Expertise6\_2023-01-20

This post includes the trial analyses of an example data related to expertise.

Notes: Need for closure scores haven’t been calculated, the reverse items will be checked. Notes: For the long format, internet article, documentaries and podcast series should be added.

### Import necessary packages and expertise data

#Import library ----  
library(tidyverse)  
library(readr)  
library(purrr)  
library(jmv)  
library(psych)  
library(DescTools)  
library(stats)  
library(factoextra)  
library('reshape2')  
library(lme4)   
library(lmerTest)  
  
  
#Read the csv file ----  
Expertise6 <- read\_csv("~/Desktop/Expertise6\_5.8.14\_December 23, 2022\_10.51 2.csv")

Creates a new dataframe called expertise6\_clean, which is a copy of the original dataframe called expertise6 and removes the second row of the dataframe and create a variable called column\_names and assign it the names of the columns in the dataframe and change the column names

#removes the second row of the dataframe  
expertise6\_clean<-Expertise6%>%   
 slice(-2)   
  
  
#selects all columns except the ones listed   
expertise6\_clean <- expertise6\_clean %>%  
 select(-StartDate, -EndDate, -Status, -Progress,-ResponseId,-RecordedDate,-RecipientLastName, -RecipientFirstName,-RecipientEmail, -ExternalReference, -LocationLatitude,-LocationLongitude, -DistributionChannel, -UserLanguage)  
  
#create a variable called column\_names and assign it the names of the columns in the dataframe  
column\_names <- names(expertise6\_clean)  
  
column\_names

[1] "IPAddress" "Duration (in seconds)" "Finished"   
 [4] "Q39" "Q40" "Q41"   
 [7] "Q42" "Q43" "Q44"   
 [10] "Q45" "Q46" "Q47"   
 [13] "Q48" "Q49" "Q50"   
 [16] "Q51" "Q52" "Q53"   
 [19] "Q54" "Q147\_1" "Q149\_1"   
 [22] "Q151\_1" "Q153\_1" "Q155\_1"   
 [25] "Q157\_1" "Q159\_1" "Q161\_1"   
 [28] "Q69" "Q3\_1" "Q3\_2"   
 [31] "Q3\_3" "Q70" "Q4"   
 [34] "Q71" "Q5" "Q204"   
 [37] "Q209...51" "Q206" "Q210"   
 [40] "Q208" "Q211...55" "Q73"   
 [43] "Q74\_1" "Q74\_2" "Q74\_3"   
 [46] "Q75" "Q76...61" "Q77"   
 [49] "Q78...63" "Q214...64" "Q219...65"   
 [52] "Q216" "Q214...67" "Q218"   
 [55] "Q215...69" "Q80...70" "Q81\_1"   
 [58] "Q81\_2" "Q81\_3" "Q82"   
 [61] "Q83" "Q84" "Q85"   
 [64] "Q217...78" "Q222" "Q219...80"   
 [67] "Q223...81" "Q221...82" "Q224"   
 [70] "Q87" "Q88\_1" "Q88\_2"   
 [73] "Q88\_3" "Q89" "Q90"   
 [76] "Q91" "Q92" "Q226"   
 [79] "Q231...93" "Q228" "Q232"   
 [82] "Q230" "Q233...97" "Q94"   
 [85] "Q95\_1" "Q95\_2" "Q95\_3"   
 [88] "Q96" "Q97" "Q98"   
 [91] "Q99" "Q245...106" "Q246...107"   
 [94] "Q247...108" "Q248...109" "Q249...110"   
 [97] "Q250...111" "Q101" "Q102\_1"   
[100] "Q102\_2" "Q102\_3" "Q103"   
[103] "Q104" "Q105" "Q106"   
[106] "Q235...120" "Q240" "Q237...122"   
[109] "Q241...123" "Q239...124" "Q242"   
[112] "Q108" "Q109\_1" "Q109\_2"   
[115] "Q109\_3" "Q110" "Q111"   
[118] "Q112" "Q113" "Q244"   
[121] "Q249...135" "Q246...136" "Q250...137"   
[124] "Q248...138" "Q251...139" "Q115"   
[127] "Q116\_1" "Q116\_2" "Q116\_3"   
[130] "Q117" "Q118" "Q119"   
[133] "Q120" "Q253" "Q258"   
[136] "Q255" "Q259" "Q257"   
[139] "Q251...153" "Q167" "Q169"   
[142] "Q171" "Q173" "Q175"   
[145] "Q177" "Q179" "Q181"   
[148] "Q183" "Q185" "Q187"   
[151] "Q189" "Q191" "Q193"   
[154] "Q195" "Q197" "Q199"   
[157] "Q201" "Q203" "Q205"   
[160] "Q207" "Q209...175" "Q211...176"   
[163] "Q213" "Q215...178" "Q217...179"   
[166] "Q219...180" "Q221...181" "Q223...182"   
[169] "Q225" "Q227" "Q229"   
[172] "Q231...186" "Q233...187" "Q235...188"   
[175] "Q237...189" "Q239...190" "Q241...191"   
[178] "Q243" "Q245...193" "Q247...194"   
[181] "Q249...195" "Q58" "Q60\_1"   
[184] "Q62" "Q64\_1" "Q64\_2"   
[187] "Q64\_3" "Q64\_4" "Q66"   
[190] "Q68" "Q72" "Q74"   
[193] "Q76...207" "Q78...208" "Q80...209"   
[196] "SurveyOrder"

##Change the column names ----  
colnames(expertise6\_clean) <- c('ip','duration', 'finished', 'stih\_food','r\_ih\_food',  
 'stih\_sports','r\_ih\_sports','stih\_school','r\_ih\_school',  
 'stih\_architect','r\_ih\_architect','stih\_product','r\_ih\_product',  
 'stih\_langu','r\_ih\_langu','stih\_network','r\_ih\_network',  
 'stih\_anthro','r\_ih\_anthro',  
 'know\_food','know\_sports','know\_school','know\_architect',  
 'know\_product','know\_langu','know\_network','know\_anthro',  
 'course\_food','high\_food', 'colle\_food', 'grad\_food',  
 'book\_food','numbook\_food','article\_food','numarticle\_food',  
 'inarti\_food','numinarti\_food', 'docu\_food', 'numdocu\_food',  
 'radio\_food','numradio\_food',  
 'course\_sports','high\_sports', 'colle\_sports', 'grad\_sports',  
 'book\_sports','numbook\_sports','article\_sports','numarticle\_sports',  
 'inarti\_sports','numinarti\_sports', 'docu\_sports', 'numdocu\_sports',  
 'radio\_sports','numradio\_sports',  
 'course\_school','high\_school', 'colle\_school', 'grad\_school',  
 'book\_school','numbook\_school','article\_school','numarticle\_school',  
 'inarti\_school','numinarti\_school', 'docu\_school', 'numdocu\_school',  
 'radio\_school','numradio\_school',  
 'course\_architect','high\_architect', 'colle\_architect','grad\_architect',  
 'book\_architect','numbook\_architect','article\_architect',  
 'numarticle\_architect',  
 'inarti\_architect','numinarti\_architect',   
 'docu\_architect', 'numdocu\_architect',  
 'radio\_architect','numradio\_architect',  
 'course\_product','high\_product', 'colle\_product', 'grad\_product',  
 'book\_product','numbook\_product','article\_product',  
 'numarticle\_product',  
 'inarti\_product','numinarti\_product', 'docu\_product', 'numdocu\_product',  
 'radio\_product','numradio\_product',  
 'course\_langu','high\_langu', 'colle\_langu', 'grad\_langu',  
 'book\_langu','numbook\_langu','article\_langu','numarticle\_langu',  
 'inarti\_langu','numinarti\_langu', 'docu\_langu', 'numdocu\_langu',  
 'radio\_langu','numradio\_langu',  
 'course\_network','high\_network', 'colle\_network', 'grad\_network',  
 'book\_network','numbook\_network','article\_network','numarticle\_network',  
 'inarti\_network','numinarti\_network', 'docu\_network', 'numdocu\_network',  
 'radio\_network','numradio\_network',  
 'course\_anthro','high\_anthro', 'colle\_anthro', 'grad\_anthro',  
 'book\_anthro','numbook\_anthro','article\_anthro','numarticle\_anthro',  
 'inarti\_anthro','numinarti\_anthro', 'docu\_anthro', 'numdocu\_anthro',  
 'radio\_anthro','numradio\_anthro',  
 'needforclo1','needforclo2','needforclo3','needforclo4','needforclo5',  
 'needforclo6','needforclo7','needforclo8','needforclo9','needforclo10',  
 'needforclo11','needforclo12','needforclo13','needforclo14',  
 'needforclo15','needforclo16','needforclo17','needforclo18',  
 'needforclo19','needforclo20','needforclo21','needforclo22',  
 'needforclo23','needforclo24','needforclo25','needforclo26',  
 'needforclo27','needforclo28','needforclo29','needforclo30',  
 'needforclo31','needforclo32','needforclo33','needforclo34',  
 'needforclo35','needforclo36','needforclo37','needforclo38',  
 'needforclo39','needforclo40','needforclo41','needforclo42',  
 'sex','birthdate','education','income','religion',  
 'identity','age','political\_atti','english\_level','proceure\_confu',  
 'whatwestudied','moretothisstudy','additional\_thoughts','attention',   
 'surveyorder')

