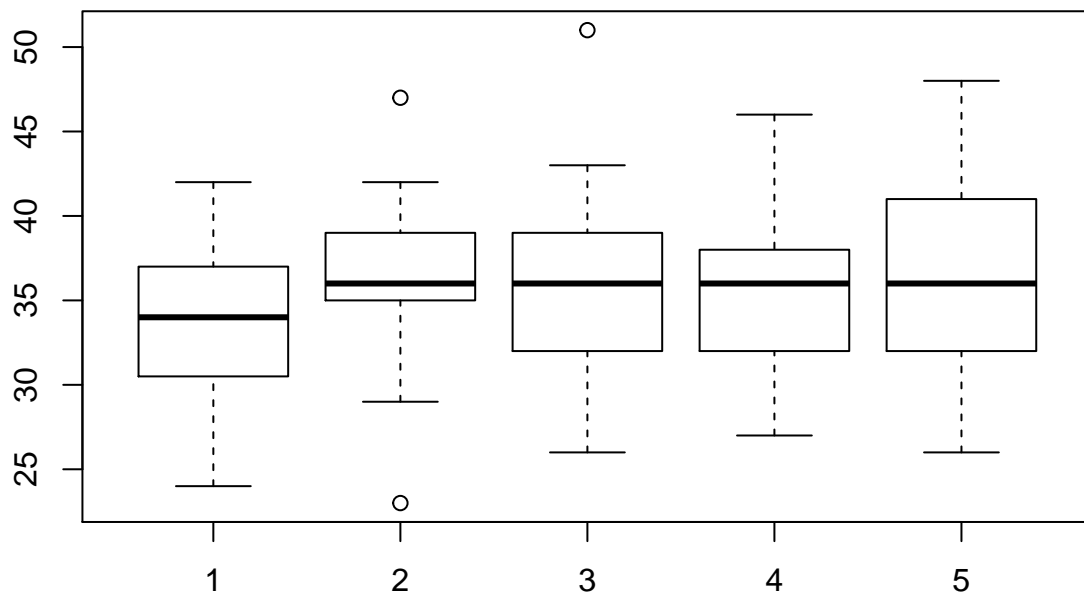
```
##
## 1 2
## 10 185
```

```
##
## Welch Two Sample t-test
##
## data: infile3$EBPAS by infile3$Q16c
## t = -0.1429, df = 10.174, p-value = 0.8892
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -3.669391 3.226148
## sample estimates:
## mean in group 1 mean in group 2
## 35.20000 35.42162
```

### Question 17

```
##
##          Df Sum Sq Mean Sq F value Pr(>F)
## as.factor(infile3$Q17) 4      162   40.44   1.562  0.186
## Residuals          190     4919   25.89
```

```
## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = infile3$EBPAS ~ as.factor(infile3$Q17))
##
## $`as.factor(infile3$Q17)`
##      diff      lwr      upr    p adj
## 2-1  2.7487500 -0.9920090  6.489509 0.2586398
## 3-1  2.1909722 -1.2138584  5.595803 0.3928244
## 4-1  1.8455616 -1.1517262  4.842849 0.4389650
## 5-1  2.7717803 -0.7051182  6.248679 0.1858258
## 3-2 -0.5577778 -4.2062493  3.090694 0.9933830
## 4-2 -0.9031884 -4.1746112  2.368234 0.9415241
## 5-2  0.0230303 -3.6927867  3.738847 1.0000000
## 4-3 -0.3454106 -3.2266952  2.535874 0.9974164
## 5-3  0.5808081 -2.7966007  3.958217 0.9896372
## 5-4  0.9262187 -2.0398818  3.892319 0.9110263
```



```
##
## 1 2 3 4 5
## 32 25 36 69 33
```

