CTT Assignment

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5. Initial alpha() call

The data set being used has already been reverse-coded based on my item interpretations.

```
mt_rev <- read_excel("Bruce_CTT_data.xlsx", sheet = "Reverse Coded")
alpha(mt_rev)
```

```
Warning in alpha(mt_rev): Some items were negatively correlated with the total scale and probably
should be reversed.
To do this, run the function again with the 'check.keys=TRUE' option

Some items ( Q1_EMPOW Q2_ADOL Q6_AVCM Q8_WHOURS Q10_SUMM Q12_STATUS Q14_FAMLY Q17_PPEERS Q19_NOACAD Q20_
probably should be reversed.
To do this, run the function again with the 'check.keys=TRUE' option

Reliability analysis
Call: alpha(x = mt_rev)

  raw_alpha std.alpha G6(smc) average_r  S/N  ase mean   sd median_r
       0.3      0.43    0.65     0.031 0.74 0.11  3.1 0.18    0.012

 lower alpha upper     95% confidence boundaries
0.09 0.3 0.52

 Reliability if an item is dropped:
            raw_alpha std.alpha G6(smc) average_r  S/N alpha se var.r  med.r
Q1_EMPOW         0.29      0.41    0.64     0.031 0.70     0.11 0.035 0.0095
Q2_ADOL          0.37      0.47    0.67     0.039 0.89     0.10 0.034 0.0198
Q3_SOCIETY       0.27      0.38    0.62     0.028 0.62     0.12 0.033 0.0095
Q4_SCHANGE       0.22      0.36    0.59     0.025 0.56     0.12 0.032 0.0097
Q5_DOER          0.32      0.45    0.66     0.036 0.81     0.11 0.033 0.0168
Q6_AVCM          0.24      0.38    0.61     0.027 0.60     0.12 0.033 0.0095
Q7_SALRY         0.35      0.46    0.66     0.037 0.86     0.10 0.033 0.0182
Q8_WHOURS        0.28      0.42    0.63     0.031 0.71     0.11 0.030 0.0125
Q9_CHILD         0.33      0.43    0.65     0.033 0.76     0.11 0.034 0.0125
Q10_SUMM         0.25      0.39    0.62     0.028 0.64     0.12 0.031 0.0097
Q11_HELP         0.27      0.39    0.61     0.028 0.64     0.12 0.033 0.0087
Q12_STATUS       0.34      0.46    0.66     0.037 0.84     0.11 0.031 0.0182
Q13_NOADMIT      0.29      0.39    0.62     0.028 0.63     0.11 0.033 0.0097
Q14_FAMLY        0.32      0.43    0.65     0.034 0.77     0.11 0.030 0.0137
```

```
Q15_INEQL        0.24      0.36    0.59     0.025 0.57     0.12 0.032 0.0118
Q16_INCOM        0.33      0.44    0.64     0.034 0.78     0.11 0.029 0.0123
Q17_PPEERS       0.29      0.42    0.64     0.032 0.74     0.11 0.034 0.0123
Q18_SJOB         0.35      0.46    0.65     0.038 0.86     0.10 0.030 0.0137
Q19_NOACAD       0.26      0.40    0.63     0.030 0.68     0.12 0.034 0.0118
Q20_FLEXR        0.30      0.44    0.65     0.034 0.77     0.11 0.032 0.0137
Q21_CUND         0.23      0.34    0.58     0.022 0.50     0.12 0.032 0.0086
Q22_SPNEED       0.21      0.36    0.60     0.025 0.56     0.13 0.032 0.0095
Q23_STEAD        0.34      0.45    0.65     0.036 0.82     0.11 0.031 0.0168
```