### Questionnaire Items

The code below shows the survey items:

#selects all columns except the ones specified  
row\_values <- expertise6\_clean %>%  
 select(-duration,-finished, -ip, -surveyorder)%>%  
 #selects only the first row  
 filter(row\_number() == 1)  
  
#Items in the questionnaire ----  
  
#unlist the row\_values  
row\_values <- unlist(row\_values)  
  
my\_list <- map(row\_values, ~paste0(.))  
  
library(stringr)  
my\_list <- str\_replace(my\_list, "(?<! )\\n(?! )", "")  
my\_list <- str\_replace(my\_list, "[^\\s]\*\\\\n[^\\s]\*", "")  
list\_string <- paste0("\* ", paste(my\_list, collapse = "\n\* "))  
  
##Show the survey items ----  
cat(list\_string)

\* There are good reasons why drive-thrus are typically associated with fast-food restaurants. There are things about drive-thrus that make them less suited for fancy or upscale restaurants.  
\* Even though we don’t typically see drive-thrus at fancy restaurants, there is no real reason why fancy restaurants don’t have drive-thrus. This practice could have easily been different.  
\* It seems natural that we sing the national anthem before sporting events, rather than after. The national anthem just fits better at the beginning of a sports game.  
\* When you really think about, singing the national anthem before sporting events is just a convention. If history had unfolded differently, it’s possible that we would be singing it after the events, or maybe even not at all.  
\* It seems right that students receive letter grades in school (A, B, C, …) to measure their performance. Another evaluative process would likely not work as well.  
\* It’s likely that evaluating students’ performance with letter grades (A, B, C, …) is not the best practice. Another evaluative process may be more effective than letter grading.  
\* It probably works best for homes to be painted with neutral or muted colors (e.g., white, gray). Bright or neon-colored homes (e.g., red, purple) would not be practical.  
\* Although homes are usually painted with neutral or muted colors (e.g., white, gray), this could have been done differently. It’s quite possible that homes could have been painted with brighter colors (e.g., red, purple).  
\* It seems ideal that forks usually have three or four prongs, rather than more prongs (for example, six or seven). Three or four prongs on forks is probably the best design.  
\* There’s no good reason why forks only have three or four prongs. Forks with more prongs (for example, six or seven) would work just as well; in principle, forks could have been designed that way too.  
\* It seems natural that the letter “s” at the end of a word is used to indicate plurality (as in "cats" or "trees"). Another way of signaling plurality would not work as well.  
\* Had historical events unfolded differently, it’s possible that the English language would indicate plurality in a different way than using the letter “s” (as in "cats" or "trees"). There’s nothing inherently special about the letter “s” for this purpose.  
\* There are good reasons why we use digits, rather than letters, to call people on the phone. Using digits seems like the optimal way to make phone calls.  
\* The only reason why we use digits, rather than letters, to call people is historical happenstance. Phones calls could have just as easily been made with a variety of symbols other than digits (for example, letters).  
\* It seems natural that people wear black to funerals. There is something about the color black that indicates mourning.  
\* When you think about it, colors other than black could have just as easily become associated with funerals (for example, white). Had history taken a different turn, another color may now signal mourning and sadness.  
\* How much do you know about the food industry and restaurant business? - Please use the slider to select your answer choice.  
\* How much do you know about sports and sports management? - Please use the slider to select your answer choice.  
\* How much do you know about school and education systems? - Please use the slider to select your answer choice.  
\* How much do you know about architecture and home design? - Please use the slider to select your answer choice.  
\* How much do you know about product design and usability? - Please use the slider to select your answer choice.  
\* How much do you know about language and linguistics? - Please use the slider to select your answer choice.  
\* How much do you know about telecommunication and network systems? - Please use the slider to select your answer choice.  
\* How much do you know about anthropology and funeral rites? - Please use the slider to select your answer choice.  
\* Have you ever taken a class that discussed the food industry and restaurant business?  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - High School  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - College  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - Graduate School  
\* Have you ever read any books on the food industry and restaurant business?  
\* If you answered "yes" above, please approximate the number of books you have read on this topic:  
\* Have you ever read any magazine, newspaper, or academic articles on the food industry and restaurant business?  
\* If you answered "yes" above, please approximate the number of articles you have read on this topic:  
\* Have you ever read any articles while browsing the internet (e.g., on Reddit, Pinterest, Buzzfeed) on the food industry and restaurant business?  
\* If you answered "yes" above, please approximate the number of articles on the internet you have read on this topic:  
\* Have you ever seen any documentaries (e,g., on the Discovery channel) on the food industry and restaurant business?  
\* If you answered "yes" above, please approximate the number of documentaries you have seen on this topic:  
\* Have you ever heard any radio shows or podcasts (e.g., NPR) on the food industry and restaurant business?  
\* If you answered "yes" above, please approximate the number of radio shows or podcasts you have heard on this topic:  
\* Have you ever taken a class that discussed sports and sports management?  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - High School  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - College  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - Graduate School  
\* Have you ever read any books on sports and sports management?  
\* If you answered "yes" above, please approximate the number of books you have read on this topic:  
\* Have you ever read any magazine, newspaper, or academic articles on sports and sports management?  
\* If you answered "yes" above, please approximate the number of articles you have read on this topic:  
\* Have you ever read any articles while browsing the internet (e.g., on Reddit, Pinterest, Buzzfeed) on sports and sports management?  
\* If you answered "yes" above, please approximate the number of articles on the internet you have read on this topic:  
\* Have you ever watched any documentaries (e,g., on the Discovery channel) on sports and sports management?  
\* If you answered "yes" above, please approximate the number of documentaries you have seen on this topic:  
\* Have you ever heard any radio shows or podcasts (e.g., NPR) on sports and sports management?  
\* If you answered "yes" above, please approximate the number of radio shows or podcasts you have heard on this topic:  
\* Have you ever taken a class that discussed school and education systems?  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - High School  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - College  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - Graduate School  
\* Have you ever read any books on school and education systems?  
\* If you answered "yes" above, please approximate the number of books you have read on this topic:  
\* Have you ever read any magazine, newspaper, or academic articles on school and education systems?  
\* If you answered "yes" above, please approximate the number of articles you have read on this topic:  
\* Have you ever read any articles while browsing the internet (e.g., on Reddit, Pinterest, Buzzfeed) on school and education systems?  
\* If you answered "yes" above, please approximate the number of articles on the internet you have read on this topic:  
\* Have you ever watched any documentaries (e,g., on the Discovery channel) on school and education systems?  
\* If you answered "yes" above, please approximate the number of documentaries you have seen on this topic:  
\* Have you ever heard any radio shows or podcasts (e.g., NPR) have you heard on school and education systems?  
\* If you answered "yes" above, please approximate the number of radio shows or podcasts you have seen on this topic:  
\* Have you ever taken a class that discussed architecture and home design?  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - High School  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - College  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - Graduate School  
\* Have you ever read any books on architecture and home design?  
\* If you answered "yes" above, please approximate the number of books you have read on this topic:  
\* Have you ever read any magazine, newspaper, or academic articles on architecture and home design?  
\* If you answered "yes" above, please approximate the number of articles you have read on this topic:  
\* Have you ever read any articles while browsing the internet (e.g., on Reddit, Pinterest, Buzzfeed) on architecture and home design?  
\* If you answered "yes" above, please approximate the number of articles on the internet you have read on this topic:  
\* Have you ever seen any documentaries (e,g., on the Discovery channel) on architecture and home design?  
\* If you answered "yes" above, please approximate the number of documentaries you have seen on this topic:  
\* Have you ever heard any radio shows or podcasts (e.g., NPR) on architecture and home design?  
\* If you answered "yes" above, please approximate the number of radio shows or podcasts you have heard on this topic:  
\* Have you ever taken a class that discussed product design and usability?  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - High School  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - College  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - Graduate School  
\* Have you ever read any books on product design and usability?  
\* If you answered "yes" above, please approximate the number of books you have read on this topic:  
\* Have you ever read any magazine, newspaper, or academic articles on product design and usabilityt?  
\* If you answered "yes" above, please approximate the number of articles you have read on this topic:  
\* Have you ever read any articles while browsing the internet (e.g., on Reddit, Pinterest, Buzzfeed) on product design and usability?  
\* If you answered "yes" above, please approximate the number of articles on the internet you have read on this topic:  
\* Have you ever seen any documentaries (e,g., on the Discovery channel) on product design and usability?  
\* If you answered "yes" above, please approximate the number of documentaries you have seen on this topic:  
\* Have you ever heard any radio shows or podcasts (e.g., on Reddit, Pinterest, Buzzfeed) on product design and usability?  
\* If you answered "yes" above, please approximate the number of radio shows or podcasts you have heard on this topic:  
\* Have you ever taken a class that discussed language and linguistics?  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - High School  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - College  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - Graduate School  
\* Have you ever read any books on language and linguistics?  
\* If you answered "yes" above, please approximate the number of books you have read on this topic:  
\* Have you ever read any magazine, newspaper, or academic articles on language and linguistics?  
\* If you answered "yes" above, please approximate the number of articles you have read on this topic:  
\* Have you ever read any articles while browsing the internet (e.g., on Reddit, Pinterest, Buzzfeed) on language and linguistics?  
\* If you answered "yes" above, please approximate the number of articles on the internet you have read on this topic:  
\* Have you ever seen any documentaries (e,g., on the Discovery channel) on language and linguistics?  
\* If you answered "yes" above, please approximate the number of documentaries you have seen on this topic:  
\* Have you ever heard any radio shows or podcasts (e.g., NPR) on language and linguistics?  
\* If you answered "yes" above, please approximate the number of radio shows or podcasts you have heard on this topic:  
\* Have you ever taken a class that discussed telecommunication and network systems?  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - High School  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - College  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - Graduate School  
\* Have you ever read any books on telecommunication and network systems?  
\* If you answered "yes" above, please approximate the number of books you have read on this topic:  
\* Have you ever read any magazine, newspaper, or academic articles on telecommunication and network systems?  
\* If you answered "yes" above, please approximate the number of articles you have read on this topic:  
\* Have you ever read any articles while browsing the internet (e.g., on Reddit, Pinterest, Buzzfeed) on telecommunication and network systems?  
\* If you answered "yes" above, please approximate the number of articles on the internet you have read on this topic:  
\* Have you ever seen any documentaries (e,g., on the Discovery channel) on telecommunication and network systems?  
\* If you answered "yes" above, please approximate the number of documentaries you have seen on this topic:  
\* Have you ever heard any radio shows or podcasts (e.g., NPR) on telecommunication and network systems?  
\* If you answered "yes" above, please approximate the number of radio shows or podcasts you have heard on this topic:  
\* Have you ever taken a class that discussed anthropology and funeral rites?  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - High School  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - College  
\* If you answered "yes" above, please approximate the number of classes of this sort you took in: - Graduate School  
\* Have you ever read any books on anthropology and funeral rites?  
\* If you answered "yes" above, please approximate the number of books you have read on this topic:  
\* Have you ever read any magazine, newspaper, or academic articles on anthropology and funeral rites?  
\* If you answered "yes" above, please approximate the number of articles you have read on this topic:  
\* Have you ever read any articles while browsing the internet (e.g., on Reddit, Pinterest, Buzzfeed) on anthropology and funeral rites?  
\* If you answered "yes" above, please approximate the number of articles on the internet you have read on this topic:  
\* Have you ever seen any documentaries (e,g., on the Discovery channel) on anthropology and funeral rites?  
\* If you answered "yes" above, please approximate the number of documentaries you have seen on this topic:  
\* Have you ever heard any radio shows or podcasts (e.g., NPR) on anthropology and funeral rites?  
\* If you answered "yes" above, please approximate the number of radio shows or podcasts you have heard on this topic:  
\* I enjoy having a clear and structured mode of life.  
\* I like to have a place for everything and everything in its place.  
\* I find that establishing a consistent routine enables me to enjoy life more  
\* I find that a well ordered life with regular hours suits my temperament.  
\* My personal space is usually messy and disorganized.  
\* I believe that orderliness and organization are among the most important characteristics of a good student.  
\* I think that having clear rules and order at work is essential for success.  
\* I think that I would learn best in a class that lacks clearly stated objectives and requirements.  
\* I dislike the routine aspects of my work (studies).  
\* I hate to change my plans at the last minute.  
\* I dislike it when a person's statement could mean many different things.  
\* I feel uncomfortable when someone's meaning or intention is unclear to me.  
\* I feel uncomfortable when I don't understand the reason why an event occurred in my life.  
\* It's annoying to listen to someone who cannot seem to make up his or her mind.  
\* When I am confused about an important issue, I feel very upset.  
\* I like to know what people are thinking all the time.  
\* In most social conflicts, I can easily see which side is right and which is wrong.  
\* I'd rather know bad news than stay in a state of uncertainty.  
\* I don't like situations that are uncertain.  
\* When thinking about a problem, I consider as many different opinions on the issue as possible.  
\* When considering most conflict situations, I can usually see how both sides could be right.  
\* I always see many possible solutions to problems I face.  
\* I do not usually consult many different opinions before forming own view.  
\* Even after I've made up my mind about something, I am always eager to consider a different opinion.  
\* I prefer interacting with people whose opinions are very different from my own.  
\* I dislike questions which could be answered in many different ways.  
\* I feel irritated when one person disagrees with what everyone else in a group believes.  
\* I like to have friends who are unpredictable.  
\* When dining out, I like to go to places where I have been before so that I know what to expect.  
\* I don't like to go into a situation without knowing what I can expect from it  
\* I think it is fun to change my plans at the last moment.  
\* I enjoy the uncertainty of going into a new situation without knowing what might happen.  
\* I don't like to be with people who are capable of unexpected actions.  
\* I prefer to socialize with familiar friends because I know what to expect from them.  
\* I dislike unpredictable situations.  
\* When I go shopping, I have difficulty deciding exactly what it is that I want.  
\* When faced with a problem I usually see the one best solution very quickly.  
\* I tend to put off making important decisions until the last possible moment.  
\* I usually make important decisions quickly and confidently.  
\* I would describe myself as indecisive.  
\* I tend to struggle with most decisions.  
\* When trying to solve a problem I often see so many possible options that it's confusing.  
\* Are you male or female?  
\* Q60 - What is your date of birth? (mm/dd/yyyy)  
\* What is the highest level of education you have completed?  
\* Q64 - What is your yearly household income?  
\* Q64 - What is your religious affiliation?  
\* Q64 - What is your racial or ethnic identity?  
\* Q64 - What is your age in years?  
\* How would you describe your political attitudes? Please select one of the points on the scale below.  
\* Please rate your overall ability in the English language:  
\* 1. Did you find any aspect of the procedure odd or confusing?  
\* 2. What did you think we were studying?  
\* 3. Do you think that there may have been more to this study than meets the eye? If so, what do you think this might have been?  
\* 4. Do you have any additional thoughts or comments about the study?  
\* Thank you for completing this survey! We just have one last question for you. You will not be penalized for your answer to this question. Since you completed the whole survey, you will receive payment no matter what answer you give here.  
   
