praticasprofissionais.R

hp

Fri Jul 25 18:04:38 2014

```
# Libraries ----
library(car) # Function Recode
library(psych) # Function Describe
```

```
##
## Attaching package: 'psych'
##
## The following object is masked from 'package:car':
##
##     logit
```

```
library(mirt)
```

```
## Loading required package: stats4
## Loading required package: lattice
```

```
# Import data ----

## Import dataframe
praticasPro  <- read.csv("praticasprofissionais_df.csv")

## Summing scales to remove NA's
praticasPro$scaleSum  <- rowSums(praticasPro[,32:68])
## Subset completed observations and consented participation
praticasPro  <- subset(praticasPro, subset=praticasPro$termo=="Sim" & praticasPro$estado=="Finalizadas"

# Demographics
## Age
# Demographics
## Age
### Clean data
praticasPro$idade  <- as.numeric(as.character(praticasPro$idade))
```

```
## Warning: NAs introduzidos por coerção
```

```
praticasPro$idade[praticasPro$idade < 18 | praticasPro$idade > 68 ]  <- NA


### Descriptives
summary(praticasPro$idade) # all
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##    19.0    34.0    41.0    40.8    47.0    68.0     332
```

```r
by(praticasPro$idade, praticasPro$sexo, describe) #by sex
```

```
## praticasPro$sexo: Feminino
##   vars    n  mean   sd median trimmed   mad min max range skew kurtosis
## 1    1 2335 40.86 8.76     41   40.77 10.38  19  68    49 0.08    -0.64
##     se
## 1 0.18
## ------------------------------------------------------------
## praticasPro$sexo: Masculino
##   vars   n  mean   sd median trimmed   mad min max range skew kurtosis  se
## 1    1 396 40.12 9.95     40   39.64 10.38  21  67    46 0.38    -0.59 0.5
```

```r
## Sex
cbind(round(prop.table(sort(table(praticasPro$sexo), decreasing = TRUE)),2))
```

```
##           [,1]
## Feminino  0.86
## Masculino 0.14
```

```r
## Degree
cbind(round(prop.table(sort(table(praticasPro$escolaridade), decreasing = TRUE)),2))
```

```
##                              [,1]
## Pós-graduação                0.65
## Ensino Superior Completo     0.29
## Ensino Superior Incompleto   0.05
## Ensino Médio Completo        0.01
## Ensino Fundamental Incompleto 0.00
## Ensino Médio Incompleto      0.00
## Ensino Fundamental Completo  0.00
```

```r
## Marital Staus
cbind(round(prop.table(sort(table(praticasPro$estadocivil), decreasing = TRUE)),2))
```

```
##                [,1]
## Casado (a)     0.58
## Solteiro (a)   0.22
## Divorciado (a) 0.09
## União Estável  0.07
## Outros         0.02
## Viúvo (a)      0.02
```

```r