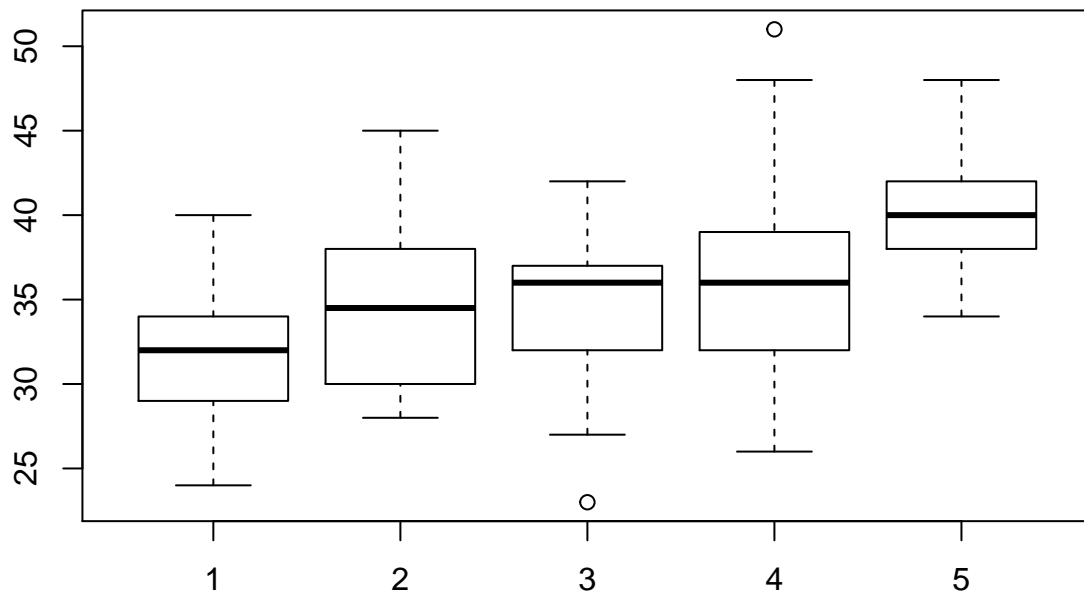
```
##
## 1 2
## 93 102
```

```
##
## Welch Two Sample t-test
##
## data: infile3$EBPAS by infile3$Q17c
## t = -0.7633, df = 192.999, p-value = 0.4462
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -2.0006233 0.8842413
## sample estimates:
## mean in group 1 mean in group 2
## 35.11828 35.67647
```

### Question 18

```
##
##              Df Sum Sq Mean Sq F value    Pr(>F)
## as.factor(infile3$Q18)    4    607   151.73    6.443 6.98e-05 ***
## Residuals              190   4474    23.55
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = infile3$EBPAS ~ as.factor(infile3$Q18))
##
## $`as.factor(infile3$Q18)`
##      diff      lwr      upr      p adj
## 2-1 3.5384615 -1.0014391 8.078362 0.2049397
## 3-1 3.4222920 -0.7473477 7.591932 0.1624973
## 4-1 4.6186931 0.6612728 8.576113 0.0131822
## 5-1 8.9835165 3.8357530 14.131280 0.0000305
## 3-2 -0.1161695 -3.3589557 3.126617 0.9999784
## 4-2 1.0802316 -1.8847208 4.045184 0.8535487
## 5-2 5.4450549 1.0145656 9.875544 0.0076308
## 4-3 1.1964011 -1.1628656 3.555668 0.6305733
## 5-3 5.5612245 1.5109859 9.611463 0.0019295
## 5-4 4.3648233 0.5334119 8.196235 0.0167098
```



```
##
##  1  2  3  4  5
## 13 26 49 93 14
```

```
##
##   1   2
## 88 107
```

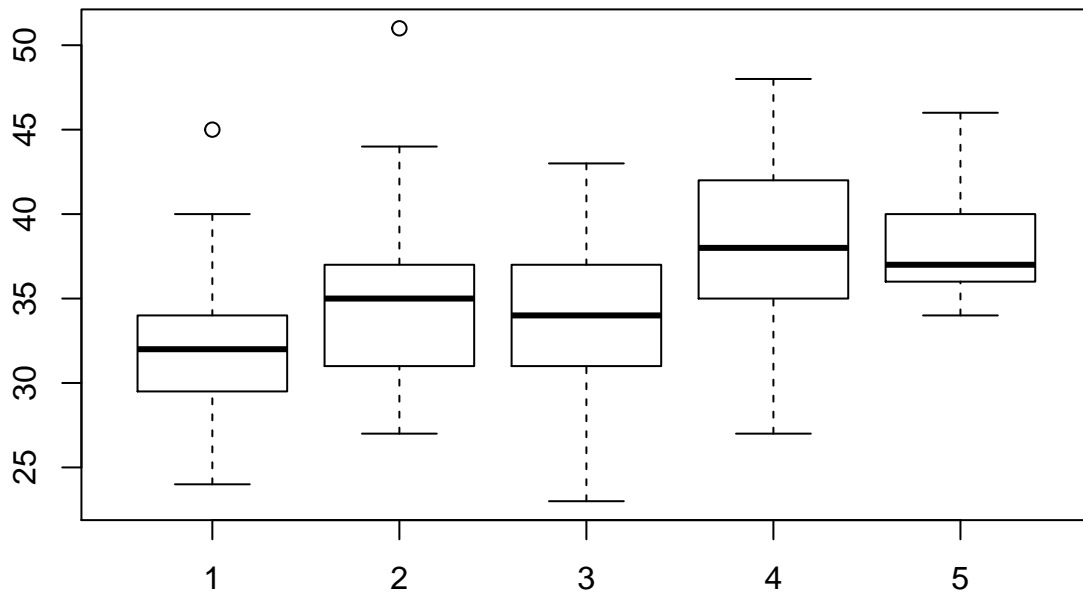
```
##
## Welch Two Sample t-test
##
## data:  infile3$EBPAS by infile3$Q18c
## t = -3.1496, df = 192.4, p-value = 0.001896
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -3.6407015 -0.8367836
## sample estimates:
## mean in group 1 mean in group 2
##      34.18182      36.42056
```