  
 It's very important to the quality and scientific aims of our study that participants pay attention (i.e., read the survey carefully, consider the response options, and avoid distractions).  
  
   
  
 Were you paying attention while completing this survey?

### Exclusion Criterias

Data preparation for further analyses

#Attention check and deletion of cases that didn't attend or finish the study ----  
expertise6\_new<-expertise6\_clean%>%  
 filter(attention==1&finished==1)  
  
##Exclude the participants that joined outside of US ----  
  
#view(expertise6\_new)  
expertise6\_new<-expertise6\_new%>%  
 filter(ip!="66.42.251.231")  
  
expertise6\_new <- expertise6\_new %>%  
 filter(!(ip %in% c("74.219.142.226", "24.12.92.17", "184.88.52.194",   
 "97.103.220.145", "76.250.238.38")))  
  
##selecting the columns that we want to keep ----  
expertise6\_new<-expertise6\_new%>%  
 select(-finished,-birthdate,-proceure\_confu,-whatwestudied,-moretothisstudy,-additional\_thoughts,-attention, -surveyorder)  
  
#adds a column to the dataframe, with the name "id"  
expertise6\_new<-cbind(ID = 1:nrow(expertise6\_new), expertise6\_new)  
  
# Numeric variables ----  
# Change the data type of the variables to numeric   
expertise6\_new <- expertise6\_new %>%  
 mutate\_at(vars(stih\_food, r\_ih\_food, stih\_sports, r\_ih\_sports, stih\_school, r\_ih\_school, stih\_architect, r\_ih\_architect,   
 stih\_product, r\_ih\_product, stih\_langu, r\_ih\_langu, stih\_network, r\_ih\_network, stih\_anthro, r\_ih\_anthro), as.numeric)