Item statistics

	n	raw.r	std.r	r.cor	r.drop	mean	sd
Q1_EMPOW	82	0.2341	0.2864	0.1867	0.132	3.7	0.46
Q2_ADOL	82	0.0064	-0.0096	-0.1555	-0.194	3.4	0.81
Q3_SOCIETY	82	0.3126	0.4046	0.3670	0.218	3.8	0.47
Q4_SCHANGE	81	0.4671	0.5058	0.5312	0.322	3.4	0.72
Q5_DOER	81	0.0998	0.1082	0.0021	-0.052	2.7	0.61
Q6_AVCM	79	0.4227	0.4421	0.4367	0.301	3.7	0.62
Q7_SALRY	82	0.1189	0.0389	-0.0868	-0.106	2.5	0.89
Q8_WHOURS	81	0.3193	0.2680	0.2270	0.106	2.3	0.88
Q9_CHILD	82	0.2018	0.1926	0.0787	-0.023	3.2	0.92
Q10_SUMM	82	0.3832	0.3727	0.3564	0.212	2.2	0.82
Q11_HELP	82	0.2983	0.3848	0.3818	0.185	3.7	0.52
Q12_STATUS	81	0.1344	0.0631	-0.0578	-0.069	2.8	0.82
Q13_NOADMIT	82	0.2485	0.3905	0.3639	0.224	4.0	0.11
Q14_FAMLY	81	0.2292	0.1757	0.1117	0.010	2.7	0.94
Q15_INEQL	81	0.4236	0.4883	0.5183	0.293	3.3	0.64
Q16_INCOM	80	0.1357	0.1603	0.1188	-0.067	2.3	0.81
Q17_PPEERS	81	0.3234	0.2267	0.1476	0.095	2.6	0.96
Q18_SJOB	82	0.0453	0.0274	-0.0423	-0.142	2.6	0.78
Q19_NOACAD	82	0.3611	0.3194	0.2618	0.209	3.6	0.67
Q20_FLEXR	81	0.1972	0.1727	0.0891	0.036	3.5	0.69
Q21_CUND	81	0.4940	0.5963	0.6456	0.399	3.6	0.51
Q22_SPNEED	81	0.5002	0.5110	0.5167	0.328	2.9	0.87
Q23_STEAD	79	0.1004	0.1025	0.0140	-0.086	2.8	0.77

Non missing response frequency for each item

	1	2	3	4	miss
Q1_EMPOW	0.00	0.00	0.29	0.71	0.00
Q2_ADOL	0.02	0.13	0.27	0.57	0.00
Q3_SOCIETY	0.00	0.02	0.17	0.80	0.00
Q4_SCHANGE	0.02	0.06	0.36	0.56	0.01
Q5_DOER	0.01	0.36	0.57	0.06	0.01
Q6_AVCM	0.01	0.04	0.23	0.72	0.04
Q7_SALRY	0.12	0.38	0.35	0.15	0.00
Q8_WHOURS	0.15	0.48	0.25	0.12	0.01
Q9_CHILD	0.05	0.18	0.27	0.50	0.00
Q10_SUMM	0.17	0.55	0.20	0.09	0.00
Q11_HELP	0.00	0.02	0.27	0.71	0.00
Q12_STATUS	0.06	0.27	0.48	0.19	0.01
Q13_NOADMIT	0.00	0.00	0.01	0.99	0.00
Q14_FAMLY	0.11	0.32	0.36	0.21	0.01
Q15_INEQL	0.00	0.09	0.48	0.43	0.01
Q16_INCOM	0.20	0.34	0.44	0.03	0.02

```
Q17_PPEERS  0.10 0.48 0.19 0.23 0.01
Q18_SJOB    0.11 0.26 0.56 0.07 0.00
Q19_NOACAD  0.01 0.06 0.28 0.65 0.00
Q20_FLEXR   0.02 0.04 0.33 0.60 0.01
Q21_CUND    0.00 0.01 0.36 0.63 0.01
Q22_SPNEED  0.06 0.25 0.42 0.27 0.01
Q23_STEAD   0.06 0.25 0.54 0.14 0.04
```