### Question 19

```
##
##              Df Sum Sq Mean Sq F value    Pr(>F)
## as.factor(infile3$Q19)  4      793   198.25    8.784 1.58e-06 ***
```

```
## Residuals          190    4288    22.57
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = infile3$EBPAS ~ as.factor(infile3$Q19))
##
## $`as.factor(infile3$Q19)`
##      diff      lwr      upr    p adj
## 2-1  2.3311688 -0.8318997  5.494237 0.2558179
## 3-1  1.8460591 -1.1648935  4.857012 0.4434362
## 4-1  5.5701970  2.5592445  8.581150 0.0000083
## 5-1  5.9642857  0.4351954 11.493376 0.0274061
## 3-2 -0.4851097 -3.1009273  2.130708 0.9862217
## 4-2  3.2390282  0.6232106  5.854846 0.0070158
## 5-2  3.6331169 -1.6911208  8.957355 0.3320093
## 4-3  3.7241379  1.2944600  6.153816 0.0003594
## 5-3  4.1182266 -1.1170709  9.353524 0.1970300
## 5-4  0.3940887 -4.8412088  5.629386 0.9995856
```



```
##
## 1 2 3 4 5
## 28 44 58 58 7
```

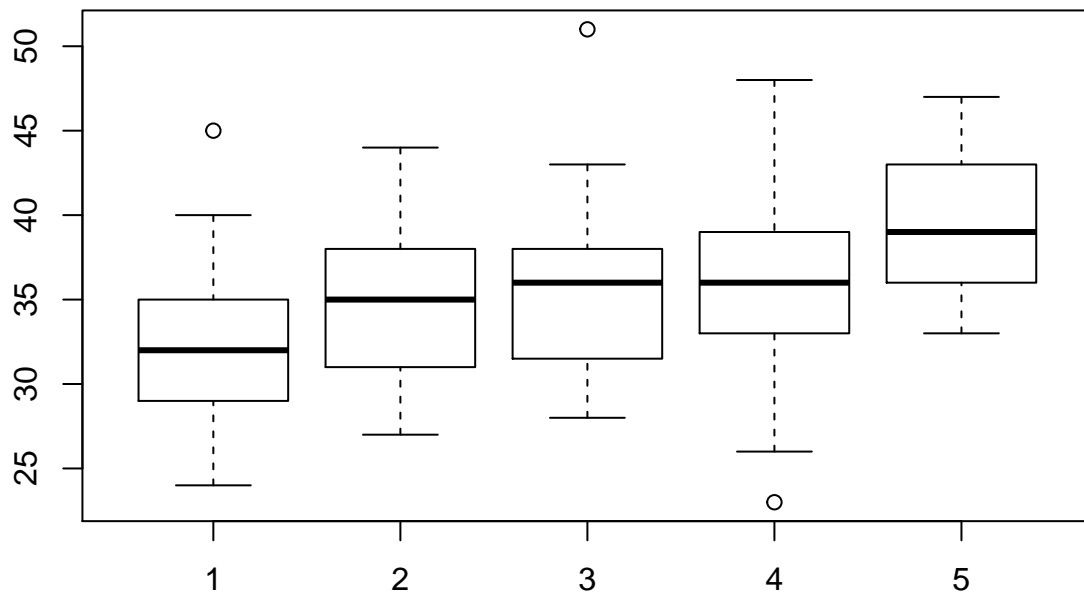
```
##
## 1 2
## 130 65

##
## Welch Two Sample t-test
##
## data: infile3$EBPAS by infile3$Q19c
## t = -5.4721, df = 125.04, p-value = 2.329e-07
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -5.446703 -2.553297
## sample estimates:
## mean in group 1 mean in group 2
## 34.07692 38.07692
```

