Model Fitting and selection

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```
library(tidyverse)
library(tableone)
library(lavaan)
library(expss)
library(mirt)
```

Import data

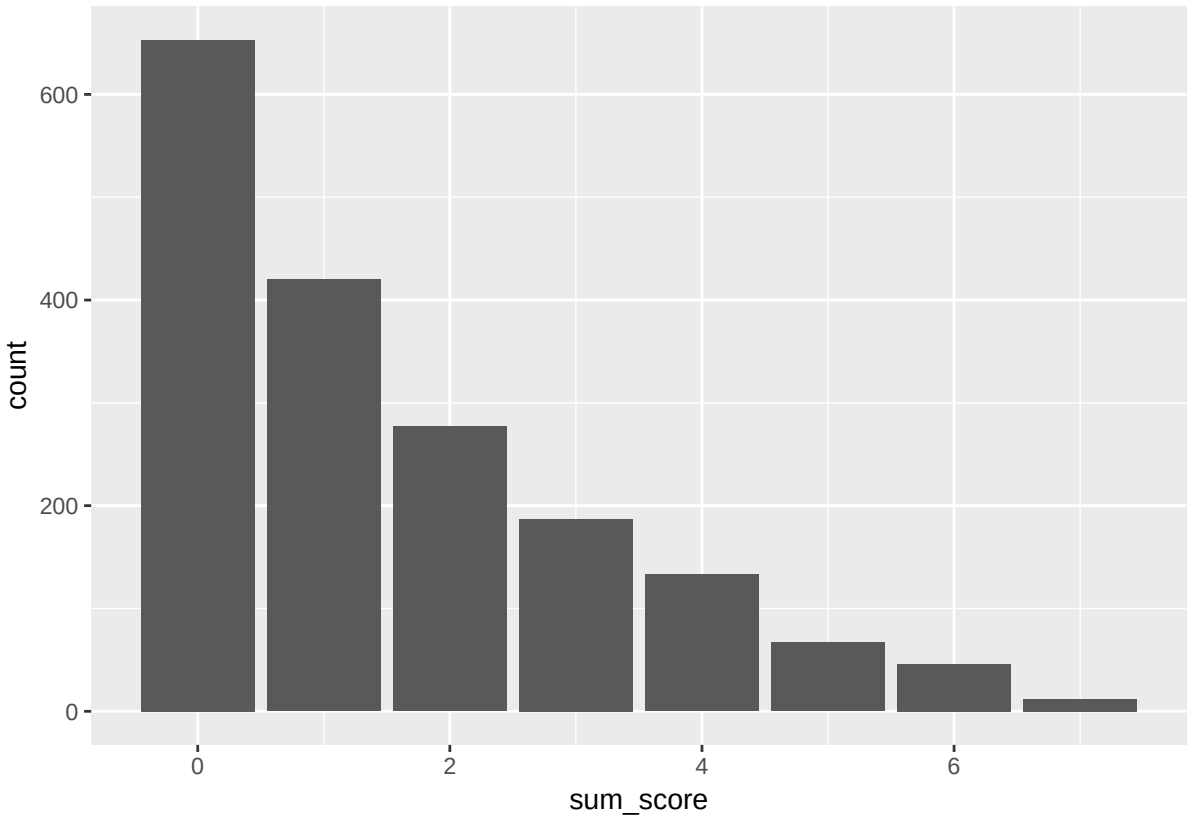
```
## read in data cleaned
scale_raw = read.csv(file = "./index.csv", head = TRUE, sep = ",")
head(scale_raw)
```

```
##   X               rnid HHI HH23r1 HH23r3 ESC1ar2 ESC1ar3 ESC1ar4 wbill
## 1 1 EPOVL5YYVTDCBPK4N0   3      0      2       0       1       1     1
## 2 2 EPOVL5ZSJ3HSNFC4N5   3      0      2       1       0       0     1
## 3 3 EPOVL5YYNLZ2LBN4N8   3      0      0       0       0       0     0
## 4 4 EPOVL5Z67ZD4BY84N1   3      0      1       1       0       0     1
## 5 5 EPOVL65CC59WVCQ4N8   2      2      0       1       0       0     1
## 6 6 EPOVL5ZDMLST6R34N9   3      0      1       0       0       0     1
##   sbill ESC2 EB2a EB4 EB5r1 EB6r1 EB7a EB8a HEC1r1a HEC1r1b HEC1r1c
## 1     0    1    1   0     1     1    1    1       0       1       1
## 2     1    1    0   1     1     1    0    1       0       1       1
## 3     0    1    0   1     1     1    0    1       0       0       0
## 4     0    1    0   1     1     1    0    1       0       0       0
## 5     1    0    0   1     1     1    0    0       0       1       0
## 6     1    0    0   1     0     1    0    0       0       0       0
##   HEC1r1d HEC2r1 HEC2r2 HEC2r3 HEC2r4 HEC2r5 HEC2r6 HEC2r7 HEC2r8 HEC2r9
## 1       0      0      0      1      0      0      1      0      0      0
## 2       0      0      0      0      1      1      0      0      0      0
## 3       0      0      0      0      0      0      0      0      0      0
## 4       0      0      0      0      0      0      0      0      0      0
## 5       0      0      0      0      0      0      0      0      0      0
## 6       0      0      0      0      0      0      0      0      0      0
##   HEC2r10 HEC3r3a HEC3r3b HEC3r3c HEC3r3d HEC3r3e HEC3r3f HEC3r3g HEC3r3h
```