## Correlation for ih scores

Check the correlations between inherence (the variables starting with st) and reverse inherence (the variables starting with r) scores to check whether it’s appropriate for averaging

# Correlations between ih scores ----  
  
# Create a list of variable names  
variables <- c("stih\_food", "r\_ih\_food", "stih\_sports", "r\_ih\_sports", "stih\_school", "r\_ih\_school", "stih\_architect", "r\_ih\_architect", "stih\_product", "r\_ih\_product", "stih\_langu", "r\_ih\_langu", "stih\_network", "r\_ih\_network", "stih\_anthro", "r\_ih\_anthro")  
  
# Initialize an empty data frame to store the correlation coefficients  
correlations <- data.frame(variable1 = character(), variable2 = character(), correlation = numeric(), p.value = numeric(), conf.int = character())  
  
# Iterate over the pairs of variables  
for (i in seq(1, length(variables), 2)) {  
 j <- i + 1  
   
 # Calculate the Pearson correlation coefficient and test the statistical significance  
 correlation\_test <- cor.test(expertise6\_new[, variables[i]], expertise6\_new[, variables[j]], method = "pearson")  
   
 # Add the correlation coefficient, p-value, and confidence interval to the data frame  
 correlations <- rbind(correlations, data.frame(variable1 = variables[i], variable2 = variables[j], correlation = correlation\_test$estimate, p.value = correlation\_test$p.value, conf.int = paste(correlation\_test$conf.int[1], correlation\_test$conf.int[2], sep = " - ")))}  
  
## View the correlation coefficients and statistical measures ----  
correlations

variable1 variable2 correlation p.value  
cor stih\_food r\_ih\_food -0.4463858 8.615861e-11  
cor1 stih\_sports r\_ih\_sports -0.5753914 2.560996e-18  
cor2 stih\_school r\_ih\_school -0.7267533 8.094747e-33  
cor3 stih\_architect r\_ih\_architect -0.6411731 1.275191e-23  
cor4 stih\_product r\_ih\_product -0.6038601 1.834983e-20  
cor5 stih\_langu r\_ih\_langu -0.5635496 1.740797e-17  
cor6 stih\_network r\_ih\_network -0.5898848 2.202312e-19  
cor7 stih\_anthro r\_ih\_anthro -0.5442449 3.376865e-16  
 conf.int  
cor -0.553035668300546 - -0.325343101426943  
cor1 -0.662979980870432 - -0.472263234194049  
cor2 -0.787333698376605 - -0.65227324221234  
cor3 -0.717624383417027 - -0.549452592494561  
cor4 -0.686743816747194 - -0.505475832894281  
cor5 -0.653042937790108 - -0.458533845459347  
cor6 -0.675100225685499 - -0.48913522712539  
cor7 -0.636777009250974 - -0.436258848944745

## IH scores calculation

It seems that each pairs have negative significant correlation, so we can take the average scores to calculate inherence scores

## Average of ih scores ----  
#It seems that each pairs have negative significant correlation, so we can take the average scores to measure inherence scores  
expertise6\_new <- expertise6\_new %>%  
 mutate(ih\_food = (stih\_food + (10 - r\_ih\_food))/2,  
 ih\_sports = (stih\_sports + (10 - r\_ih\_sports)) / 2,  
 ih\_school = (stih\_school + (10 - r\_ih\_school)) / 2,  
 ih\_architect = (stih\_architect + (10 - r\_ih\_architect)) / 2,  
 ih\_product = (stih\_product + (10 - r\_ih\_product)) / 2,  
 ih\_langu = (stih\_langu + (10 - r\_ih\_langu)) / 2,  
 ih\_network = (stih\_network + (10-r\_ih\_network)) / 2,  
 ih\_anthro = (stih\_anthro + (10-r\_ih\_anthro)) / 2 )

## Need for Cognition scores calculation

Calculate “Need for cognition” scale scores

# Need for cognition scale scores ----  
  
# change the data type of the variables to numeric  
expertise6\_new <- expertise6\_new %>%  
 mutate\_at(vars( 'needforclo1','needforclo2','needforclo3','needforclo4','needforclo5',  
 'needforclo6','needforclo7','needforclo8','needforclo9','needforclo10',  
 'needforclo11','needforclo12','needforclo13','needforclo14',  
 'needforclo15','needforclo16','needforclo17','needforclo18',  
 'needforclo19','needforclo20','needforclo21','needforclo22',  
 'needforclo23','needforclo24','needforclo25','needforclo26',  
 'needforclo27','needforclo28','needforclo29','needforclo30',  
 'needforclo31','needforclo32','needforclo33','needforclo34',  
 'needforclo35','needforclo36','needforclo37','needforclo38',  
 'needforclo39','needforclo40','needforclo41','needforclo42'), as.numeric)  
  
## Calculate needforclo scores ----  
#add a new variable called needforclo, which is the sum of all the need for cognition items, the items are weighted according to the scoring key  
expertise6\_new <- expertise6\_new %>%  
 group\_by(ID)%>%  
 mutate(needforclo=(needforclo1+needforclo2+needforclo3+needforclo4+  
 (10-needforclo5)+needforclo6+needforclo7+(10-needforclo8)+  
 (10-needforclo9)+needforclo10+ needforclo11+needforclo12+  
 needforclo13+needforclo14+needforclo15+needforclo16+  
 needforclo17+needforclo18+needforclo19+(10-needforclo20)+  
 (10-needforclo21)+(10-needforclo22)+needforclo23+(10-needforclo24)+  
 (10-needforclo25)+needforclo26+needforclo27+(10-needforclo28)+  
 needforclo29+needforclo30+(10-needforclo31)+(10-needforclo32)+  
 needforclo33+needforclo34+needforclo35+(10-needforclo36)+  
 needforclo37+(10-needforclo38)+needforclo39+(10-needforclo40)+  
 (10-needforclo41)+needforclo42)/42)

## Data preparation

Prepare the expertise scores and other scores ready for analyses

# Replace expertise variables' NA values in the expertise columns with 0 ----  
variables <- c('know\_food','know\_sports','know\_school','know\_architect',  
 'know\_product','know\_langu','know\_network','know\_anthro',  
 'high\_food', 'colle\_food', 'grad\_food',  
 'numbook\_food','numarticle\_food',  
 'numinarti\_food', 'numdocu\_food',  
 'numradio\_food',  
 'high\_sports', 'colle\_sports', 'grad\_sports',  
 'numbook\_sports','numarticle\_sports',  
 'numinarti\_sports', 'numdocu\_sports',  
 'numradio\_sports',  
 'high\_school', 'colle\_school', 'grad\_school',  
 'numbook\_school','numarticle\_school',  
 'numinarti\_school','numdocu\_school',  
 'numradio\_school',  
 'high\_architect', 'colle\_architect','grad\_architect',  
 'numbook\_architect',  
 'numarticle\_architect',  
 'numinarti\_architect',   
 'numdocu\_architect',  
 'numradio\_architect',  
 'high\_product', 'colle\_product', 'grad\_product',  
 'numbook\_product',  
 'numarticle\_product',  
 'numinarti\_product','numdocu\_product',  
 'numradio\_product',  
 'high\_langu', 'colle\_langu', 'grad\_langu',  
 'numbook\_langu','numarticle\_langu',  
 'numinarti\_langu', 'numdocu\_langu',  
 'numradio\_langu',  
 'high\_network', 'colle\_network', 'grad\_network',  
 'numbook\_network','numarticle\_network',  
 'numinarti\_network', 'numdocu\_network',  
 'numradio\_network',  
 'high\_anthro', 'colle\_anthro','grad\_anthro',  
 'numbook\_anthro','numarticle\_anthro',  
 'numinarti\_anthro', 'numdocu\_anthro',  
 'numradio\_anthro')  
  
expertise6\_new <- expertise6\_new %>%  
 mutate\_at(vars('know\_food','know\_sports','know\_school','know\_architect',  
 'know\_product','know\_langu','know\_network','know\_anthro',  
 'high\_food', 'colle\_food', 'grad\_food',  
 'numbook\_food','numarticle\_food',  
 'numinarti\_food', 'numdocu\_food',  
 'numradio\_food',  
 'high\_sports', 'colle\_sports', 'grad\_sports',  
 'numbook\_sports','numarticle\_sports',  
 'numinarti\_sports', 'numdocu\_sports',  
 'numradio\_sports',  
 'high\_school', 'colle\_school', 'grad\_school',  
 'numbook\_school','numarticle\_school',  
 'numinarti\_school','numdocu\_school',  
 'numradio\_school',  
 'high\_architect', 'colle\_architect','grad\_architect',  
 'numbook\_architect',  
 'numarticle\_architect',  
 'numinarti\_architect',   
 'numdocu\_architect',  
 'numradio\_architect',  
 'high\_product', 'colle\_product', 'grad\_product',  
 'numbook\_product',  
 'numarticle\_product',  
 'numinarti\_product','numdocu\_product',  
 'numradio\_product',  
 'high\_langu', 'colle\_langu', 'grad\_langu',  
 'numbook\_langu','numarticle\_langu',  
 'numinarti\_langu', 'numdocu\_langu',  
 'numradio\_langu',  
 'high\_network', 'colle\_network', 'grad\_network',  
 'numbook\_network','numarticle\_network',  
 'numinarti\_network', 'numdocu\_network',  
 'numradio\_network',  
 'high\_anthro', 'colle\_anthro','grad\_anthro',  
 'numbook\_anthro','numarticle\_anthro',  
 'numinarti\_anthro', 'numdocu\_anthro',  
 'numradio\_anthro'), as.numeric)  
  