## Question 120

```
##              Df Sum Sq Mean Sq F value    Pr(>F)
## as.factor(infile3$Q20)  4      527   131.84    5.486 0.000336 ***
## Residuals              189    4542    24.03
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 1 observation deleted due to missingness

## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = infile3$EBPAS ~ as.factor(infile3$Q20))
##
## $`as.factor(infile3$Q20)`
##      diff      lwr      upr      p adj
## 2-1 2.9076923 -0.71019702  6.525582 0.1791485
## 3-1 3.1923077 -0.05084593  6.435461 0.0560292
## 4-1 3.8076923  0.72395014  6.891434 0.0072443
## 5-1 7.4230769  2.83656508 12.009589 0.0001372
## 3-2 0.2846154 -2.81104417  3.380275 0.9990868
## 4-2 0.9000000 -2.02822956  3.828230 0.9156106
## 5-2 4.5153846  0.03195362  8.998816 0.0474469
## 4-3 0.6153846 -1.83480938  3.065579 0.9580776
## 5-3 4.2307692  0.04387590  8.417663 0.0462849
## 5-4 3.6153846 -0.44927970  7.680049 0.1068363
```



```
##
##  1  2  3  4  5
## 26 30 52 73 13
```

```
##
##   1   2
## 108  86
```

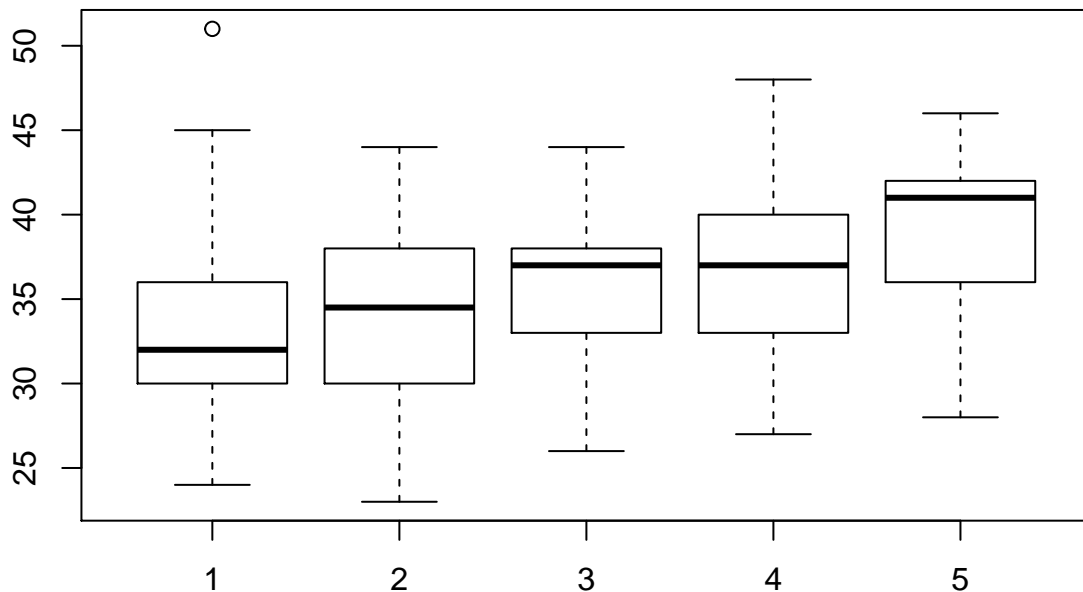
```
##
## Welch Two Sample t-test
##
## data:  infile3$EBPAS by infile3$Q20c
## t = -2.7395, df = 177.028, p-value = 0.006782
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -3.4570203 -0.5619288
## sample estimates:
## mean in group 1 mean in group 2
##      34.53704      36.54651
```