## Education
#cbind(round(prop.table(table(praticasPro$formacao)),2)) # Broken, needs manual recoding

## Ocupação
#cbind(round(prop.table(table(praticasPro$ocupacao)),2)) # Broken, needs manual recoding

## Time  working
timeWorking  <- as.numeric(as.character(praticasPro$tempodeservico))
```

```
## Warning: NAs introduzidos por coerção
```

```
timeWorking[timeWorking > 59]  <- NA
summary(timeWorking)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##       0       5      12      13      20      48     760
```

```
## Religion
cbind(round(prop.table(sort(table(praticasPro$religiao), decreasing = TRUE)),2))
```

```
##              [,1]
## Católica     0.66
## Evangélica   0.19
## Espírita     0.08
## Sem religião 0.04
## Outras       0.02
## Umbanda      0.00
## Budismo      0.00
## Candomblé    0.00
```

```
## Contact
cbind(round(prop.table(sort(table(praticasPro$contatoanterior), decreasing = TRUE)),2))
```

```
##     [,1]
## Sim 0.63
## Não 0.37
```

```
## Deal with
cbind(round(prop.table(sort(table(praticasPro$lidadiretamente), decreasing = TRUE)),2))
```

```
##     [,1]
## Sim 0.64
## Não 0.36
```

```
## Where deal with
cbind(round(prop.table(sort(table(praticasPro$lida.onde), decreasing = TRUE)),2))
```

```
##                      [,1]
## Escola               0.35
## Família              0.23
## Comunidade           0.19
## Outros               0.13
## Amigos               0.05
## Serviços de atuação 0.04
## Serviços de saúde   0.02
```

```
# Scale analysis ---
# Full scale
fullScale  <- praticasPro[,32:68]

# descriptives
describe(fullScale)
```

```
##       vars    n mean   sd median trimmed  mad min max range  skew kurtosis
## pp001    1 3064 2.09 0.92      2    1.97 0.00   1   5     4  0.87     0.48
## pp002    2 3064 4.33 0.60      4    4.36 0.00   1   5     4 -0.76     2.35
## pp003    3 3064 4.38 0.61      4    4.41 0.00   1   5     4 -0.90     2.47
## pp004    4 3064 4.54 0.53      5    4.57 0.00   1   5     4 -0.79     1.24
## pp005    5 3064 3.88 0.88      4    3.98 0.00   1   5     4 -0.85     0.41
## pp006    6 3064 4.51 0.59      5    4.56 0.00   1   5     4 -1.25     3.15
## pp007    7 3064 4.44 0.69      5    4.52 0.00   1   5     4 -1.53     3.96
## pp008    8 3064 1.97 0.89      2    1.86 1.48   1   5     4  1.00     1.06
## pp009    9 3064 2.38 0.90      2    2.32 0.00   1   5     4  0.77     0.18
## pp010   10 3064 3.89 0.78      4    3.96 0.00   1   5     4 -1.01     1.68
## pp011   11 3064 3.53 0.96      4    3.56 0.00   1   5     4 -0.58    -0.39
## pp012   12 3064 3.54 0.91      