```
## 1       0       1       0       0       1       0       1       1       0
## 2       0       0       1       0       0       1       1       1       0
## 3       1       1       0       0       0       0       0       0       0
## 4       1       0       0       0       0       0       0       0       0
## 5       1       0       1       0       0       0       0       0       1
## 6       1       1       1       0       0       0       1       0       1
##   HEC4a HEC4b HEC5 HEC5a HEC6 HEC6a CEP1 CEP2 CEP3 CEP4 CEP5 CEP6 CEP7
## 1     1     1    0     1    0     1    1    0    1    1    1    0    1
## 2     1     0    0     1    0     1    0    0    0    0    0    0    0
## 3     1     1    0     0    0     0    0    0    0    0    0    0    0
## 4     1     1    0     0    0     0    0    0    0    0    0    0    0
## 5     1     1    1     0    1     0    0    0    0    0    0    0    0
## 6     0     1    0     0    0     0    0    0    0    0    0    0    0
##   CEP8r1 CEP8r2 CEP8r3 CEP8r4
## 1      0      0      1      0
## 2      0      0      0      1
## 3      0      0      0      1
## 4      0      0      1      0
## 5      0      0      1      0
## 6      0      1      1      0
```

```
## scale_raw to index data add one row for score.
scale_df = scale_raw %>%
   dplyr::select(rnid, EB2a, CEP1, HEC1r1b,HEC3r3e,HEC6a,
         EB7a, HEC3r3f) %>%
   mutate(sum_score = rowSums(dplyr::select(., -rnid)))
```

```
## Distribution of the sum scores
ggplot(scale_df, aes( sum_score)) +
  geom_bar()
```




```
## Demographical  variables
append = readxl::read_xlsx("./data_append.xlsx") %>%
  mutate(rnid = RNID)

## Combine the cleaned dataset with appendix.
full_data = merge(append, scale_df, by = "rnid" )
write.csv(full_data, "./full.csv")
```

Table one

1. Recode Age into groups

```
agebreaks <- c(0,1,5,10,15,20,25,30,35,40,45,50,55,60,65,70,75,80,85,500)
agelabels <- c("0-1","1-4","5-9","10-14","15-19","20-24","25-29","30-34",
               "35-39","40-44","45-49","50-54","55-59","60-64","65-69",
               "70-74","75-79","80-84","85+")

full_data = full_data %>%
  mutate(agegroups =  cut(Age,
```

```
                    breaks = agebreaks,
                    right = FALSE,
                    labels = agelabels))
```

2. Education

```
full_data = full_data %>%
  mutate(Education = fct_recode(Education,
                                "Low" = "Prefer not to answer", ## remove the levels
         "Low" = "Incomplete Secondary (high school) Education",
         "Low" =  "Secondary (high school) Education",
          "Medium" = "Vocational or Technical Degree",
          "Medium" = "Some College, University, Technical School or Further Education" ,
         "Medium" = "Associate's Degree",
          "High" = "Bachelor's Degree",
         "High" = "Master's Degree",
          "High" = "Doctoral or Professional Degree (PhD, Ed.D, JD, DVM, DO, MD, DDS, or
         )
```

3. Income and employment

```
energy.new = full_data %>%
  filter(Race != "Other") %>%
  filter(Race != "Prefer not to answer") %>%
  filter(Race != "DO NOT USE") %>%
  filter(`Hispanic Origin` != "Prefer Not to Answer") %>%
  filter(Children != "Prefer not to state") %>%
  filter(Education != "Prefer not to answer") %>%
  filter(`Household Income` != "Prefer not to answer") %>%
  filter(`Household Income` !=  "None of the above") %>%
  filter(`Employment Status` != "None of the above") %>%
  mutate(Hispanic = factor(`Hispanic Origin`, levels = c("No","Yes") ),
         `Household Income` = factor(`Household Income`,
  levels = c("< 15,000","15,000 to 24,999", "25,000 to 49,999", "50,000 to 74,999","75,
  janitor::clean_names()
```

Table 1: Descriptive social demographical

(1) Table 1

```r
# Create a variable list which we want in Table 1:"No.in household", "Household Incom

listVar <- c("region", "race", "education",
             "children", "gender", "agegroups",
              "number_in_household", "sum_score",
             "household_income", "employment_status", "home_ownership" )

# Define categorical variables
catVar <- c("region", "race",   "education",
             "children", "gender","agegroups",
             "number_in_household", "sum_score",
             "household_income", "employment_status", "home_ownership")

# Total Population
table1 <- CreateTableOne(vars = listVar, data = energy.new,
                         strata = c("hispanic"),
                         factorVars = catVar,
                         includeNA = FALSE
                     )
print(table1, quote = TRUE, test = TRUE )
```

```
##                                                                "Stratified by hispani
##  ""                                                             "No"
##   "n"                                                           "1130"
##   "region (%)"                                                  " "
##   "   Region 1: Northeast"                                      " 196 (17.3) "
##   "   Region 2: Midwest"                                        " 309 (27.3) "
##   "   Region 3: South"                                          " 397 (35.1) "
##   "   Region 4: West"                                           " 228 (20.2) "
##   "race (%)"                                                    " "
##   "   African American / Black"                                 " 544 (48.1) "
##   "   Asian / Asian American"                                   "  42 ( 3.7) "
##   "   Caucasian / White"                                        " 541 (47.9) "
##   "   Native American, Inuit or Aleut"                          "   1 ( 0.1) "
##   "   Native Hawaiian / Pacific Islander"                       "   2 ( 0.2) "
##   "education (%)"                                               " "
##   "   Medium"                                                   " 424 (37.5) "
##   "   High"                                                     " 503 (44.5) "
##   "   Low"                                                      " 203 (18.0) "
##   "children (%)"                                                " "
##   "   1"                                                        " 195 (17.3) "
##   "   2"                                                        " 133 (11.8) "
##   "   3"                                                        "  54 ( 4.8) "
```