## Question 21

```
##
## as.factor(infile3$Q21) Df Sum Sq Mean Sq F value Pr(>F)
## 4 410 102.52 4.158 0.00299 **
```

```
## Residuals          189   4659   24.65
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 1 observation deleted due to missingness

## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = infile3$EBPAS ~ as.factor(infile3$Q21))
##
## $`as.factor(infile3$Q21)`
##      diff      lwr      upr    p adj
## 2-1 1.0400458 -1.9578322  4.037924 0.8744897
## 3-1 2.5608187 -0.4520903  5.573728 0.1366663
## 4-1 3.2302632  0.3560225  6.104504 0.0189972
## 5-1 5.6052632  0.5355791 10.674947 0.0220669
## 3-2 1.5207729 -1.3465760  4.388122 0.5891817
## 4-2 2.1902174 -0.5310560  4.911491 0.1779866
## 5-2 4.5652174 -0.4193353  9.549770 0.0899480
## 4-3 0.6694444 -2.0683790  3.407268 0.9619046
## 5-3 3.0444444 -1.9491629  8.038052 0.4492794
## 5-4 2.3750000 -2.5361865  7.286187 0.6716523
```



```
##
## 1 2 3 4 5
## 38 46 45 56 9
```



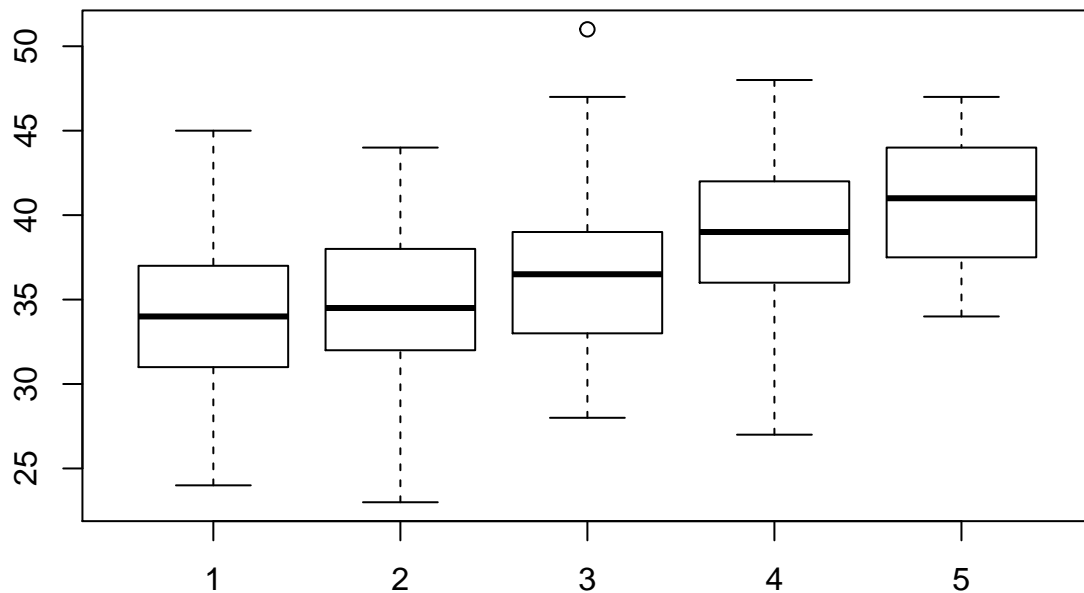
```
##
## 1 2
## 129 65

##
## Welch Two Sample t-test
##
## data: infile3$EBPAS by infile3$Q21c
## t = -2.983, df = 125.997, p-value = 0.003429
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -3.8174444 -0.7724185
## sample estimates:
## mean in group 1 mean in group 2
## 34.65891 36.95385
```

## Question 22

```
##              Df Sum Sq Mean Sq F value    Pr(>F)
## as.factor(infile3$Q22)  4      629   157.33    6.746 4.27e-05 ***
## Residuals            189    4408    23.32
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 1 observation deleted due to missingness

## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = infile3$EBPAS ~ as.factor(infile3$Q22))
##
## $`as.factor(infile3$Q22)`
##      diff      lwr      upr      p adj
## 2-1 0.9338609 -1.50565758  3.373379 0.8294555
## 3-1 2.5586885  0.02110047  5.096277 0.0470322
## 4-1 5.2786885  1.91324805  8.644129 0.0002419
## 5-1 7.0286885  0.16320203 13.894175 0.0419141
## 3-2 1.6248276 -0.94215209  4.191807 0.4100366
## 4-2 4.3448276  0.95717041  7.732485 0.0046550
## 5-2 6.0948276 -0.78157673 12.971232 0.1089928
## 4-3 2.7200000 -0.73894835  6.178948 0.1972926
## 5-3 4.4700000 -2.44180432 11.381804 0.3875516
## 5-4 1.7500000 -5.50671244  9.006712 0.9637507
```



```
##
##  1  2  3  4  5
## 61 58 50 21  4
```

```
##
##   1   2
## 169  25
```