  
#expertise6\_new[variables] <- lapply(expertise6\_new[variables],   
 #function(x) ifelse(is.na(x), 0, ifelse(x=='no',0, x)))  
  
expertise6\_new[variables] <- lapply(expertise6\_new[variables], function(x) replace(x, is.na(x) | !is.numeric(x) , 0))

## Detect the ID of missing values of expertise scores

missing\_ids <- unlist(mapply(function(x) expertise6\_new$ID[which(is.na(expertise6\_new[x]))], c('know\_food','know\_sports','know\_school','know\_architect',  
 'know\_product','know\_langu','know\_network','know\_anthro',  
 'high\_food', 'colle\_food', 'grad\_food',  
 'numbook\_food','numarticle\_food',  
 'numinarti\_food', 'numdocu\_food',  
 'numradio\_food',  
 'high\_sports', 'colle\_sports', 'grad\_sports',  
 'numbook\_sports','numarticle\_sports',  
 'numinarti\_sports', 'numdocu\_sports',  
 'numradio\_sports',  
 'high\_school', 'colle\_school', 'grad\_school',  
 'numbook\_school','numarticle\_school',  
 'numinarti\_school','numdocu\_school',  
 'numradio\_school',  
 'high\_architect', 'colle\_architect','grad\_architect',  
 'numbook\_architect',  
 'numarticle\_architect',  
 'numinarti\_architect',   
 'numdocu\_architect',  
 'numradio\_architect',  
 'high\_product', 'colle\_product', 'grad\_product',  
 'numbook\_product',  
 'numarticle\_product',  
 'numinarti\_product','numdocu\_product',  
 'numradio\_product',  
 'high\_langu', 'colle\_langu', 'grad\_langu',  
 'numbook\_langu','numarticle\_langu',  
 'numinarti\_langu', 'numdocu\_langu',  
 'numradio\_langu',  
 'high\_network', 'colle\_network', 'grad\_network',  
 'numbook\_network','numarticle\_network',  
 'numinarti\_network', 'numdocu\_network',  
 'numradio\_network',  
 'high\_anthro', 'colle\_anthro','grad\_anthro',  
 'numbook\_anthro','numarticle\_anthro',  
 'numinarti\_anthro', 'numdocu\_anthro',  
 'numradio\_anthro')))  
  
cat(ifelse(length(missing\_ids[missing\_ids > 0]) > 0, paste("The following IDs are missing:",missing\_ids[missing\_ids != 0]), "There is no missing IDs."),"\n")

There is no missing IDs.

# Expertise Ready Df ----  
  
#','high\_food','colle\_food','grad\_food','numbook\_food','numarticle\_food','numinarti\_food','numdocu\_food','numradio\_food','high\_sports','colle\_sports','grad\_sports','numbook\_sports','numarticle\_sports','numinarti\_sports','numdocu\_sports','numradio\_sports','high\_school','colle\_school','grad\_school','numbook\_school','numarticle\_school','numinarti\_school','numdocu\_school','numradio\_school','high\_architect','colle\_architect','grad\_architect','numbook\_architect','numarticle\_architect','numinarti\_architect','numdocu\_architect','numradio\_architect','high\_product','colle\_product','grad\_product','numbook\_product','numarticle\_product','numinarti\_product','numdocu\_product','numradio\_product','high\_langu','colle\_langu','grad\_langu','numbook\_langu','numarticle\_langu','numinarti\_langu','numdocu\_langu','numradio\_langu','high\_network','colle\_network','grad\_network','numbook\_network','numarticle\_network','numinarti\_network','numdocu\_network','numradio\_network','high\_anthro','colle\_anthro','grad\_anthro','numbook\_anthro','numarticle\_anthro','numinarti\_anthro','numdocu\_anthro','numradio\_anthro  
  
# change the data type of the variables to numeric  
expertise6\_new<-expertise6\_new%>%mutate\_at(vars('know\_food','know\_sports','know\_school','know\_architect','know\_product','know\_langu','know\_network','know\_anthro'),as.numeric)

## Long format

Long format of expertise dataset for factor analysis

expertise6\_factor <- melt(expertise6\_new, id.vars = c("ID",'duration',"sex" ,"education" ,"income","religion",'identity','age','political\_atti','english\_level','needforclo'),   
 measure.vars = c("ih\_food", "ih\_sports","ih\_school","ih\_architect",  
 "ih\_product","ih\_langu","ih\_network","ih\_anthro",  
 'know\_food','know\_sports','know\_school','know\_architect',  
 'know\_product','know\_langu','know\_network','know\_anthro',  
 'high\_food', 'colle\_food', 'grad\_food',  
 'numbook\_food','numarticle\_food',  
 'numinarti\_food', 'numdocu\_food',  
 'numradio\_food',  
 'high\_sports', 'colle\_sports', 'grad\_sports',  
 'numbook\_sports','numarticle\_sports',  
 'numinarti\_sports', 'numdocu\_sports',  
 'numradio\_sports',  
 'high\_school', 'colle\_school', 'grad\_school',  
 'numbook\_school','numarticle\_school',  
 'numinarti\_school','numdocu\_school',  
 'numradio\_school',  
 'high\_architect', 'colle\_architect','grad\_architect',  
 'numbook\_architect',  
 'numarticle\_architect',  
 'numinarti\_architect',   
 'numdocu\_architect',  
 'numradio\_architect',  
 'high\_product', 'colle\_product', 'grad\_product',  
 'numbook\_product',  
 'numarticle\_product',  
 'numinarti\_product','numdocu\_product',  
 'numradio\_product',  
 'high\_langu', 'colle\_langu', 'grad\_langu',  
 'numbook\_langu','numarticle\_langu',  
 'numinarti\_langu', 'numdocu\_langu',  
 'numradio\_langu',  
 'high\_network', 'colle\_network', 'grad\_network',  
 'numbook\_network','numarticle\_network',  
 'numinarti\_network', 'numdocu\_network',  
 'numradio\_network',  
 'high\_anthro', 'colle\_anthro','grad\_anthro',  
 'numbook\_anthro','numarticle\_anthro',  
 'numinarti\_anthro', 'numdocu\_anthro',  
 'numradio\_anthro'),  
 sep = "\_", variable.name = "Category", value.name = "Score")  
  
# Split the Category column into two columns based on the underscore separator  
expertise6\_factor <- expertise6\_factor %>% separate(Category, into = c("Category", "Score\_Type"), sep = "\_")  
  
## spread the data from long to wide format ----  
expertise6\_fact <- expertise6\_factor %>% spread(Category, Score)  
  
# change the score type to a factor  
expertise6\_fact$Score\_Type<-as.factor(expertise6\_fact$Score\_Type)  
  
# convert the column ih to numeric  
expertise6\_fact$ih<-as.numeric(expertise6\_fact$ih)

###Create another data frame to winsorize expertise variables before factor analysis

expertise6\_wins\_fact<-expertise6\_fact

## Winsorize the variables at 1%

# winsorize the variables (at 1%)  
expertise6\_fact1 <- expertise6\_fact%>%  
 mutate(numarticle=Winsorize(numarticle, probs = c(0,0.99)),   
 numbook=Winsorize(numbook, probs = c(0,0.99)),  
 high=Winsorize(high, probs = c(0,0.99)),  
 colle=Winsorize(colle, probs = c(0,0.99)),  
 grad=Winsorize(grad,na.rm=TRUE, probs = c(0,0.99)),  
 numdocu=Winsorize(numdocu,na.rm=TRUE, probs = c(0,0.99)),  
 numinarti=Winsorize(numinarti,na.rm=TRUE, probs = c(0,0.99)),  
 numradio=Winsorize(numradio,na.rm=TRUE, probs = c(0,0.99)))

## Factor analysis

# Factor analysis for expertise variables with raw scores ----  
  
# Import packages   
  
library(psych) #PCA/EFA analysis  
library(REdaS) #Produces KMO and Bartletts test

Loading required package: grid

library(GPArotation)  
  