```
##    "   4"                                                  "  18 ( 1.6) "
##    "   5 or more"                                          "  19 ( 1.7) "
##    "   None"                                               " 711 (62.9) "
##    "gender = Male (%)"                                     " 377 (33.4) "
##    "agegroups (%)"                                         " "
##    "   15-19"                                              "  10 ( 0.9) "
##    "   20-24"                                              "  14 ( 1.2) "
##    "   25-29"                                              "  56 ( 5.0) "
##    "   30-34"                                              "  80 ( 7.1) "
##    "   35-39"                                              "  84 ( 7.4) "
##    "   40-44"                                              "  72 ( 6.4) "
##    "   45-49"                                              "  84 ( 7.4) "
##    "   50-54"                                              "  80 ( 7.1) "
##    "   55-59"                                              " 142 (12.6) "
##    "   60-64"                                              " 136 (12.0) "
##    "   65-69"                                              " 164 (14.5) "
##    "   70-74"                                              " 119 (10.5) "
##    "   75-79"                                              "  57 ( 5.0) "
##    "   80-84"                                              "  27 ( 2.4) "
##    "   85+"                                                "   5 ( 0.4) "
##    "number_in_household (%)"                               " "
##    "   1"                                                  " 380 (34.6) "
##    "   2"                                                  " 385 (35.0) "
##    "   3"                                                  " 158 (14.4) "
##    "   4"                                                  " 103 ( 9.4) "
##    "   5 or more"                                          "  73 ( 6.6) "
##    "sum_score (%)"                                         " "
##    "   0"                                                  " 466 (41.2) "
##    "   1"                                                  " 275 (24.3) "
##    "   2"                                                  " 147 (13.0) "
##    "   3"                                                  " 122 (10.8) "
##    "   4"                                                  "  59 ( 5.2) "
##    "   5"                                                  "  34 ( 3.0) "
##    "   6"                                                  "  24 ( 2.1) "
##    "   7"                                                  "   3 ( 0.3) "
##    "household_income (%)"                                  " "
##    "   15,000 to 24,999"                                   " 246 (25.3) "
##    "   25,000 to 49,999"                                   " 348 (35.7) "
##    "   50,000 to 74,999"                                   " 129 (13.2) "
##    "   75,000 to 99,999"                                   "  81 ( 8.3) "
##    "   100,000 to 149,999"                                 "  98 (10.1) "
##    "   150,000 to 199,999"                                 "  40 ( 4.1) "
##    "   200,000 to 249,999"                                 "  19 ( 2.0) "
##    "   250,000 to 499,999"                                 "   9 ( 0.9) "
```

```
##   "   500,000 to 999,999"                                          "   2 ( 0.2) "
##   "   1 million +"                                                 "   2 ( 0.2) "
##   "employment_status (%)"                                          " "
##   "   Contract, Freelance or Temporary Employee"                   "  13 ( 1.2) "
##   "   Disabled"                                                    "  34 ( 3.0) "
##   "   Full-time (30 or more hours per week)"                       " 412 (36.5) "
##   "   Full-time Student"                                           "  19 ( 1.7) "
##   "   Homemaker"                                                   "  33 ( 2.9) "
##   "   Part-time"                                                   " 101 ( 8.9) "
##   "   Part-time Student (working LESS than 30 hours per week)"     "   3 ( 0.3) "
##   "   Part-time Student (working MORE than 30 hours per week)"     "   1 ( 0.1) "
##   "   Retired"                                                     " 383 (33.9) "
##   "   Self-employed"                                               "  46 ( 4.1) "
##   "   Semi-retired"                                                "  13 ( 1.2) "
##   "   Stay-at-Home Parent"                                         "  25 ( 2.2) "
##   "   Unemployed"                                                  "  47 ( 4.2) "
##   "home_ownership (%)"                                             " "
##   "   Live in student/university housing"                          "   2 ( 0.2) "
##   "   Live with family member(s) in their residence"               "  54 ( 4.8) "
##   "   Own"                                                         " 590 (52.2) "
##   "   Rent"                                                        " 484 (42.8) "
##                                                                   "Stratified by hispani
##  ""                                                               "Yes"
##   "n"                                                             "368"
##   "region (%)"                                                    ""
##   "   Region 1: Northeast"                                        " 53 (14.4) "
##   "   Region 2: Midwest"                                          " 56 (15.2) "
##   "   Region 3: South"                                            "151 (41.0) "
##   "   Region 4: West"                                             "108 (29.3) "
##   "race (%)"                                                      ""
##   "   African American / Black"                                   " 30 ( 8.2) "
##   "   Asian / Asian American"                                     " 14 ( 3.8) "
##   "   Caucasian / White"                                          "306 (83.2) "
##   "   Native American, Inuit or Aleut"                            " 15 ( 4.1) "
##   "   Native Hawaiian / Pacific Islander"                         "  3 ( 0.8) "
##   "education (%)"                                                 ""
##   "   Medium"                                                     "142 (38.6) "
##   "   High"                                                       "164 (44.6) "
##   "   Low"                                                        " 62 (16.8) "
##   "children (%)"                                                  ""
##   "   1"                                                          " 73 (19.8) "
##   "   2"                                                          " 74 (20.1) "
##   "   3"                                                          " 29 ( 7.9) "
##   "   4"                                                          "  9 ( 2.4) "
```