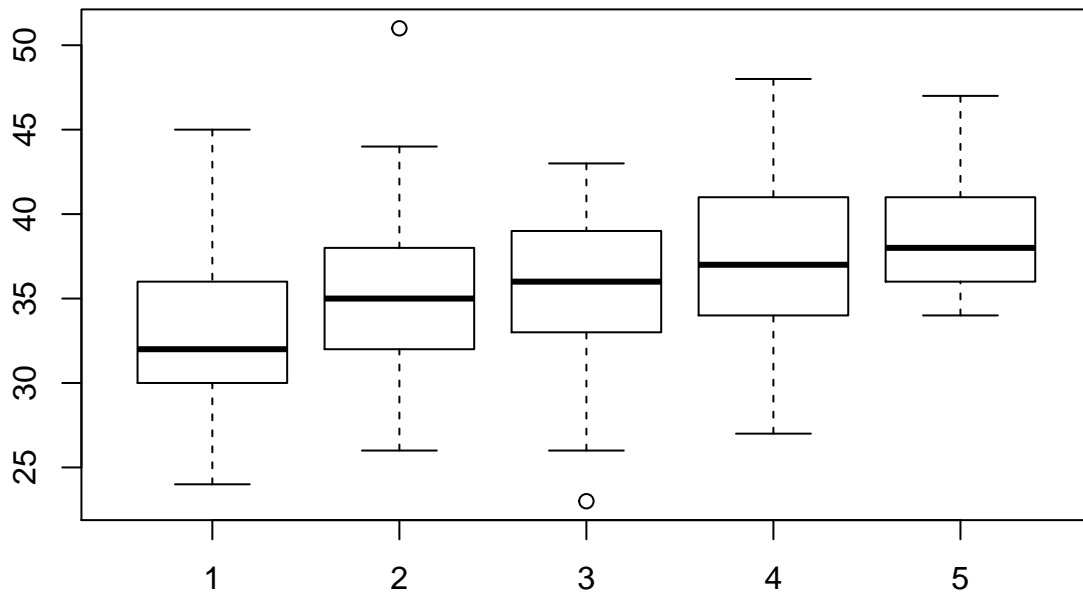
```
##
## Welch Two Sample t-test
##
## data:  infile3$EBPAS by infile3$Q22c
## t = -3.883, df = 29.752, p-value = 0.0005316
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -6.838896 -2.123471
## sample estimates:
## mean in group 1 mean in group 2
##      34.79882      39.28000
```

### Question 23

```
##
##               Df Sum Sq Mean Sq F value    Pr(>F)
## as.factor(infile3$Q23)  4    563   140.81    5.922 0.000164 ***
```

```
## Residuals          190    4518    23.78
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = infile3$EBPAS ~ as.factor(infile3$Q23))
##
## $`as.factor(infile3$Q23)`
##      diff      lwr      upr    p adj
## 2-1 1.8353576 -0.955549  4.626270 0.3701578
## 3-1 2.2626996 -0.5706751  5.096074 0.1843878
## 4-1 4.8742964  1.8702884  7.878305 0.0001306
## 5-1 6.1230769 -0.2564631 12.502617 0.0666839
## 3-2 0.4273419 -2.1353790  2.990063 0.9907806
## 4-2 3.0389388  0.2887405  5.789137 0.0221823
## 5-2 4.2877193 -1.9763095 10.551748 0.3288327
## 4-3 2.6115969 -0.1816826  5.404876 0.0791411
## 5-3 3.8603774 -2.4226853 10.143440 0.4412312
## 5-4 1.2487805 -5.1130533  7.610614 0.9829577
```



```
##
## 1 2 3 4 5
## 39 57 53 41 5
```