6. alpha() call with "check.keys=TRUE"

```
alpha(mt_rev, check.keys=TRUE)
```

```
Warning in alpha(mt_rev, check.keys = TRUE): Some items were negatively correlated with total scale and
 This is indicated by a negative sign for the variable name.

Reliability analysis
Call: alpha(x = mt_rev, check.keys = TRUE)

  raw_alpha std.alpha G6(smc) average_r S/N   ase mean   sd median_r
      0.73      0.71    0.81     0.098 2.5 0.042  2.6 0.28    0.085

 lower alpha upper     95% confidence boundaries
0.65 0.73 0.81

 Reliability if an item is dropped:
            raw_alpha std.alpha G6(smc) average_r S/N alpha se var.r med.r
Q1_EMPOW-        0.73      0.72    0.82     0.106 2.6    0.041 0.024 0.094
Q2_ADOL-         0.73      0.72    0.81     0.102 2.5    0.041 0.025 0.093
Q3_SOCIETY       0.73      0.71    0.81     0.099 2.4    0.042 0.024 0.085
Q4_SCHANGE       0.72      0.70    0.79     0.096 2.3    0.043 0.023 0.085
Q5_DOER          0.72      0.71    0.80     0.099 2.4    0.043 0.025 0.085
Q6_AVCM-         0.73      0.72    0.81     0.106 2.6    0.041 0.023 0.089
Q7_SALRY         0.73      0.71    0.81     0.102 2.5    0.041 0.024 0.089
Q8_WHOURS-       0.70      0.69    0.79     0.091 2.2    0.047 0.023 0.084
Q9_CHILD         0.73      0.71    0.81     0.100 2.4    0.041 0.025 0.087
Q10_SUMM-        0.71      0.70    0.80     0.096 2.3    0.044 0.023 0.083
Q11_HELP         0.73      0.71    0.80     0.100 2.4    0.042 0.024 0.087
Q12_STATUS-      0.71      0.69    0.80     0.093 2.2    0.045 0.024 0.083
Q13_NOADMIT      0.73      0.71    0.81     0.102 2.5    0.042 0.024 0.088
Q14_FAMLY-       0.69      0.68    0.79     0.090 2.2    0.047 0.023 0.083
Q15_INEQL        0.72      0.71    0.80     0.099 2.4    0.042 0.023 0.085
Q16_INCOM        0.70      0.68    0.78     0.089 2.2    0.047 0.022 0.082
Q17_PPEERS-      0.74      0.71    0.81     0.102 2.5    0.041 0.024 0.087
Q18_SJOB         0.71      0.69    0.79     0.093 2.3    0.045 0.022 0.085
Q19_NOACAD-      0.72      0.71    0.80     0.099 2.4    0.043 0.025 0.085
Q20_FLEXR-       0.71      0.70    0.80     0.094 2.3    0.044 0.024 0.084
Q21_CUND         0.73      0.72    0.80     0.103 2.5    0.041 0.022 0.089
Q22_SPNEED       0.71      0.69    0.80     0.093 2.2    0.044 0.024 0.082