```
##    "   5 or more"                                  "  6 ( 1.6) "
##    "   None"                                       "177 (48.1) "
##    "gender = Male (%)"                             "145 (39.4) "
##    "agegroups (%)"                                 ""
##    "   15-19"                                      "  3 ( 0.8) "
##    "   20-24"                                      " 18 ( 4.9) "
##    "   25-29"                                      " 34 ( 9.2) "
##    "   30-34"                                      " 33 ( 9.0) "
##    "   35-39"                                      " 39 (10.6) "
##    "   40-44"                                      " 37 (10.1) "
##    "   45-49"                                      " 30 ( 8.2) "
##    "   50-54"                                      " 35 ( 9.5) "
##    "   55-59"                                      " 33 ( 9.0) "
##    "   60-64"                                      " 34 ( 9.2) "
##    "   65-69"                                      " 35 ( 9.5) "
##    "   70-74"                                      " 28 ( 7.6) "
##    "   75-79"                                      "  6 ( 1.6) "
##    "   80-84"                                      "  2 ( 0.5) "
##    "   85+"                                        "  1 ( 0.3) "
##    "number_in_household (%)"                       ""
##    "   1"                                          " 85 (24.1) "
##    "   2"                                          " 96 (27.3) "
##    "   3"                                          " 69 (19.6) "
##    "   4"                                          " 65 (18.5) "
##    "   5 or more"                                  " 37 (10.5) "
##    "sum_score (%)"                                 ""
##    "   0"                                          "111 (30.2) "
##    "   1"                                          " 91 (24.7) "
##    "   2"                                          " 73 (19.8) "
##    "   3"                                          " 30 ( 8.2) "
##    "   4"                                          " 37 (10.1) "
##    "   5"                                          " 12 ( 3.3) "
##    "   6"                                          "  9 ( 2.4) "
##    "   7"                                          "  5 ( 1.4) "
##    "household_income (%)"                          ""
##    "   15,000 to 24,999"                           " 56 (17.6) "
##    "   25,000 to 49,999"                           "116 (36.5) "
##    "   50,000 to 74,999"                           " 47 (14.8) "
##    "   75,000 to 99,999"                           " 34 (10.7) "
##    "   100,000 to 149,999"                         " 42 (13.2) "
##    "   150,000 to 199,999"                         " 16 ( 5.0) "
##    "   200,000 to 249,999"                         "  3 ( 0.9) "
##    "   250,000 to 499,999"                         "  4 ( 1.3) "
##    "   500,000 to 999,999"                         "  0 ( 0.0) "
```

```
##   "   1 million +"                                                 "  0 ( 0.0) "
##   "employment_status (%)"                                         ""
##   "   Contract, Freelance or Temporary Employee"                  "  4 ( 1.1) "
##   "   Disabled"                                                   "  9 ( 2.4) "
##   "   Full-time (30 or more hours per week)"                      "172 (46.7) "
##   "   Full-time Student"                                          " 11 ( 3.0) "
##   "   Homemaker"                                                  " 18 ( 4.9) "
##   "   Part-time"                                                  " 24 ( 6.5) "
##   "   Part-time Student (working LESS than 30 hours per week)"    "  2 ( 0.5) "
##   "   Part-time Student (working MORE than 30 hours per week)"    "  1 ( 0.3) "
##   "   Retired"                                                    " 74 (20.1) "
##   "   Self-employed"                                              " 14 ( 3.8) "
##   "   Semi-retired"                                               "  6 ( 1.6) "
##   "   Stay-at-Home Parent"                                        " 13 ( 3.5) "
##   "   Unemployed"                                                 " 20 ( 5.4) "
##   "home_ownership (%)"                                            ""
##   "   Live in student/university housing"                         "  0 ( 0.0) "
##   "   Live with family member(s) in their residence"              " 29 ( 7.9) "
##   "   Own"                                                        "223 (60.6) "
##   "   Rent"                                                       "116 (31.5) "
##                                                                  "Stratified by hispani
##  ""                                                              "p"
##   "n"                                                            ""
##   "region (%)"                                                   "<0.001"
##   "   Region 1: Northeast"                                       ""
##   "   Region 2: Midwest"                                         ""
##   "   Region 3: South"                                           ""
##   "   Region 4: West"                                            ""
##   "race (%)"                                                     "<0.001"
##   "   African American / Black"                                  ""
##   "   Asian / Asian American"                                    ""
##   "   Caucasian / White"                                         ""
##   "   Native American, Inuit or Aleut"                           ""
##   "   Native Hawaiian / Pacific Islander"                        ""
##   "education (%)"                                                " 0.870"
##   "   Medium"                                                    ""
##   "   High"                                                      ""
##   "   Low"                                                       ""
##   "children (%)"                                                 "<0.001"
##   "   1"                                                         ""
##   "   2"                                                         ""
##   "   3"                                                         ""
##   "   4"                                                         ""
##   "   5 or more"                                                 ""
```

```
##   "   None"                                                    ""
##   "gender = Male (%)"                                          " 0.040"
##   "agegroups (%)"                                              "<0.001"
##   "   15-19"                                                   ""
##   "   20-24"                                                   ""
##   "   25-29"                                                   ""
##   "   30-34"                                                   ""
##   "   35-39"                                                   ""
##   "   40-44"                                                   ""
##   "   45-49"                                                   ""
##   "   50-54"                                                   ""
##   "   55-59"                                                   ""
##   "   60-64"                                                   ""
##   "   65-69"                                                   ""
##   "   70-74"                                                   ""
##   "   75-79"                                                   ""
##   "   80-84"                                                   ""
##   "   85+"                                                     ""
##   "number_in_household (%)"                                    "<0.001"
##   "   1"                                                       ""
##   "   2"                                                       ""
##   "   3"                                                       ""
##   "   4"                                                       ""
##   "   5 or more"                                               ""
##   "sum_score (%)"                                              "<0.001"
##   "   0"                                                       ""
##   "   1"                                                       ""
##   "   2"                                                       ""
##   "   3"                                                       ""
##   "   4"                                                       ""
##   "   5"                                                       ""
##   "   6"                                                       ""
##   "   7"                                                       ""
##   "household_income (%)"                                       " 0.136"
##   "   15,000 to 24,999"                                        ""
##   "   25,000 to 49,999"                                        ""
##   "   50,000 to 74,999"                                        ""
##   "   75,000 to 99,999"                                        ""
##   "   100,000 to 149,999"                                      ""
##   "   150,000 to 199,999"                                      ""
##   "   200,000 to 249,999"                                      ""
##   "   250,000 to 499,999"                                      ""
##   "   500,000 to 999,999"                                      ""
##   "   1 million +"                                             ""
```