  
# Create a new dataframe that include only related variables  
factor\_exp<-expertise6\_fact1%>%  
 select(colle, grad, high, numarticle, numbook, numdocu, numinarti, numradio)  
  
# Check missing values  
apply(is.na(factor\_exp), 2, sum)

colle grad high numarticle numbook numdocu numinarti   
 0 0 0 0 0 0 0   
 numradio   
 0

Factor analysis for expertise variables with raw scores

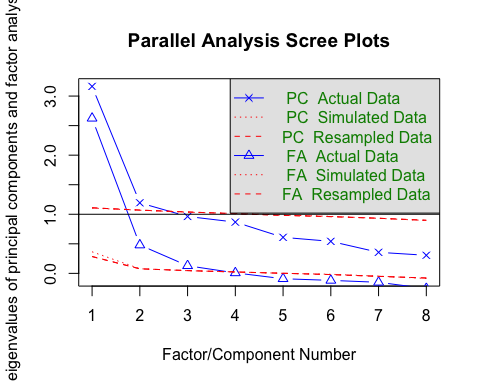
# Since grad classes for TV category is missing (nobody takes any class in the sample), listwise deletion is applied here.  
bart\_spher(factor\_exp, use = "complete.obs") ###### produces Bartletts test of spherecity

Bartlett's Test of Sphericity  
  
Call: bart\_spher(x = factor\_exp, use = "complete.obs")  
  
 X2 = 3334.573  
 df = 28  
p-value < 2.22e-16

KMO(factor\_exp) ###### Kaiser-Meyer-Olkin measure, which is above .5.

Kaiser-Meyer-Olkin factor adequacy  
Call: KMO(r = factor\_exp)  
Overall MSA = 0.79  
MSA for each item =   
 colle grad high numarticle numbook numdocu numinarti   
 0.77 0.83 0.70 0.79 0.81 0.83 0.77   
 numradio   
 0.84

#Check eigenvalues  
  
fa.parallel(factor\_exp)



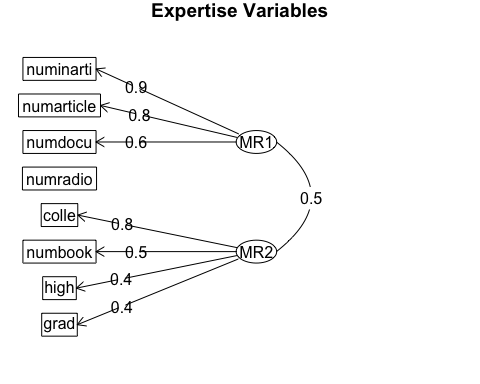
Parallel analysis suggests that the number of factors = 3 and the number of components = 2

### Factor analysis

# So we can reduce it to 2 factors  
fa(factor\_exp, nfactors = 2, rotate = "oblimin" )

Factor Analysis using method = minres  
Call: fa(r = factor\_exp, nfactors = 2, rotate = "oblimin")  
Standardized loadings (pattern matrix) based upon correlation matrix  
 MR1 MR2 h2 u2 com  
colle -0.04 0.83 0.66 0.34 1.0  
grad 0.09 0.35 0.16 0.84 1.1  
high -0.03 0.40 0.15 0.85 1.0  
numarticle 0.77 0.06 0.63 0.37 1.0  
numbook 0.44 0.47 0.62 0.38 2.0  
numdocu 0.58 -0.06 0.30 0.70 1.0  
numinarti 0.89 -0.04 0.76 0.24 1.0  
numradio 0.30 0.04 0.10 0.90 1.0  
  
 MR1 MR2  
SS loadings 2.10 1.30  
Proportion Var 0.26 0.16  
Cumulative Var 0.26 0.42  
Proportion Explained 0.62 0.38  
Cumulative Proportion 0.62 1.00  
  
 With factor correlations of   
 MR1 MR2  
MR1 1.00 0.49  
MR2 0.49 1.00  
  
Mean item complexity = 1.2  
Test of the hypothesis that 2 factors are sufficient.  
  
The degrees of freedom for the null model are 28 and the objective function was 2.18 with Chi Square of 3334.57  
The degrees of freedom for the model are 13 and the objective function was 0.08   
  
The root mean square of the residuals (RMSR) is 0.03   
The df corrected root mean square of the residuals is 0.05   
  
The harmonic number of observations is 1536 with the empirical chi square 90.74 with prob < 1e-13   
The total number of observations was 1536 with Likelihood Chi Square = 123.66 with prob < 3.8e-20   
  
Tucker Lewis Index of factoring reliability = 0.928  
RMSEA index = 0.074 and the 90 % confidence intervals are 0.063 0.087  
BIC = 28.27  
Fit based upon off diagonal values = 0.99  
Measures of factor score adequacy   
 MR1 MR2  
Correlation of (regression) scores with factors 0.93 0.88  
Multiple R square of scores with factors 0.87 0.77  
Minimum correlation of possible factor scores 0.73 0.54

# Figure for the analysis  
  
M1<-fa(factor\_exp, nfactors = 2, rotate = "oblimin" ) ##save the analysis as the object m1  
fa.diagram(M1,main="Expertise Variables")



So here we have two factors and we can investigate them as classes and media-literature part, let’s extract values for now, but creating these categories with averaging related variables may be a better way for the sake of conceptual understanding.

### Extracting factor values

factor\_exp\_score <- factanal(factor\_exp, factors=2, scores="regression", rotation = "oblimin", na.rm=TRUE)  
  
head(factor\_exp\_score$scores)

Factor1 Factor2  
[1,] 0.02119905 -0.4233947  
[2,] 0.22119338 -0.4679913  
[3,] -0.14582577 -0.3159511  
[4,] 0.17926929 -0.5193750  
[5,] -0.26945985 -0.2581370  
[6,] 0.82731651 -0.4607261

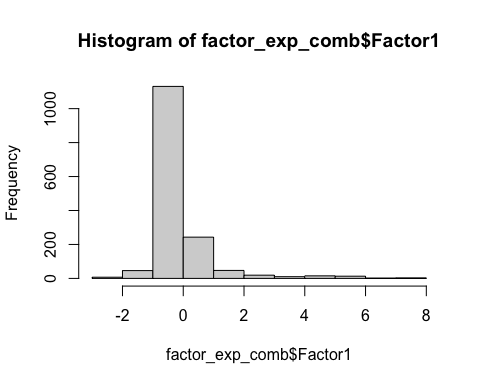
factor\_exp\_comb <- bind\_cols(factor\_exp, data.frame(factor\_exp\_score$scores))  
  
factor\_exp\_comb$class<-factor\_exp\_comb$Factor1  
  
factor\_exp\_comb$media\_grad<-factor\_exp\_comb$Factor2

### Histogram and descriptives for factor scores

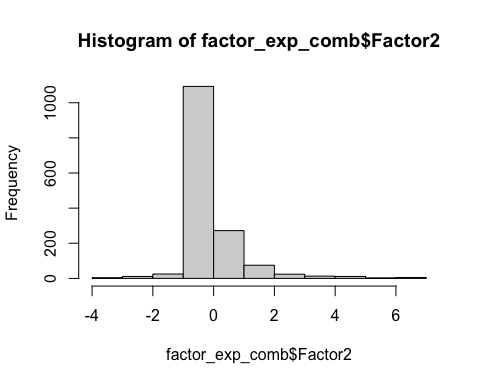
descriptives(dat=factor\_exp\_comb, vars(Factor1, Factor2),  
 sd=T)

DESCRIPTIVES  
  
 Descriptives   
 ───────────────────────────────────────────────────────   
 Factor1 Factor2   
 ───────────────────────────────────────────────────────   
 N 1536 1536   
 Missing 0 0   
 Mean -5.305905e-16 8.812395e-16   
 Median -0.2694598 -0.2581370   
 Standard deviation 0.9977506 0.9220806   
 Minimum -2.856278 -3.778751   
 Maximum 7.978103 6.476149   
 ───────────────────────────────────────────────────────

hist(factor\_exp\_comb$Factor1)



hist(factor\_exp\_comb$Factor2)



## Winsorize the variables at 1%

# winsorize the variables (at 1%)  
expertise6\_ready <- expertise6\_fact%>%  
 mutate(numarticle\_wins\_1=Winsorize(numarticle, probs = c(0,0.99)),   
 numbook\_wins\_1=Winsorize(numbook, probs = c(0,0.99)),  
 high\_wins\_1=Winsorize(high, probs = c(0,0.99)),  
 colle\_wins\_1=Winsorize(colle, probs = c(0,0.99)),  
 grad\_wins\_1=Winsorize(grad,na.rm=TRUE, probs = c(0,0.99)),  
 docu\_wins\_1=Winsorize(numdocu,na.rm=TRUE, probs = c(0,0.99)),  
 inarti\_wins\_1=Winsorize(numinarti,na.rm=TRUE, probs = c(0,0.99)),  
 radio\_wins\_1=Winsorize(numradio,na.rm=TRUE, probs = c(0,0.99)))  
  
