Some R Basics for Reliability Analysis

The R program is free and can be downloaded from https://www.r-project.org/. The R package is a community contributed package so has many modules that are contributed by different individuals. So, using the package for statistical analysis requires that you load different components called "packages" for different types of data manipulations or statistical analyses.

You can use the R program as is by submitting R scripts (syntax) with commands with the R console, which is the default R program installed on the computer after you download. The R console does not do as much and most people I know use R Studio, which provides a bit more of a user-friendly working environment.

Here are the steps you need to read in an SPSS data, obtain some descriptive analyses, and conduct some reliability analyses. Note that all of the lines that begin with # are comments and the computer ignores those (so you do not need them to run the analyses).

A couple of commands that are handy. You can highlight all of the script (R for "syntax") using CTL + A, and you can run the highlighted script with CTL + R. The output window can be cleared with CTL + L if the cursor is in the output window.

```
#the lessR package allows you to perform some R commands simply, including reading in SPSS data
#on first use, you must install the package using the following command (then comment it out)
#replace the data file location with the path and file location on your computer
#install.packages("lessR")
#the library function loads the package and must be used in each new session
library(lessR)
mydata = Read('C:/Users/newsomj/Downloads/ias.sav',quiet=TRUE)

#look at data
Mydata


#reverse score items (lessR functions)
mydata <- Recode(q4, old=1:7, new=7:1)
mydata <- Recode(q5, old=1:7, new=7:1)
mydata <- Recode(q10, old=1:7, new=7:1)

#get some descriptive statistics
SummaryStats(mydata)
Histogram(mydata)

#use the psyc package to get alpha and item statistics
#on first use of psych install it
#install.packages("psych")
library(psych)
alpha(mydata)


Some items ( q4 q5 q10 ) 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 = mydata)

  raw_alpha std.alpha G6(smc) average_r S/N  ase mean  sd
      0.62      0.62     0.9      0.12 1.6 0.13  3.9 0.8

 lower alpha upper     95% confidence boundaries
0.36 0.62 0.88
```

```
reliability if an item is dropped:
    raw_alpha std.alpha G6(smc) average_r S/N alpha se
q1       0.55      0.56    0.82     0.104 1.3     0.15
q2       0.60      0.60    0.87     0.121 1.5     0.14
q3       0.59      0.60    0.87     0.118 1.5     0.14
q4       0.63      0.63    0.88     0.135 1.7     0.13
q5       0.66      0.66    0.90     0.152 2.0     0.12
q6       0.54      0.54    0.86     0.097 1.2     0.16
q7       0.64      0.63    0.90     0.135 1.7     0.12
q8       0.65      0.67    0.89     0.154 2.0     0.12
q9       0.53      0.53    0.87     0.092 1.1     0.16
q10      0.63      0.65    0.89     0.144 1.9     0.13
q11      0.52      0.53    0.83     0.094 1.1     0.17
q12      0.55      0.56    0.86     0.103 1.3     0.16

 Item statistics
     n raw.r std.r r.cor r.drop mean  sd
q1  18 0.615  0.62 0.644  0.486  4.6 1.7
q2  18 0.417  0.44 0.428  0.245  4.1 1.8
q3  18 0.486  0.46 0.447  0.301  3.4 2.0
q4  18 0.287  0.30 0.264  0.096  4.9 1.9
q5  18 0.129  0.11 0.049 -0.072  3.2 1.9
q6  18 0.675  0.68 0.688  0.560  4.5 1.7
q7  18 0.332  0.30 0.213  0.096  3.4 2.3
q8  18 0.075  0.09 0.043 -0.084  4.7 1.5
q9  18 0.729  0.74 0.730  0.633  1.9 1.6
q10 18 0.195  0.20 0.145  0.037  4.9 1.5
q11 18 0.722  0.72 0.748  0.604  4.4 1.9
q12 18 0.615  0.63 0.611  0.468  2.8 1.9

Non missing response frequency for each item
       1    2    3    4    5    6    7 miss
q1  0.06 0.06 0.22 0.00 0.28 0.33 0.06    0
q2  0.11 0.11 0.11 0.22 0.28 0.06 0.11    0
q3  0.28 0.06 0.22 0.11 0.22 0.00 0.11    0
q4  0.06 0.06 0.17 0.06 0.17 0.28 0.22    0
q5  0.28 0.06 0.39 0.00 0.11 0.11 0.06    0
q6  0.06 0.00 0.28 0.17 0.22 0.11 0.17    0
q7  0.33 0.11 0.06 0.17 0.11 0.06 0.17    0
q8  0.00 0.06 0.22 0.17 0.17 0.28 0.11    0
q9  0.67 0.11 0.00 0.11 0.06 0.06 0.00    0
q10 0.00 0.06 0.11 0.22 0.28 0.11 0.22    0
q11 0.17 0.00 0.11 0.06 0.33 0.28 0.06    0
q12 0.33 0.22 0.17 0.06 0.11 0.06 0.06    0
```