```
##   "employment_status (%)"                                          "<0.001"
##   "   Contract, Freelance or Temporary Employee"                   ""
##   "   Disabled"                                                    ""
##   "   Full-time (30 or more hours per week)"                       ""
##   "   Full-time Student"                                           ""
##   "   Homemaker"                                                   ""
##   "   Part-time"                                                   ""
##   "   Part-time Student (working LESS than 30 hours per week)"     ""
##   "   Part-time Student (working MORE than 30 hours per week)"     ""
##   "   Retired"                                                     ""
##   "   Self-employed"                                               ""
##   "   Semi-retired"                                                ""
##   "   Stay-at-Home Parent"                                         ""
##   "   Unemployed"                                                  ""
##   "home_ownership (%)"                                             "<0.001"
##   "   Live in student/university housing"                          ""
##   "   Live with family member(s) in their residence"               ""
##   "   Own"                                                         ""
##   "   Rent"                                                        ""
##                                                                   "Stratified by hispani
##  ""                                                                "test"
##   "n"                                                              ""
##   "region (%)"                                                     ""
##   "   Region 1: Northeast"                                         ""
##   "   Region 2: Midwest"                                           ""
##   "   Region 3: South"                                             ""
##   "   Region 4: West"                                              ""
##   "race (%)"                                                       ""
##   "   African American / Black"                                    ""
##   "   Asian / Asian American"                                      ""
##   "   Caucasian / White"                                           ""
##   "   Native American, Inuit or Aleut"                             ""
##   "   Native Hawaiian / Pacific Islander"                          ""
##   "education (%)"                                                  ""
##   "   Medium"                                                      ""
##   "   High"                                                        ""
##   "   Low"                                                         ""
##   "children (%)"                                                   ""
##   "   1"                                                           ""
##   "   2"                                                           ""
##   "   3"                                                           ""
##   "   4"                                                           ""
##   "   5 or more"                                                   ""
##   "   None"                                                        ""
```

```
##   "gender = Male (%)"                                                ""
##   "agegroups (%)"                                                    ""
##   "   15-19"                                                         ""
##   "   20-24"                                                         ""
##   "   25-29"                                                         ""
##   "   30-34"                                                         ""
##   "   35-39"                                                         ""
##   "   40-44"                                                         ""
##   "   45-49"                                                         ""
##   "   50-54"                                                         ""
##   "   55-59"                                                         ""
##   "   60-64"                                                         ""
##   "   65-69"                                                         ""
##   "   70-74"                                                         ""
##   "   75-79"                                                         ""
##   "   80-84"                                                         ""
##   "   85+"                                                           ""
##   "number_in_household (%)"                                          ""
##   "   1"                                                             ""
##   "   2"                                                             ""
##   "   3"                                                             ""
##   "   4"                                                             ""
##   "   5 or more"                                                     ""
##   "sum_score (%)"                                                    ""
##   "   0"                                                             ""
##   "   1"                                                             ""
##   "   2"                                                             ""
##   "   3"                                                             ""
##   "   4"                                                             ""
##   "   5"                                                             ""
##   "   6"                                                             ""
##   "   7"                                                             ""
##   "household_income (%)"                                             ""
##   "   15,000 to 24,999"                                              ""
##   "   25,000 to 49,999"                                              ""
##   "   50,000 to 74,999"                                              ""
##   "   75,000 to 99,999"                                              ""
##   "   100,000 to 149,999"                                            ""
##   "   150,000 to 199,999"                                            ""
##   "   200,000 to 249,999"                                            ""
##   "   250,000 to 499,999"                                            ""
##   "   500,000 to 999,999"                                            ""
##   "   1 million +"                                                   ""
##   "employment_status (%)"                                            ""
```

```
##   "   Contract, Freelance or Temporary Employee"                "" 
##   "   Disabled"                                                 "" 
##   "   Full-time (30 or more hours per week)"                    "" 
##   "   Full-time Student"                                        "" 
##   "   Homemaker"                                                "" 
##   "   Part-time"                                                "" 
##   "   Part-time Student (working LESS than 30 hours per week)" "" 
##   "   Part-time Student (working MORE than 30 hours per week)" "" 
##   "   Retired"                                                  "" 
##   "   Self-employed"                                            "" 
##   "   Semi-retired"                                             "" 
##   "   Stay-at-Home Parent"                                      "" 
##   "   Unemployed"                                               "" 
##   "home_ownership (%)"                                          "" 
##   "   Live in student/university housing"                       "" 
##   "   Live with family member(s) in their residence"            "" 
##   "   Own"                                                      "" 
##   "   Rent"                                                     ""
```

```
listVar <- c("region", "race", "hispanic",  "education",
             "children", "gender", "agegroups",
              "number_in_household", "sum_score",
             "household_income", "employment_status", "home_ownership" )

# Define categorical variables
catVar <- c("region", "race", "hispanic",  "education",
             "children", "gender","agegroups",
             "number_in_household", "sum_score",
             "household_income", "employment_status", "home_ownership")

# Total Population
table1 <- CreateTableOne(vars = listVar, data = energy.new,
                         strata = c("gender"),
                         factorVars = catVar,
                         includeNA = FALSE
                    )
print(table1, quote = TRUE, test = TRUE )
```

```
##                                                          "Stratified by gender"
##  ""                                                       "Female"
##   "n"                                                     "976"
##   "region (%)"                                            ""
##   "   Region 1: Northeast"                                "158 (16.2) "
```