#check descriptives  
descriptives(dat=expertise6\_ready, vars(docu\_wins\_1,inarti\_wins\_1, radio\_wins\_1 ), median=F, n=F, missing=T, sd=T, skew =T)

DESCRIPTIVES  
  
 Descriptives   
 ───────────────────────────────────────────────────────────────────────   
 docu\_wins\_1 inarti\_wins\_1 radio\_wins\_1   
 ───────────────────────────────────────────────────────────────────────   
 Missing 0 0 0   
 Mean 2.194010 9.023438 0.7988281   
 Standard deviation 5.699259 26.33146 2.767993   
 Minimum 0.000000 0.000000 0.000000   
 Maximum 38.25000 191.2500 20.00000   
 Skewness 4.286225 4.959908 5.015617   
 Std. error skewness 0.06243908 0.06243908 0.06243908   
 ───────────────────────────────────────────────────────────────────────

descriptives(dat=expertise6\_ready, vars(high\_wins\_1, colle\_wins\_1), median=F, n=F, missing=T, sd=T)

DESCRIPTIVES  
  
 Descriptives   
 ─────────────────────────────────────────────────────   
 high\_wins\_1 colle\_wins\_1   
 ─────────────────────────────────────────────────────   
 Missing 0 0   
 Mean 0.3147135 0.5794271   
 Standard deviation 0.8859480 1.522536   
 Minimum 0.000000 0.000000   
 Maximum 4.650000 10.00000   
 ─────────────────────────────────────────────────────

descriptives(dat=expertise6\_ready, vars(numarticle\_wins\_1, numbook\_wins\_1, grad\_wins\_1), median=F, n=F, missing=T, sd=T)

DESCRIPTIVES  
  
 Descriptives   
 ────────────────────────────────────────────────────────────────────────────   
 numarticle\_wins\_1 numbook\_wins\_1 grad\_wins\_1   
 ────────────────────────────────────────────────────────────────────────────   
 Missing 0 0 0   
 Mean 5.916667 1.592448 0.07291667   
 Standard deviation 16.05380 4.371575 0.4732818   
 Minimum 0.000000 0.000000 0.000000   
 Maximum 100.0000 30.00000 4.000000   
 ────────────────────────────────────────────────────────────────────────────

# Standardize the Selected variables ----  
vars\_to\_standardize <- c("know", "docu\_wins\_1","inarti\_wins\_1", "radio\_wins\_1","high\_wins\_1", "colle\_wins\_1",  
 "numarticle\_wins\_1", "numbook\_wins\_1", "grad\_wins\_1")  
  
  
  
expertise6\_ready<-expertise6\_ready %>%   
 group\_by(Score\_Type) %>%   
 mutate\_at(vars(vars\_to\_standardize), scale)

sum(is.na(expertise6\_ready$grad\_wins\_1))

[1] 384

## Take the means of winsorized variables to create our new categories: media and class

expertise6\_ready <- expertise6\_ready %>% replace\_na(list(colle\_wins\_1 = NA, high\_wins\_1 = NA, grad\_wins\_1 = NA, docu\_wins\_1= NA,inarti\_wins\_1 = NA, radio\_wins\_1 = NA, numarticle\_wins\_1 = NA, numbook\_wins\_1 = NA))  
  
  
expertise6\_ready <- expertise6\_ready %>% mutate(class\_wins1 = mapply(function(x, y, z) {  
 ifelse(is.na(x), (y + z)/2,   
 ifelse(is.na(y), (x + z)/2,   
 ifelse(is.na(z), (x + y)/2, (x + y + z)/3)))},   
 grad\_wins\_1, colle\_wins\_1, high\_wins\_1))  
  
expertise6\_ready <- expertise6\_ready %>% mutate(media\_wins1 = mapply(function(x, y, z, t, r) {  
 ifelse(is.na(x), (y + z + t + r)/4,   
 ifelse(is.na(y), (x + z + t + r)/4,  
 ifelse(is.na(z), (x + y + t + r)/4,   
 ifelse(is.na(t),(x + y + z + r)/4,   
 ifelse(is.na(r),(x + y + z + t)/4,  
 (x + y + z + t + r)/5)))))},   
 docu\_wins\_1,inarti\_wins\_1, radio\_wins\_1, numbook\_wins\_1, numarticle\_wins\_1))

## Center the variables

expertise6\_ready$know\_cent <- scale(expertise6\_ready$know, center = TRUE, scale = FALSE)  
  
expertise6\_ready$needforclo\_cent <- scale(expertise6\_ready$needforclo, center = TRUE, scale = FALSE)  
  
expertise6\_ready$class\_wins1\_cent <- scale(expertise6\_ready$class\_wins1, center = TRUE, scale = FALSE)  
  
expertise6\_ready$media\_wins1\_cent <- scale(expertise6\_ready$media\_wins1, center = TRUE, scale = FALSE)

## HLM Models

### Model objective expertise with grad courses, books and magazines

## Model objective expertise ----  
  
Model\_obj<-lmer(ih ~class\_wins1\_cent\*needforclo\_cent+class\_wins1\_cent+needforclo\_cent+  
 (1|Score\_Type)+(1|ID), data=expertise6\_ready)  
summary(Model\_obj)

Linear mixed model fit by REML. t-tests use Satterthwaite's method [  
lmerModLmerTest]  
Formula: ih ~ class\_wins1\_cent \* needforclo\_cent + class\_wins1\_cent +   
 needforclo\_cent + (1 | Score\_Type) + (1 | ID)  
 Data: expertise6\_ready  
  
REML criterion at convergence: 6320.8  
  
Scaled residuals:   
 Min 1Q Median 3Q Max   
-2.93455 -0.65040 0.02653 0.66826 2.56442   
  
Random effects:  
 Groups Name Variance Std.Dev.  
 ID (Intercept) 0.7734 0.8794   
 Score\_Type (Intercept) 0.7745 0.8801   
 Residual 3.1236 1.7674   
Number of obs: 1528, groups: ID, 191; Score\_Type, 8  
  
Fixed effects:  
 Estimate Std. Error df t value  
(Intercept) 5.10303 0.32079 7.58400 15.907  
class\_wins1\_cent -0.07206 0.06840 1503.58449 -1.053  
needforclo\_cent 0.18572 0.11261 189.81958 1.649  
class\_wins1\_cent:needforclo\_cent 0.02288 0.08782 1510.75809 0.261  
 Pr(>|t|)   
(Intercept) 4.24e-07 \*\*\*  
class\_wins1\_cent 0.292   
needforclo\_cent 0.101   
class\_wins1\_cent:needforclo\_cent 0.794   
---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
  
Correlation of Fixed Effects:  
 (Intr) cls\_1\_ ndfrc\_  
clss\_wns1\_c 0.000   
nedfrcl\_cnt 0.000 0.013   
clss\_wn1\_:\_ 0.004 0.093 -0.050

### Model objective expertise with high school and college courses

Model\_obj2<-lmer(ih ~media\_wins1\_cent \* needforclo\_cent +media\_wins1\_cent + needforclo\_cent+(1|Score\_Type)+(1|ID), data=expertise6\_ready)  
summary(Model\_obj2)

Linear mixed model fit by REML. t-tests use Satterthwaite's method [  
lmerModLmerTest]  
Formula: ih ~ media\_wins1\_cent \* needforclo\_cent + media\_wins1\_cent +   
 needforclo\_cent + (1 | Score\_Type) + (1 | ID)  
 Data: expertise6\_ready  
  
REML criterion at convergence: 6312  
  
Scaled residuals:   
 Min 1Q Median 3Q Max   
-2.95382 -0.66151 0.02337 0.66064 2.55803   
  
Random effects:  
 Groups Name Variance Std.Dev.  
 ID (Intercept) 0.7553 0.8691   
 Score\_Type (Intercept) 0.7773 0.8817   
 Residual 3.1108 1.7638   
Number of obs: 1528, groups: ID, 191; Score\_Type, 8  
  
Fixed effects:  
 Estimate Std. Error df t value  
(Intercept) 5.10190 0.32118 7.56820 15.885  
media\_wins1\_cent -0.22040 0.07087 1498.82315 -3.110  
needforclo\_cent 0.18599 0.11163 188.65641 1.666  
media\_wins1\_cent:needforclo\_cent -0.06861 0.08735 1466.83328 -0.785  
 Pr(>|t|)   
(Intercept) 4.38e-07 \*\*\*  
media\_wins1\_cent 0.00191 \*\*   
needforclo\_cent 0.09735 .   
media\_wins1\_cent:needforclo\_cent 0.43236   
---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
  