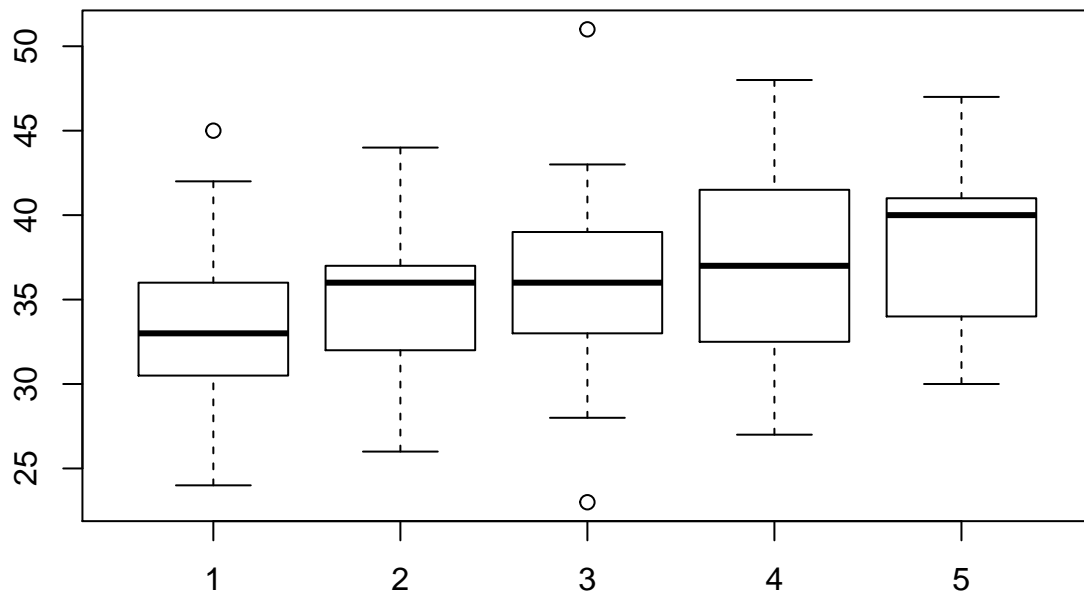
```
##
## 1 2
## 149 46

##
## Welch Two Sample t-test
##
## data: infile3$EBPAS by infile3$Q23c
## t = -4.0285, df = 69.655, p-value = 0.0001412
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -5.237499 -1.768629
## sample estimates:
## mean in group 1 mean in group 2
## 34.58389 38.08696
```

## Question 24

```
##              Df Sum Sq Mean Sq F value Pr(>F)
## as.factor(infile3$Q24) 4    430  107.40  4.387 0.00205 **
## Residuals          190   4652   24.48
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = infile3$EBPAS ~ as.factor(infile3$Q24))
##
## $`as.factor(infile3$Q24)`
##      diff      lwr      upr      p adj
## 2-1 1.274510 -1.42410544  3.973125 0.6910842
## 3-1 2.634225 -0.01487057  5.283320 0.0520925
## 4-1 3.939338  0.86614386  7.012533 0.0046841
## 5-1 5.137255 -0.74424067 11.018750 0.1182445
## 3-2 1.359715 -1.28938037  4.008810 0.6196582
## 4-2 2.664828 -0.40836594  5.738023 0.1230142
## 5-2 3.862745 -2.01875048  9.744241 0.3715147
## 4-3 1.305114 -1.72468909  4.334916 0.7592033
## 5-3 2.503030 -3.35590912  8.361970 0.7647395
## 5-4 1.197917 -4.86459021  7.260424 0.9825327
```



```
##
##  1  2  3  4  5
## 51 51 55 32  6
```

```
##
##   1   2
## 157  38
```

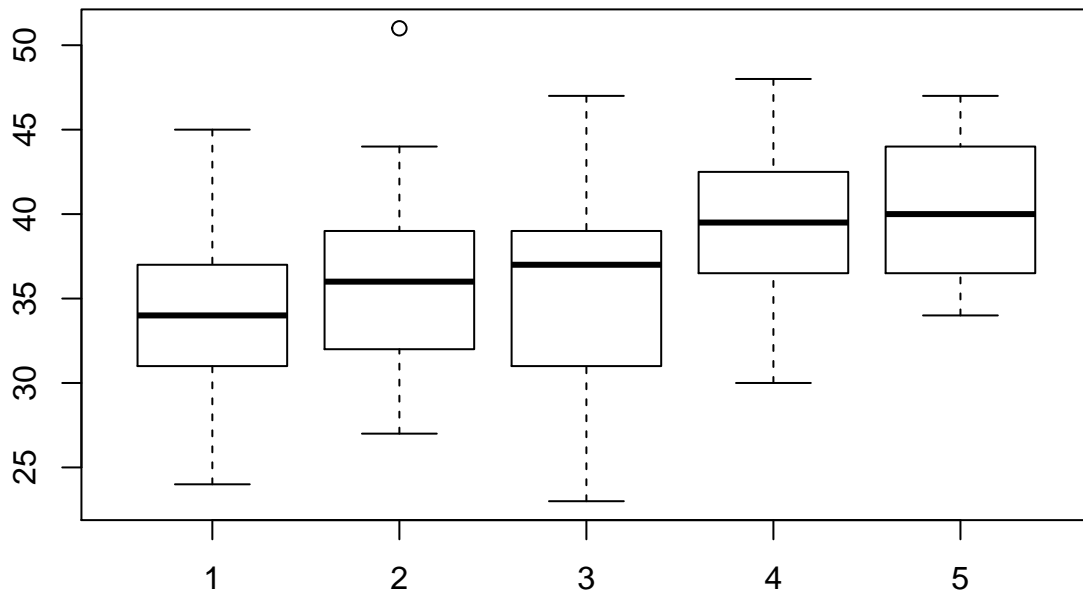
```
##
## Welch Two Sample t-test
##
## data:  infile3$EBPAS by infile3$Q24c
## t = -2.7302, df = 49.686, p-value = 0.008733
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -4.8457139 -0.7375915
## sample estimates:
## mean in group 1 mean in group 2
##      34.86624      37.65789
```