```
##   "   Region 2: Midwest"                          "246 (25.2) "
##   "   Region 3: South"                            "351 (36.0) "
##   "   Region 4: West"                             "221 (22.6) "
##   "race (%)"                                      ""
##   "   African American / Black"                   "450 (46.1) "
##   "   Asian / Asian American"                     " 26 ( 2.7) "
##   "   Caucasian / White"                          "486 (49.8) "
##   "   Native American, Inuit or Aleut"            " 10 ( 1.0) "
##   "   Native Hawaiian / Pacific Islander"         "  4 ( 0.4) "
##   "hispanic = Yes (%)"                            "223 (22.8) "
##   "education (%)"                                 ""
##   "   Medium"                                     "403 (41.3) "
##   "   High"                                       "384 (39.3) "
##   "   Low"                                        "189 (19.4) "
##   "children (%)"                                  ""
##   "   1"                                          "189 (19.4) "
##   "   2"                                          "149 (15.3) "
##   "   3"                                          " 68 ( 7.0) "
##   "   4"                                          " 19 ( 1.9) "
##   "   5 or more"                                  " 17 ( 1.7) "
##   "   None"                                       "534 (54.7) "
##   "gender = Male (%)"                             "  0 ( 0.0) "
##   "agegroups (%)"                                 ""
##   "   15-19"                                      " 11 ( 1.1) "
##   "   20-24"                                      " 22 ( 2.3) "
##   "   25-29"                                      " 66 ( 6.8) "
##   "   30-34"                                      " 89 ( 9.1) "
##   "   35-39"                                      " 87 ( 8.9) "
##   "   40-44"                                      " 82 ( 8.4) "
##   "   45-49"                                      " 80 ( 8.2) "
##   "   50-54"                                      " 71 ( 7.3) "
##   "   55-59"                                      "113 (11.6) "
##   "   60-64"                                      "109 (11.2) "
##   "   65-69"                                      "122 (12.5) "
##   "   70-74"                                      " 69 ( 7.1) "
##   "   75-79"                                      " 30 ( 3.1) "
##   "   80-84"                                      " 23 ( 2.4) "
##   "   85+"                                        "  2 ( 0.2) "
##   "number_in_household (%)"                       ""
##   "   1"                                          "303 (32.3) "
##   "   2"                                          "280 (29.9) "
##   "   3"                                          "148 (15.8) "
##   "   4"                                          "119 (12.7) "
##   "   5 or more"                                  " 87 ( 9.3) "
```

```
##   "sum_score (%)"                                                  ""
##   "   0"                                                           "318 (32.6) "
##   "   1"                                                           "252 (25.8) "
##   "   2"                                                           "156 (16.0) "
##   "   3"                                                           "121 (12.4) "
##   "   4"                                                           " 60 ( 6.1) "
##   "   5"                                                           " 39 ( 4.0) "
##   "   6"                                                           " 23 ( 2.4) "
##   "   7"                                                           "  7 ( 0.7) "
##   "household_income (%)"                                           ""
##   "   15,000 to 24,999"                                            "226 (27.6) "
##   "   25,000 to 49,999"                                            "324 (39.5) "
##   "   50,000 to 74,999"                                            "107 (13.0) "
##   "   75,000 to 99,999"                                            " 54 ( 6.6) "
##   "   100,000 to 149,999"                                          " 67 ( 8.2) "
##   "   150,000 to 199,999"                                          " 25 ( 3.0) "
##   "   200,000 to 249,999"                                          " 14 ( 1.7) "
##   "   250,000 to 499,999"                                          "  2 ( 0.2) "
##   "   500,000 to 999,999"                                          "  0 ( 0.0) "
##   "   1 million +"                                                 "  1 ( 0.1) "
##   "employment_status (%)"                                          ""
##   "   Contract, Freelance or Temporary Employee"                   "  9 ( 0.9) "
##   "   Disabled"                                                    " 35 ( 3.6) "
##   "   Full-time (30 or more hours per week)"                       "381 (39.0) "
##   "   Full-time Student"                                           " 20 ( 2.0) "
##   "   Homemaker"                                                   " 49 ( 5.0) "
##   "   Part-time"                                                   " 99 (10.1) "
##   "   Part-time Student (working LESS than 30 hours per week)"     "  2 ( 0.2) "
##   "   Part-time Student (working MORE than 30 hours per week)"     "  1 ( 0.1) "
##   "   Retired"                                                     "267 (27.4) "
##   "   Self-employed"                                               " 33 ( 3.4) "
##   "   Semi-retired"                                                "  7 ( 0.7) "
##   "   Stay-at-Home Parent"                                         " 35 ( 3.6) "
##   "   Unemployed"                                                  " 38 ( 3.9) "
##   "home_ownership (%)"                                             ""
##   "   Live in student/university housing"                          "  2 ( 0.2) "
##   "   Live with family member(s) in their residence"               " 64 ( 6.6) "
##   "   Own"                                                         "459 (47.0) "
##   "   Rent"                                                        "451 (46.2) "
##                                                                   "Stratified by gender"
##  ""                                                               "Male"
##   "n"                                                             "522"
##   "region (%)"                                                    ""
##   "   Region 1: Northeast"                                        " 91 ( 17.4) "
```