4    3.58 0.00   1   5     4 -0.63    -0.13
## pp013   13 3064 4.08 0.70      4    4.14 0.00   1   5     4 -0.95     2.29
## pp014   14 3064 2.87 0.92      3    2.84 1.48   1   5     4  0.23    -0.86
## pp015   15 3064 3.23 1.01      3    3.25 1.48   1   5     4 -0.31    -0.68
## pp016   16 3064 3.34 0.96      4    3.36 1.48   1   5     4 -0.34    -0.64
## pp017   17 3064 4.29 0.62      4    4.33 0.00   1   5     4 -0.84     2.54
## pp018   18 3064 2.29 1.03      2    2.19 0.00   1   5     4  0.82     0.04
## pp019   19 3064 3.75 0.83      4    3.82 0.00   1   5     4 -0.82     0.65
## pp020   20 3064 3.74 0.80      4    3.79 0.00   1   5     4 -0.78     0.69
## pp021   21 3064 3.76 0.82      4    3.83 0.00   1   5     4 -0.74     0.45
## pp022   22 3064 3.59 0.92      4    3.63 0.00   1   5     4 -0.66    -0.06
## pp023   23 3064 4.21 0.65      4    4.26 0.00   1   5     4 -0.90     2.55
## pp024   24 3064 1.70 0.76      2    1.59 1.48   1   5     4  1.41     3.09
## pp025   25 3064 2.08 0.90      2    1.98 1.48   1   5     4  0.82     0.51
## pp026   26 3064 2.75 0.99      3    2.72 1.48   1   5     4  0.33    -0.63
## pp027   27 3064 3.26 0.92      3    3.29 1.48   1   5     4 -0.32    -0.61
## pp028   28 3064 1.72 0.92      2    1.53 1.48   1   5     4  1.79     3.50
## pp029   29 3064 3.88 0.76      4    3.93 0.00   1   5     4 -0.71     0.91
## pp030   30 3064 3.91 0.75      4    3.97 0.00   1   5     4 -0.78     0.98
## pp031   31 3064 3.74 0.78      4    3.77 0.00   1   5     4 -0.59     0.36
## pp032   32 3064 3.63 0.90      4    3.67 0.00   1   5     4 -0.56    -0.21
## pp033   33 3064 1.97 0.78      2    1.90 0.00   1   5     4  0.89     1.36
## pp034   34 3064 1.87 0.78      2    1.77 0.00   1   5     4  1.02     1.48
## pp035   35 3064 2.44 0.93      2    2.41 1.48   1   5     4  0.56    -0.25
## pp036   36 3064 2.34 0.91      2    2.28 0.00   1   5     4  0.74     0.10
## pp037   37 3064 4.29 0.71      4    4.37 0.00   1   5     4 -1.38     3.79
##         se
## pp001 0.02
## pp002 0.01
## pp003 0.01
## pp004 0.01
## pp005 0.02
## pp006 0.01
## pp007 0.01
## pp008 0.02
## pp009 0.02
## pp010 0.01
## pp011 0.02
## pp012 0.02
## pp013 0.01
## pp014 0.02
## pp015 0.02
```

```
## pp016 0.02
## pp017 0.01
## pp018 0.02
## pp019 0.01
## pp020 0.01
## pp021 0.01
## pp022 0.02
## pp023 0.01
## pp024 0.01
## pp025 0.02
## pp026 0.02
## pp027 0.02
## pp028 0.02
## pp029 0.01
## pp030 0.01
## pp031 0.01
## pp032 0.02
## pp033 0.01
## pp034 0.01
## pp035 0.02
## pp036 0.02
## pp037 0.01
```

```
