HW1

2025-09-02

```
## Anything Following the pound sign is a comment in R
# Helpful Hint:  you can hit Ctrl-Enter to run the current line of code.



# the first time you install a package, you do so by removing the pound
# sign below and running the line. you'll want both the below.
#install.packages("psych")
#install.packages("lessR")


#While you only install a package once, you must load it each time you run R.
library("psych")
library("lessR")


rm(list=ls())   # clear out old junk, if any.
```

```
#read in data. replace the below with the folder on your computer. note the
# slashes are the opposite from windows explorer!!!
hw1Data <- read.csv("Reverse.csv")
#congrats you created an object that should appear in your R Studio workspace
# in the top left.


#  1. Compute the descriptive statistics for all variables using the 'summary'
# command and specifying the dataframe name
summary(hw1Data)
```

```
##       Pos1            Pos2            Pos3            Pos4            Pos5
##  Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.00
##  1st Qu.:2.000   1st Qu.:2.000   1st Qu.:3.000   1st Qu.:2.000   1st Qu.:3.00
##  Median :3.000   Median :3.000   Median :4.000   Median :2.000   Median :4.00
##  Mean   :3.132   Mean   :3.135   Mean   :3.459   Mean   :2.675   Mean   :3.45
##  3rd Qu.:4.000   3rd Qu.:4.000   3rd Qu.:4.000   3rd Qu.:3.000   3rd Qu.:4.00
##  Max.   :5.000   Max.   :5.000   Max.   :5.000   Max.   :5.000   Max.   :5.00
##       Pos6
##  Min.   :2.000
##  1st Qu.:3.000
##  Median :4.000
##  Mean   :3.684
##  3rd Qu.:4.000
##  Max.   :5.000
```

```r
# 2. Compute the correlations among all variables using the 'cor' command
cor(hw1Data)
```

```
##            Pos1       Pos2       Pos3       Pos4       Pos5       Pos6
## Pos1  1.0000000  0.1898131  0.3095972 -0.2998237  0.2794837  0.2947621
## Pos2  0.1898131  1.0000000  0.2881187 -0.5442878  0.4683227  0.3941277
## Pos3  0.3095972  0.2881187  1.0000000 -0.3475837  0.3279626  0.3866052
## Pos4 -0.2998237 -0.5442878 -0.3475837  1.0000000 -0.6539404 -0.5118210
## Pos5  0.2794837  0.4683227  0.3279626 -0.6539404  1.0000000  0.6230545
## Pos6  0.2947621  0.3941277  0.3866052 -0.5118210  0.6230545  1.0000000
```

```r
# Pos4 is negatively correlated with other variables indicating that it should be reverse coded

# 3. Recode the item that is out of whack with the others.  I'll give you
# the code to this one.
newData <- lessR::recode(c(Pos4), old=1:5, new=5:1, data=hw1Data)
```

```
##
## ------------------------------------------------------
## First four rows of data to recode for data frame: hw1Data
## ------------------------------------------------------
##   Pos4
## 1    3
## 2    2
## 3    2
## 4    2
##
##
## Recoding Specification
## ----------------------
##    1 --> 5
##    2 --> 4
##    3 --> 3
##    4 --> 2
##    5 --> 1
##
## Number of cases (rows) to recode: 342
##
## Replace existing values of each specified variable, no value for option: new.var
##
## ---  Recode: Pos4 ---------------------------------
## Number of unique values of Pos4 in the data: 5
## Number of values of Pos4 to recode: 5
##
##
## -----------------------------------------------
## First four rows of recoded data
## -----------------------------------------------
##   Pos4
## 1    3
## 2    4
## 3    4
## 4    4
```

```r
# 4. rerun the correlation among all variables.  I'll give you the code again.
cor(hw1Data)
```

```
##            Pos1       Pos2       Pos3       Pos4       Pos5       Pos6
## Pos1  1.0000000  0.1898131  0.3095972 -0.2998237  0.2794837  0.2947621
## Pos2  0.1898131  1.0000000  0.2881187 -0.5442878  0.4683227  0.3941277
## Pos3  0.3095972  0.2881187  1.0000000 -0.3475837  0.3279626  0.3866052
## Pos4 -0.2998237 -0.5442878 -0.3475837  1.0000000 -0.6539404 -0.5118210
## Pos5  0.2794837  0.4683227  0.3279626 -0.6539404  1.0000000  0.6230545
## Pos6  0.2947621  0.3941277  0.3866052 -0.5118210  0.6230545  1.0000000
```

```r
# hey, nothing happened!
# problem: used hw1Data instead of the newData

# 5. try it again with the correct object this time.
cor(newData)
```

```
##           Pos1      Pos2      Pos3      Pos4      Pos5      Pos6
## Pos1 1.0000000 0.1898131 0.3095972 0.2998237 0.2794837 0.2947621
## Pos2 0.1898131 1.0000000 0.2881187 0.5442878 0.4683227 0.3941277
## Pos3 0.3095972 0.2881187 1.0000000 0.3475837 0.3279626 0.3866052
## Pos4 0.2998237 0.5442878 0.3475837 1.0000000 0.6539404 0.5118210
## Pos5 0.2794837 0.4683227 0.3279626 0.6539404 1.0000000 0.6230545
## Pos6 0.2947621 0.3941277 0.3866052 0.5118210 0.6230545 1.0000000
```

```r
# 6. look at the coefficient alpha in both hw1Data and newData.
alpha(newData)$total$raw_alpha
```

```
## [1] 0.7919083
```

```r
alpha(hw1Data)$total$raw_alpha
```

```
## Some items ( Pos4 ) were negatively correlated with the first principal component and
## probably should be reversed.
## To do this, run the function again with the 'check.keys=TRUE' option
```

```
## [1] 0.3441327
```

```r
# alpha improves dramatically when Pos4 is reverse coded.
```