```
##   "   Region 2: Midwest"                          "119 ( 22.8) "
##   "   Region 3: South"                            "197 ( 37.7) "
##   "   Region 4: West"                             "115 ( 22.0) "
##   "race (%)"                                      ""
##   "   African American / Black"                   "124 ( 23.8) "
##   "   Asian / Asian American"                     " 30 (  5.7) "
##   "   Caucasian / White"                          "361 ( 69.2) "
##   "   Native American, Inuit or Aleut"            "  6 (  1.1) "
##   "   Native Hawaiian / Pacific Islander"         "  1 (  0.2) "
##   "hispanic = Yes (%)"                            "145 ( 27.8) "
##   "education (%)"                                 ""
##   "   Medium"                                     "163 ( 31.2) "
##   "   High"                                       "283 ( 54.2) "
##   "   Low"                                        " 76 ( 14.6) "
##   "children (%)"                                  ""
##   "   1"                                          " 79 ( 15.1) "
##   "   2"                                          " 58 ( 11.1) "
##   "   3"                                          " 15 (  2.9) "
##   "   4"                                          "  8 (  1.5) "
##   "   5 or more"                                  "  8 (  1.5) "
##   "   None"                                       "354 ( 67.8) "
##   "gender = Male (%)"                             "522 (100.0) "
##   "agegroups (%)"                                 ""
##   "   15-19"                                      "  2 (  0.4) "
##   "   20-24"                                      " 10 (  1.9) "
##   "   25-29"                                      " 24 (  4.6) "
##   "   30-34"                                      " 24 (  4.6) "
##   "   35-39"                                      " 36 (  6.9) "
##   "   40-44"                                      " 27 (  5.2) "
##   "   45-49"                                      " 34 (  6.5) "
##   "   50-54"                                      " 44 (  8.4) "
##   "   55-59"                                      " 62 ( 11.9) "
##   "   60-64"                                      " 61 ( 11.7) "
##   "   65-69"                                      " 77 ( 14.8) "
##   "   70-74"                                      " 78 ( 14.9) "
##   "   75-79"                                      " 33 (  6.3) "
##   "   80-84"                                      "  6 (  1.1) "
##   "   85+"                                        "  4 (  0.8) "
##   "number_in_household (%)"                       ""
##   "   1"                                          "162 ( 31.5) "
##   "   2"                                          "201 ( 39.1) "
##   "   3"                                          " 79 ( 15.4) "
##   "   4"                                          " 49 (  9.5) "
##   "   5 or more"                                  " 23 (  4.5) "
```

```
##   "sum_score (%)"                                                  ""
##   "   0"                                                           "259 ( 49.6) "
##   "   1"                                                           "114 ( 21.8) "
##   "   2"                                                           " 64 ( 12.3) "
##   "   3"                                                           " 31 (  5.9) "
##   "   4"                                                           " 36 (  6.9) "
##   "   5"                                                           "  7 (  1.3) "
##   "   6"                                                           " 10 (  1.9) "
##   "   7"                                                           "  1 (  0.2) "
##   "household_income (%)"                                           ""
##   "   15,000 to 24,999"                                            " 76 ( 16.1) "
##   "   25,000 to 49,999"                                            "140 ( 29.7) "
##   "   50,000 to 74,999"                                            " 69 ( 14.6) "
##   "   75,000 to 99,999"                                            " 61 ( 12.9) "
##   "   100,000 to 149,999"                                          " 73 ( 15.5) "
##   "   150,000 to 199,999"                                          " 31 (  6.6) "
##   "   200,000 to 249,999"                                          "  8 (  1.7) "
##   "   250,000 to 499,999"                                          " 11 (  2.3) "
##   "   500,000 to 999,999"                                          "  2 (  0.4) "
##   "   1 million +"                                                 "  1 (  0.2) "
##   "employment_status (%)"                                          ""
##   "   Contract, Freelance or Temporary Employee"                   "  8 (  1.5) "
##   "   Disabled"                                                    "  8 (  1.5) "
##   "   Full-time (30 or more hours per week)"                       "203 ( 38.9) "
##   "   Full-time Student"                                           " 10 (  1.9) "
##   "   Homemaker"                                                   "  2 (  0.4) "
##   "   Part-time"                                                   " 26 (  5.0) "
##   "   Part-time Student (working LESS than 30 hours per week)"     "  3 (  0.6) "
##   "   Part-time Student (working MORE than 30 hours per week)"     "  1 (  0.2) "
##   "   Retired"                                                     "190 ( 36.4) "
##   "   Self-employed"                                               " 27 (  5.2) "
##   "   Semi-retired"                                                " 12 (  2.3) "
##   "   Stay-at-Home Parent"                                         "  3 (  0.6) "
##   "   Unemployed"                                                  " 29 (  5.6) "
##   "home_ownership (%)"                                             ""
##   "   Live in student/university housing"                          "  0 (  0.0) "
##   "   Live with family member(s) in their residence"               " 19 (  3.6) "
##   "   Own"                                                         "354 ( 67.8) "
##   "   Rent"                                                        "149 ( 28.5) "
##                                                                   "Stratified by gender'
##  ""                                                               "p"
##   "n"                                                             ""
##   "region (%)"                                                    " 0.688"
##   "   Region 1: Northeast"                                        ""
```

```
##    "   Region 2: Midwest"                                  ""
##    "   Region 3: South"                                    ""
##    "   Region 4: West"                                     ""
##    "race (%)"                                              "<0.001"
##    "   African American / Black"                           ""
##    "   Asian / Asian American"                             ""
##    "   Caucasian / White"                                  ""
##    "   Native American, Inuit or Aleut"                    ""
##    "   Native Hawaiian / Pacific Islander"                 ""
##    "hispanic = Yes (%)"                                    " 0.040"
##    "education (%)"                                         "<0.001"
##    "   Medium"                                             ""
##    "   High"                                               ""
##    "   Low"                                                ""
##    "children (%)"                                          "<0.001"
##    "   1"                                                  ""
##    "   2"                                                  ""
##    "   3"                                                  ""
##    "   4"                                                  ""
##    "   5 or more"                                          ""
##    "   None"                                               ""
##    "gender = Male (%)"                                     "<0.001"
##    "agegroups (%)"                                         "<0.001"
##    "   15-19"                                              ""
##    "   20-24"                                              ""
##    "   25-29"                                              ""
##    "   30-34"                                              ""
##    "   35-39"                                              ""
##    "   40-44"                                              ""
##    "   45-49"                                              ""
##    "   50-54"                                              ""
##    "   55-59"                                              ""
##    "   60-64"                                              ""
##    "   65-69"                                              ""
##    "   70-74"                                              ""
##    "   75-79"                                              ""
##    "   80-84"                                              ""
##    "   85+"                                                ""
##    "number_in_household (%)"                               "<0.001"
##    "   1"                                                  ""
##    "   2"                                                  ""
##    "   3"                                                  ""
##    "   4"                                                  ""
##    "   5 or more"                                          ""
```