# correlations
round(cor(fullScale, method="kendal", use="complete.obs"),2) # kendall correlation coef
```

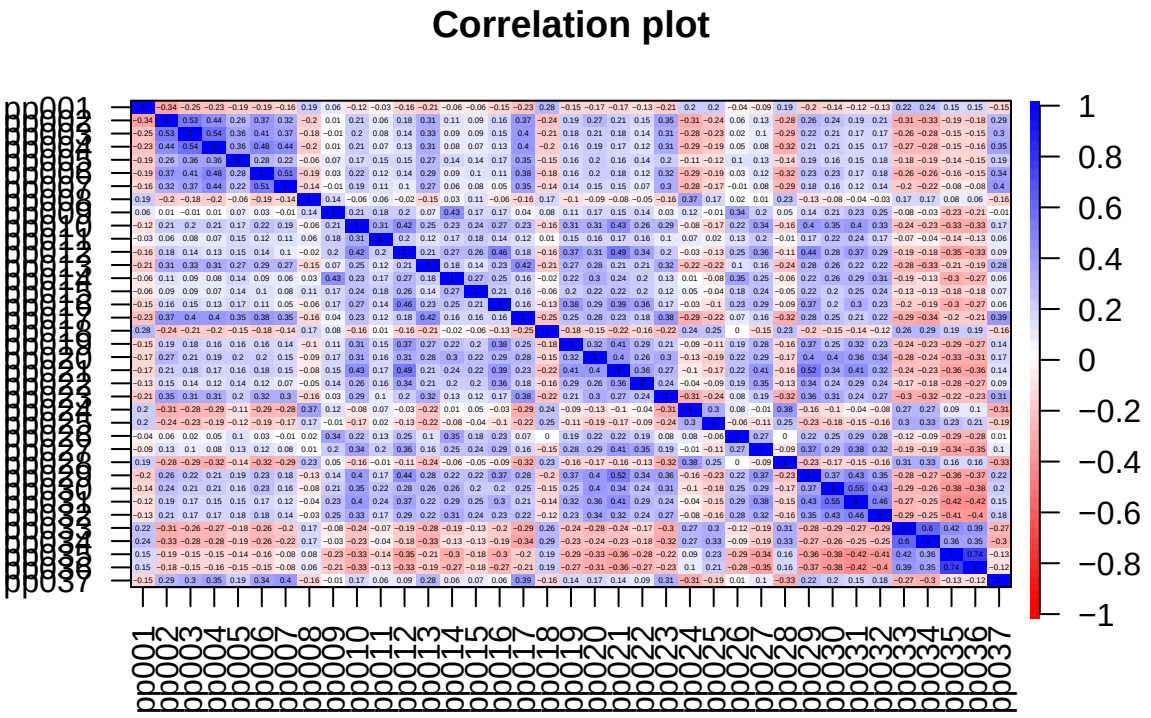
```
##       pp001 pp002 pp003 pp004 pp005 pp006 pp007 pp008 pp009 pp010 pp011
## pp001  1.00 -0.34 -0.25 -0.23 -0.19 -0.19 -0.16  0.19  0.06 -0.12 -0.03
## pp002 -0.34  1.00  0.53  0.44  0.26  0.37  0.32 -0.20  0.01  0.21  0.06
## pp003 -0.25  0.53  1.00  0.54  0.36  0.41  0.37 -0.18 -0.01  0.20  0.08
## pp004 -0.23  0.44  0.54  1.00  0.36  0.48  0.44 -0.20  0.01  0.21  0.07
## pp005 -0.19  0.26  0.36  0.36  1.00  0.28  0.22 -0.06  0.07  0.17  0.15
## pp006 -0.19  0.37  0.41  0.48  0.28  1.00  0.51 -0.19  0.03  0.22  0.12
## pp007 -0.16  0.32  0.37  0.44  0.22  0.51  1.00 -0.14 -0.01  0.19  0.11
## pp008  0.19 -0.20 -0.18 -0.20 -0.06 -0.19 -0.14  1.00  0.14 -0.06  0.06
## pp009  0.06  0.01 -0.01  0.01  0.07  0.03 -0.01  0.14  1.00  0.21  0.18
## pp010 -0.12  0.21  0.20  0.21  0.17  0.22  0.19 -0.06  0.21  1.00  0.31
## pp011 -0.03  0.06  0.08  0.07  0.15  0.12  0.11  0.06  0.18  0.31  1.00
## pp012 -0.16  0.18  0.14  0.13  0.15  0.14  0.10 -0.02  0.20  0.42  0.20
## pp013 -0.21  0.31  0.33  0.31  0.27  0.29  0.27 -0.15  0.07  0.25  0.12
## pp014 -0.06  0.11  0.09  0.08  0.14  0.09  0.06  0.03  0.43  0.23  0.17
## pp015 -0.06  0.09  0.09  0.07  0.14  0.10  0.08  0.11  0.17  0.24  0.18
## pp016 -0.15  0.16  0.15  0.13  0.17  0.11  0.05 -0.06  0.17  0.27  0.14
## pp017 -0.23  0.37  0.40  0.40  0.35  0.38  0.35 -0.16  0.04  0.23  0.12
## pp018  0.28 -0.24 -0.21 -0.20 -0.15 -0.18 -0.14  0.17  0.08 -0.16  0.01
## pp019 -0.15  0.19  0.18  0.16  0.16  0.16  0.14 -0.10  0.11  0.31  0.15
## pp020 -0.17  0.27  0.21  0.19  0.20  0.20  0.15 -0.09  0.17  0.31  0.16
## pp021 -0.17  0.21  0.18  0.17  0.16  0.18  0.15 -0.08  0.15  0.43  0.17
## pp022 -0.13  0.15  0.14  0.12  0.14  0.12  0.07 -0.05  0.14  0.26  0.16
## pp023 -0.21  0.35  0.31  0.31  0.20  0.32  0.30 -0.16  0.03  0.29  0.10
## pp024  0.20 -0.31 -0.28 -0.29 -0.11 -0.29 -0.28  0.37  0.12 -0.08  0.07
## pp025  0.20 -0.24 -0.23 -0.19 -0.12 -0.19 -0.17  0.17 -0.01 -0.17  0.02
## pp026 -0.04  0.06  0.02  0.05  0.10  0.03 -0.01  0.02  0.34  0.22  0.13
## pp027 -0.09  0.13  0.10  0.08  0.13  0.12  0.08  0.01  0.20  0.34  0.20
```

```