Q23_STEAD        0.71      0.70    0.80     0.096 2.3    0.044 0.023 0.087

 Item statistics
```

```
             n raw.r std.r r.cor r.drop mean   sd
Q1_EMPOW-   82  0.11  0.14 0.046  0.037  1.3 0.46
Q2_ADOL-    82  0.23  0.24 0.175  0.120  1.6 0.81
Q3_SOCIETY  82  0.26  0.35 0.297  0.195  3.8 0.47
Q4_SCHANGE  81  0.36  0.41 0.397  0.261  3.4 0.72
Q5_DOER     81  0.31  0.34 0.295  0.240  2.7 0.61
Q6_AVCM-    79  0.19  0.16 0.103  0.085  1.3 0.62
Q7_SALRY    82  0.31  0.26 0.197  0.169  2.5 0.89
Q8_WHOURS-  81  0.61  0.55 0.545  0.523  2.7 0.88
Q9_CHILD    82  0.31  0.31 0.234  0.173  3.2 0.92
Q10_SUMM-   82  0.47  0.41 0.389  0.359  2.8 0.82
Q11_HELP    82  0.27  0.32 0.290  0.192  3.7 0.52
Q12_STATUS- 81  0.51  0.51 0.474  0.421  2.2 0.82
Q13_NOADMIT 82  0.11  0.25 0.193  0.096  4.0 0.11
Q14_FAMLY-  81  0.64  0.59 0.582  0.540  2.3 0.94
Q15_INEQL   81  0.31  0.34 0.322  0.210  3.3 0.64
Q16_INCOM   80  0.62  0.60 0.615  0.528  2.3 0.81
Q17_PPEERS- 81  0.28  0.26 0.201  0.134  2.4 0.96
Q18_SJOB    82  0.55  0.50 0.502  0.451  2.6 0.78
Q19_NOACAD- 82  0.33  0.35 0.299  0.250  1.4 0.67
Q20_FLEXR-  81  0.46  0.46 0.431  0.372  1.5 0.69
Q21_CUND    81  0.15  0.23 0.191  0.064  3.6 0.51
Q22_SPNEED  81  0.50  0.51 0.488  0.379  2.9 0.87
Q23_STEAD   79  0.47  0.43 0.402  0.359  2.8 0.77

Non missing response frequency for each item
               1    2    3    4 miss
Q1_EMPOW    0.00 0.00 0.29 0.71 0.00
Q2_ADOL     0.02 0.13 0.27 0.57 0.00
Q3_SOCIETY  0.00 0.02 0.17 0.80 0.00
Q4_SCHANGE  0.02 0.06 0.36 0.56 0.01
Q5_DOER     0.01 0.36 0.57 0.06 0.01
Q6_AVCM     0.01 0.04 0.23 0.72 0.04
Q7_SALRY    0.12 0.38 0.35 0.15 0.00
Q8_WHOURS   0.15 0.48 0.25 0.12 0.01
Q9_CHILD    0.05 0.18 0.27 0.50 0.00
Q10_SUMM    0.17 0.55 0.20 0.09 0.00
Q11_HELP    0.00 0.02 0.27 0.71 0.00
Q12_STATUS  0.06 0.27 0.48 0.19 0.01
Q13_NOADMIT 0.00 0.00 0.01 0.99 0.00
Q14_FAMLY   0.11 0.32 0.36 0.21 0.01
Q15_INEQL   0.00 0.09 0.48 0.43 0.01
Q16_INCOM   0.20 0.34 0.44 0.03 0.02
Q17_PPEERS  0.10 0.48 0.19 0.23 0.01
Q18_SJOB    0.11 0.26 0.56 0.07 0.00
Q19_NOACAD  0.01 0.06 0.28 0.65 0.00
Q20_FLEXR   0.02 0.04 0.33 0.60 0.01
Q21_CUND    0.00 0.01 0.36 0.63 0.01
Q22_SPNEED  0.06 0.25 0.42 0.27 0.01
Q23_STEAD   0.06 0.25 0.54 0.14 0.04
```