```
##   "sum_score (%)"                                                  "<0.001"
##   "   0"                                                           ""
##   "   1"                                                           ""
##   "   2"                                                           ""
##   "   3"                                                           ""
##   "   4"                                                           ""
##   "   5"                                                           ""
##   "   6"                                                           ""
##   "   7"                                                           ""
##   "household_income (%)"                                           "<0.001"
##   "   15,000 to 24,999"                                            ""
##   "   25,000 to 49,999"                                            ""
##   "   50,000 to 74,999"                                            ""
##   "   75,000 to 99,999"                                            ""
##   "   100,000 to 149,999"                                          ""
##   "   150,000 to 199,999"                                          ""
##   "   200,000 to 249,999"                                          ""
##   "   250,000 to 499,999"                                          ""
##   "   500,000 to 999,999"                                          ""
##   "   1 million +"                                                 ""
##   "employment_status (%)"                                          "<0.001"
##   "   Contract, Freelance or Temporary Employee"                   ""
##   "   Disabled"                                                    ""
##   "   Full-time (30 or more hours per week)"                       ""
##   "   Full-time Student"                                           ""
##   "   Homemaker"                                                   ""
##   "   Part-time"                                                   ""
##   "   Part-time Student (working LESS than 30 hours per week)"     ""
##   "   Part-time Student (working MORE than 30 hours per week)"     ""
##   "   Retired"                                                     ""
##   "   Self-employed"                                               ""
##   "   Semi-retired"                                                ""
##   "   Stay-at-Home Parent"                                         ""
##   "   Unemployed"                                                  ""
##   "home_ownership (%)"                                             "<0.001"
##   "   Live in student/university housing"                          ""
##   "   Live with family member(s) in their residence"               ""
##   "   Own"                                                         ""
##   "   Rent"                                                        ""
##                                                                   "Stratified by gender'
##  ""                                                                "test"
##   "n"                                                              ""
##   "region (%)"                                                     ""
##   "   Region 1: Northeast"                                         ""
```

```
##   "   Region 2: Midwest"                                  ""
##   "   Region 3: South"                                    ""
##   "   Region 4: West"                                     ""
##   "race (%)"                                              ""
##   "   African American / Black"                           ""
##   "   Asian / Asian American"                             ""
##   "   Caucasian / White"                                  ""
##   "   Native American, Inuit or Aleut"                    ""
##   "   Native Hawaiian / Pacific Islander"                 ""
##   "hispanic = Yes (%)"                                    ""
##   "education (%)"                                         ""
##   "   Medium"                                             ""
##   "   High"                                               ""
##   "   Low"                                                ""
##   "children (%)"                                          ""
##   "   1"                                                  ""
##   "   2"                                                  ""
##   "   3"                                                  ""
##   "   4"                                                  ""
##   "   5 or more"                                          ""
##   "   None"                                               ""
##   "gender = Male (%)"                                     ""
##   "agegroups (%)"                                         ""
##   "   15-19"                                              ""
##   "   20-24"                                              ""
##   "   25-29"                                              ""
##   "   30-34"                                              ""
##   "   35-39"                                              ""
##   "   40-44"                                              ""
##   "   45-49"                                              ""
##   "   50-54"                                              ""
##   "   55-59"                                              ""
##   "   60-64"                                              ""
##   "   65-69"                                              ""
##   "   70-74"                                              ""
##   "   75-79"                                              ""
##   "   80-84"                                              ""
##   "   85+"                                                ""
##   "number_in_household (%)"                               ""
##   "   1"                                                  ""
##   "   2"                                                  ""
##   "   3"                                                  ""
##   "   4"                                                  ""
##   "   5 or more"                                          ""
```

```
##   "sum_score (%)"                                                    ""
##   "   0"                                                             ""
##   "   1"                                                             ""
##   "   2"                                                             ""
##   "   3"                                                             ""
##   "   4"                                                             ""
##   "   5"                                                             ""
##   "   6"                                                             ""
##   "   7"                                                             ""
##   "household_income (%)"                                             ""
##   "   15,000 to 24,999"                                              ""
##   "   25,000 to 49,999"                                              ""
##   "   50,000 to 74,999"                                              ""
##   "   75,000 to 99,999"                                              ""
##   "   100,000 to 149,999"                                            ""
##   "   150,000 to 199,999"                                            ""
##   "   200,000 to 249,999"                                            ""
##   "   250,000 to 499,999"                                            ""
##   "   500,000 to 999,999"                                            ""
##   "   1 million +"                                                   ""
##   "employment_status (%)"                                            ""
##   "   Contract, Freelance or Temporary Employee"                     ""
##   "   Disabled"                                                      ""
##   "   Full-time (30 or more hours per week)"                         ""
##   "   Full-time Student"                                             ""
##   "   Homemaker"                                                     ""
##   "   Part-time"                                                     ""
##   "   Part-time Student (working LESS than 30 hours per week)"       ""
##   "   Part-time Student (working MORE than 30 hours per week)"       ""
##   "   Retired"                                                       ""
##   "   Self-employed"                                                 ""
##   "   Semi-retired"                                                  ""
##   "   Stay-at-Home Parent"                                           ""
##   "   Unemployed"                                                    ""
##   "home_ownership (%)"                                               ""
##   "   Live in student/university housing"                            ""
##   "   Live with family member(s) in their residence"                 ""
##   "   Own"                                                           ""
##   "   Rent"                                                          ""
```

Model construction: regression with the health status covariates