Correlation of Fixed Effects:  
 (Intr) md\_w1\_ ndfrc\_  
md\_wns1\_cnt 0.000   
nedfrcl\_cnt 0.000 0.017   
md\_wns1\_c:\_ 0.004 0.087 -0.044

### Model of perceived expertise and need for cognition

Model\_perc<-lmer(ih ~know\_cent\*needforclo\_cent+ know\_cent + needforclo\_cent +  
 (1|Score\_Type)+(1|ID), data=expertise6\_ready)  
summary(Model\_perc)

Linear mixed model fit by REML. t-tests use Satterthwaite's method [  
lmerModLmerTest]  
Formula: ih ~ know\_cent \* needforclo\_cent + know\_cent + needforclo\_cent +   
 (1 | Score\_Type) + (1 | ID)  
 Data: expertise6\_ready  
  
REML criterion at convergence: 6321.4  
  
Scaled residuals:   
 Min 1Q Median 3Q Max   
-2.92364 -0.65771 0.01587 0.66300 2.56876   
  
Random effects:  
 Groups Name Variance Std.Dev.  
 ID (Intercept) 0.7989 0.8938   
 Score\_Type (Intercept) 0.7760 0.8809   
 Residual 3.1140 1.7646   
Number of obs: 1528, groups: ID, 191; Score\_Type, 8  
  
Fixed effects:  
 Estimate Std. Error df t value Pr(>|t|)   
(Intercept) 5.10150 0.32130 7.60464 15.878 4.19e-07 \*\*\*  
know\_cent -0.06434 0.05369 1451.39265 -1.198 0.231   
needforclo\_cent 0.18403 0.11385 185.25861 1.616 0.108   
know\_cent:needforclo\_cent -0.02139 0.07491 1397.20099 -0.286 0.775   
---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
  
Correlation of Fixed Effects:  
 (Intr) knw\_cn ndfrc\_  
know\_cent 0.001   
nedfrcl\_cnt 0.000 0.046   
knw\_cnt:nd\_ 0.012 0.063 -0.040

### Model of objective expertise, perceived expertise and need for cognition without interaction

Model.1.1<-lmer(ih ~class\_wins1\_cent + media\_wins1\_cent + know\_cent +needforclo\_cent +(1|Score\_Type)+(1|ID),   
 data=expertise6\_ready)  
summary(Model.1.1)

Linear mixed model fit by REML. t-tests use Satterthwaite's method [  
lmerModLmerTest]  
Formula:   
ih ~ class\_wins1\_cent + media\_wins1\_cent + know\_cent + needforclo\_cent +   
 (1 | Score\_Type) + (1 | ID)  
 Data: expertise6\_ready  
  
REML criterion at convergence: 6316.6  
  
Scaled residuals:   
 Min 1Q Median 3Q Max   
-2.94278 -0.66321 0.01385 0.66298 2.54206   
  
Random effects:  
 Groups Name Variance Std.Dev.  
 ID (Intercept) 0.7506 0.8664   
 Score\_Type (Intercept) 0.7758 0.8808   
 Residual 3.1160 1.7652   
Number of obs: 1528, groups: ID, 191; Score\_Type, 8  
  
Fixed effects:  
 Estimate Std. Error df t value Pr(>|t|)   
(Intercept) 5.103e+00 3.209e-01 7.566e+00 15.905 4.36e-07 \*\*\*  
class\_wins1\_cent 2.461e-02 7.825e-02 1.493e+03 0.314 0.75321   
media\_wins1\_cent -2.259e-01 8.177e-02 1.508e+03 -2.762 0.00581 \*\*   
know\_cent -2.644e-03 5.943e-02 1.411e+03 -0.044 0.96453   
needforclo\_cent 1.823e-01 1.114e-01 1.840e+02 1.635 0.10367   
---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
  
Correlation of Fixed Effects:  
 (Intr) cls\_1\_ md\_w1\_ knw\_cn  
clss\_wns1\_c 0.000   
md\_wns1\_cnt 0.000 -0.357   
know\_cent 0.001 -0.239 -0.259   
nedfrcl\_cnt 0.000 -0.001 0.003 0.044

### Model of objective expertise, perceived expertise and need for cognition with interaction

Model.2.1<-lmer(ih ~class\_wins1\_cent + media\_wins1\_cent + know\_cent+ needforclo\_cent +  
 class\_wins1\_cent\*needforclo\_cent + media\_wins1\_cent\*needforclo\_cent +  
 know\_cent\*needforclo\_cent+(1|Score\_Type)+(1|ID),data=expertise6\_ready)  
summary(Model.2.1)

Linear mixed model fit by REML. t-tests use Satterthwaite's method [  
lmerModLmerTest]  
Formula:   
ih ~ class\_wins1\_cent + media\_wins1\_cent + know\_cent + needforclo\_cent +   
 class\_wins1\_cent \* needforclo\_cent + media\_wins1\_cent \* needforclo\_cent +   
 know\_cent \* needforclo\_cent + (1 | Score\_Type) + (1 | ID)  
 Data: expertise6\_ready  
  
REML criterion at convergence: 6324.1  
  
Scaled residuals:   
 Min 1Q Median 3Q Max   
-2.94235 -0.65807 0.01588 0.66131 2.55946   
  
Random effects:  
 Groups Name Variance Std.Dev.  
 ID (Intercept) 0.7574 0.8703   
 Score\_Type (Intercept) 0.7741 0.8798   
 Residual 3.1172 1.7656   
Number of obs: 1528, groups: ID, 191; Score\_Type, 8  
  
Fixed effects:  
 Estimate Std. Error df t value  
(Intercept) 5.102e+00 3.206e-01 7.573e+00 15.914  
class\_wins1\_cent 2.937e-02 7.858e-02 1.490e+03 0.374  
media\_wins1\_cent -2.337e-01 8.223e-02 1.499e+03 -2.842  
know\_cent -1.025e-03 5.960e-02 1.407e+03 -0.017  
needforclo\_cent 1.836e-01 1.120e-01 1.834e+02 1.640  
class\_wins1\_cent:needforclo\_cent 9.434e-02 1.101e-01 1.439e+03 0.857  
media\_wins1\_cent:needforclo\_cent -1.188e-01 1.108e-01 1.512e+03 -1.073  
know\_cent:needforclo\_cent -8.282e-03 8.415e-02 1.402e+03 -0.098  
 Pr(>|t|)   
(Intercept) 4.29e-07 \*\*\*  
class\_wins1\_cent 0.70864   
media\_wins1\_cent 0.00455 \*\*   
know\_cent 0.98628   
needforclo\_cent 0.10278   
class\_wins1\_cent:needforclo\_cent 0.39167   
media\_wins1\_cent:needforclo\_cent 0.28364   
know\_cent:needforclo\_cent 0.92162   
---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
  
Correlation of Fixed Effects:  
 (Intr) cls\_1\_ md\_w1\_ knw\_cn ndfrc\_ c\_1\_:\_ m\_1\_:\_  
clss\_wns1\_c 0.001   
md\_wns1\_cnt -0.001 -0.359   
know\_cent 0.001 -0.234 -0.263   
nedfrcl\_cnt 0.000 -0.005 0.002 0.043   
clss\_wn1\_:\_ -0.001 0.075 -0.043 0.023 -0.024   
md\_wns1\_c:\_ 0.000 -0.044 0.099 -0.044 -0.014 -0.495   
knw\_cnt:nd\_ 0.011 0.023 -0.038 0.051 -0.018 -0.213 -0.249

Model.2.2<-lmer(ih ~media\_wins1\_cent+(1|Score\_Type)+(1|ID),data=expertise6\_ready)  
summary(Model.2.2)

Linear mixed model fit by REML. t-tests use Satterthwaite's method [  
lmerModLmerTest]  
Formula: ih ~ media\_wins1\_cent + (1 | Score\_Type) + (1 | ID)  
 Data: expertise6\_ready  
  
REML criterion at convergence: 6345.6  
  
Scaled residuals:   
 Min 1Q Median 3Q Max   
-2.93194 -0.65843 0.01725 0.66062 2.55088   
  
Random effects:  
 Groups Name Variance Std.Dev.  
 ID (Intercept) 0.7696 0.8773   
 Score\_Type (Intercept) 0.7709 0.8780   
 Residual 3.1151 1.7650   
Number of obs: 1536, groups: ID, 192; Score\_Type, 8  
  
Fixed effects:  
 Estimate Std. Error df t value Pr(>|t|)   
(Intercept) 5.11230 0.31999 7.58084 15.976 4.13e-07 \*\*\*  
media\_wins1\_cent -0.21835 0.07068 1517.05869 -3.089 0.00204 \*\*   
---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
  
Correlation of Fixed Effects:  
 (Intr)  
md\_wns1\_cnt 0.000