## Question 25

```
##
## as.factor(infile3$Q25)  Df Sum Sq Mean Sq F value Pr(>F)
##                        4    559    139.7    5.87 0.000178 ***
```

```
## Residuals          190    4522    23.8
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = infile3$EBPAS ~ as.factor(infile3$Q25))
##
## $`as.factor(infile3$Q25)`
##      diff      lwr      upr    p adj
## 2-1  1.8599532 -0.4935427  4.213449 0.1930917
## 3-1  1.7396104 -0.8454387  4.324659 0.3462842
## 4-1  5.7964286  2.0730950  9.519762 0.0002754
## 5-1  6.4214286 -0.4861936 13.329051 0.0820550
## 3-2 -0.1203428 -2.7779765  2.537291 0.9999450
## 4-2  3.9364754  0.1623860  7.710565 0.0362122
## 5-2  4.5614754 -2.3736368 11.496588 0.3699725
## 4-3  4.0568182  0.1341549  7.979481 0.0387364
## 5-3  4.6818182 -2.3352551 11.698892 0.3551412
## 5-4  0.6250000 -6.8863282  8.136328 0.9993841
```



```
##
## 1 2 3 4 5
## 70 61 44 16 4
```

```
##
## 1 2
## 175 20

##
## Welch Two Sample t-test
##
## data: infile3$EBPAS by infile3$Q25c
## t = -4.0424, df = 23.205, p-value = 0.0004992
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -7.309135 -2.362293
## sample estimates:
## mean in group 1 mean in group 2
## 34.91429 39.75000
```

	N	Mean	SD	T-Test P-Value
Question 14 Group 1	69	34.203	5.274	0.017
Question 14 Group 2	120	36.100	5.022	0.017
Question 15 Group 1	124	34.250	4.620	0.000
Question 15 Group 2	69	37.536	5.362	0.000
Question 16 Group 1	10	35.200	4.756	0.889
Question 16 Group 2	185	35.422	5.148	0.889
Question 17 Group 1	93	35.118	4.863	0.446
Question 17 Group 2	102	35.676	5.349	0.446
Question 18 Group 1	88	34.182	4.613	0.002
Question 18 Group 2	107	36.421	5.309	0.002
Question 19 Group 1	130	34.077	4.724	0.000
Question 19 Group 2	65	38.077	4.855	0.000
Question 20 Group 1	108	34.537	4.898	0.007
Question 20 Group 2	86	36.547	5.212	0.007
Question 21 Group 1	129	34.659	4.985	0.003
Question 21 Group 2	65	36.954	5.094	0.003
Question 22 Group 1	169	34.799	4.808	0.001
Question 22 Group 2	25	39.280	5.466	0.001
Question 23 Group 1	149	34.584	4.796	0.000
Question 23 Group 2	46	38.087	5.261	0.000
Question 24 Group 1	157	34.866	4.789	0.009
Question 24 Group 2	38	37.658	5.846	0.009
Question 25 Group 1	175	34.914	4.895	0.000
Question 25 Group 2	20	39.750	5.087	0.000

### Summary Table of Results from Collapsed T-tests (Analagous to Table. 6, Overby et al.)

**Step 3: Linear Regression** Model EBPAS ~ Step 1 predictors + possible covariates

Covariates collected include:

- Age
- Gender
- Medical School Year

- Dual Degree
- Interest in Research