alpha() with original scores

The data set being used here is the original data with no items that are reverse-coded.

```
mt_orig <- read_excel("Bruce_CTT_data.xlsx", sheet = "Transposed Responses")
```

```
New names:
* `` -> ...24
```

```
alpha(mt_orig[,1:23])$total$raw_alpha
```

```
Warning in alpha(mt_orig[, 1:23]): Some items were negatively correlated with the total scale and probal
should be reversed.
To do this, run the function again with the 'check.keys=TRUE' option

Some items ( Q1_EMPOW Q2_ADOL Q13_NOADMIT ) were negatively correlated with the total scale and
probably should be reversed.
To do this, run the function again with the 'check.keys=TRUE' option

[1] 0.7051619
```

```
alpha(mt_orig[,1:23], check.keys = TRUE)$total$raw_alpha
```

```
Warning in alpha(mt_orig[, 1:23], check.keys = TRUE): Some items were negatively correlated with total s
 This is indicated by a negative sign for the variable name.

[1] 0.7293692
```

8a. First pass at eliminating items

```
keep <- c(1,3,4,6,8,10,11,12,14,15,16,17,18,20,21,23)
alpha(mt_orig[,keep])
```

```
Warning in alpha(mt_orig[, keep]): Some items were negatively correlated with the total scale and probal
should be reversed.
To do this, run the function again with the 'check.keys=TRUE' option

Some items ( Q1_EMPOW Q21_CUND ) were negatively correlated with the total scale and
probably should be reversed.
To do this, run the function again with the 'check.keys=TRUE' option

Reliability analysis
Call: alpha(x = mt_orig[, keep])

  raw_alpha std.alpha G6(smc) average_r S/N   ase mean   sd median_r
      0.72      0.69    0.78      0.12 2.2 0.043  2.8 0.32    0.097
```

```
 lower alpha upper     95% confidence boundaries
0.64 0.72 0.8

 Reliability if an item is dropped:
           raw_alpha std.alpha G6(smc) average_r S/N alpha se var.r med.r
Q1_EMPOW        0.73      0.71    0.79      0.14 2.4    0.042 0.032 0.117
Q3_SOCIETY      0.72      0.69    0.78      0.13 2.2    0.042 0.033 0.102
Q4_SCHANGE      0.71      0.68    0.76      0.12 2.1    0.043 0.032 0.102
Q6_AVCM         0.72      0.70    0.78      0.14 2.4    0.042 0.029 0.102
Q8_WHOURS       0.68      0.65    0.75      0.11 1.9    0.049 0.030 0.095
Q10_SUMM        0.71      0.68    0.76      0.12 2.1    0.045 0.029 0.095
Q11_HELP        0.72      0.69    0.76      0.13 2.2    0.043 0.032 0.099
Q12_STATUS      0.69      0.65    0.76      0.11 1.9    0.048 0.032 0.085
Q14_FAMLY       0.67      0.65    0.75      0.11 1.8    0.051 0.029 0.093
Q15_INEQL       0.71      0.68    0.75      0.12 2.1    0.043 0.030 0.093
Q16_INCOM       0.67      0.64    0.74      0.11 1.8    0.050 0.029 0.089
Q17_PPEERS      0.73      0.70    0.78      0.13 2.3    0.040 0.033 0.102
Q18_SJOB        0.69      0.66    0.74      0.12 2.0    0.047 0.028 0.099
Q20_FLEXR       0.71      0.67    0.77      0.12 2.1    0.045 0.033 0.093
Q21_CUND        0.73      0.70    0.77      0.13 2.3    0.041 0.029 0.102
Q23_STEAD       0.69      0.66    0.76      0.12 2.0    0.047 0.031 0.099

 Item statistics
            n raw.r std.r r.cor r.drop mean   sd
Q1_EMPOW   82  0.10  0.19 0.057  0.013  3.7 0.46
Q3_SOCIETY 82  0.20  0.31 0.218  0.118  3.8 0.47
Q4_SCHANGE 81  0.37  0.42 0.385  0.234  3.4 0.72
Q6_AVCM    79  0.25  0.21 0.127  0.118  1.3 0.62
Q8_WHOURS  81  0.64  0.60 0.576  0.530  2.7 0.88
Q10_SUMM   82  0.46  0.41 0.361  0.315  2.8 0.82
Q11_HELP   82  0.28  0.34 0.295  0.175  3.7 0.52
Q12_STATUS 81  0.58  0.59 0.544  0.482  2.2 0.82
Q14_FAMLY  81  0.68  0.63 0.618  0.564  2.3 0.94
Q15_INEQL  81  0.35  0.40 0.371  0.238  3.3 0.64
Q16_INCOM  80  0.68  0.66 0.665  0.589  2.3 0.81
Q17_PPEERS 81  0.32  0.27 0.175  0.145  2.4 0.96
Q18_SJOB   82  0.57  0.52 0.522  0.457  2.6 0.78
Q20_FLEXR  81  0.43  0.44 0.365  0.326  1.5 0.69
Q21_CUND   81  0.15  0.24 0.174  0.046  3.6 0.51
Q23_STEAD  79  0.56  0.54 0.496  0.439  2.8 0.77

Non missing response frequency for each item
               1    2    3    4 miss
Q1_EMPOW    0.00 0.00 0.29 0.71 0.00
Q3_SOCIETY  0.00 0.02 0.17 0.80 0.00
Q4_SCHANGE  0.02 0.06 0.36 0.56 0.01
Q6_AVCM     0.72 0.23 0.04 0.01 0.04
Q8_WHOURS   0.12 0.25 0.48 0.15 0.01
Q10_SUMM    0.09 0.20 0.55 0.17 0.00
Q11_HELP    0.00 0.02 0.27 0.71 0.00
Q12_STATUS  0.19 0.48 0.27 0.06 0.01
Q14_FAMLY   0.21 0.36 0.32 0.11 0.01
Q15_INEQL   0.00 0.09 0.48 0.43 0.01
Q16_INCOM   0.20 0.34 0.44 0.03 0.02
```

```
Q17_PPEERS 0.23 0.19 0.48 0.10 0.01
Q18_SJOB   0.11 0.26 0.56 0.07 0.00
Q20_FLEXR  0.60 0.33 0.04 0.02 0.01
Q21_CUND   0.00 0.01 0.36 0.63 0.01
Q23_STEAD  0.06 0.25 0.54 0.14 0.04
```

```
alpha(mt_orig[,keep], check.keys = TRUE)$total$raw_alpha
```

```
Warning in alpha(mt_orig[, keep], check.keys = TRUE): Some items were negatively correlated with total s
 This is indicated by a negative sign for the variable name.
```

```
[1] 0.7163267
```

8b. Second pass at eliminating items

```
# keep <- c(1,4,6,8,10,11,12,14,15,16,17,18,20,21,23)
# alpha(mt_orig[,keep], check.keys = TRUE)
```