## pp028  0.19 -0.28 -0.29 -0.32 -0.14 -0.32 -0.29  0.23  0.05 -0.16 -0.01
## pp029 -0.20  0.26  0.22  0.21  0.19  0.23  0.18 -0.13  0.14  0.40  0.17
## pp030 -0.14  0.24  0.21  0.21  0.16  0.23  0.16 -0.08  0.21  0.35  0.22
## pp031 -0.12  0.19  0.17  0.15  0.15  0.17  0.12 -0.04  0.23  0.40  0.24
## pp032 -0.13  0.21  0.17  0.17  0.18  0.18  0.14 -0.03  0.25  0.33  0.17
## pp033  0.22 -0.31 -0.26 -0.27 -0.18 -0.26 -0.20  0.17 -0.08 -0.24 -0.07
## pp034  0.24 -0.33 -0.28 -0.28 -0.19 -0.26 -0.22  0.17 -0.03 -0.23 -0.04
## pp035  0.15 -0.19 -0.15 -0.15 -0.14 -0.16 -0.08  0.08 -0.23 -0.33 -0.14
## pp036  0.15 -0.18 -0.15 -0.16 -0.15 -0.15 -0.08  0.06 -0.21 -0.33 -0.13
## pp037 -0.15  0.29  0.30  0.35  0.19  0.34  0.40 -0.16 -0.01  0.17  0.06
##       pp012 pp013 pp014 pp015 pp016 pp017 pp018 pp019 pp020 pp021 pp022
## pp001 -0.16 -0.21 -0.06 -0.06 -0.15 -0.23  0.28 -0.15 -0.17 -0.17 -0.13
## pp002  0.18  0.31  0.11  0.09  0.16  0.37 -0.24  0.19  0.27  0.21  0.15
## pp003  0.14  0.33  0.09  0.09  0.15  0.40 -0.21  0.18  0.21  0.18  0.14
## pp004  0.13  0.31  0.08  0.07  0.13  0.40 -0.20  0.16  0.19  0.17  0.12
## pp005  0.15  0.27  0.14  0.14  0.17  0.35 -0.15  0.16  0.20  0.16  0.14
## pp006  0.14  0.29  0.09  0.10  0.11  0.38 -0.18  0.16  0.20  0.18  0.12
## pp007  0.10  0.27  0.06  0.08  0.05  0.35 -0.14  0.14  0.15  0.15  0.07
## pp008 -0.02 -0.15  0.03  0.11 -0.06 -0.16  0.17 -0.10 -0.09 -0.08 -0.05
## pp009  0.20  0.07  0.43  0.17  0.17  0.04  0.08  0.11  0.17  0.15  0.14
## pp010  0.42  0.25  0.23  0.24  0.27  0.23 -0.16  0.31  0.31  0.43  0.26
## pp011  0.20  0.12  0.17  0.18  0.14  0.12  0.01  0.15  0.16  0.17  0.16
## pp012  1.00  0.21  0.27  0.26  0.46  0.18 -0.16  0.37  0.31  0.49  0.34
## pp013  0.21  1.00  0.18  0.14  0.23  0.42 -0.21  0.27  0.28  0.21  0.21
## pp014  0.27  0.18  1.00  0.27  0.25  0.16 -0.02  0.22  0.30  0.24  0.20
## pp015  0.26  0.14  0.27  1.00  0.21  0.16 -0.06  0.20  0.22  0.22  0.20
## pp016  0.46  0.23  0.25  0.21  1.00  0.16 -0.13  0.38  0.29  0.39  0.36
## pp017  0.18  0.42  0.16  0.16  0.16  1.00 -0.25  0.25  0.28  0.23  0.18
## pp018 -0.16 -0.21 -0.02 -0.06 -0.13 -0.25  1.00 -0.18 -0.15 -0.22 -0.16
## pp019  0.37  0.27  0.22  0.20  0.38  0.25 -0.18  1.00  0.32  0.41  0.29
## pp020  0.31  0.28  0.30  0.22  0.29  0.28 -0.15  0.32  1.00  0.40  0.26
## pp021  0.49  0.21  0.24  0.22  0.39  0.23 -0.22  0.41  0.40  1.00  0.36
## pp022  0.34  0.21  0.20  0.20  0.36  0.18 -0.16  0.29  0.26  0.36  1.00
## pp023  0.20  0.32  0.13  0.12  0.17  0.38 -0.22  0.21  0.30  0.27  0.24
## pp024 -0.03 -0.22  0.01  0.05 -0.03 -0.29  0.24 -0.09 -0.13 -0.10 -0.04
## pp025 -0.13 -0.22 -0.08 -0.04 -0.10 -0.22  0.25 -0.11 -0.19 -0.17 -0.09
## pp026  0.25  0.10  0.35  0.18  0.23  0.07  0.00  0.19  0.22  0.22  0.19
## pp027  0.36  0.16  0.25  0.24  0.29  0.16 -0.15  0.28  0.29  0.41  0.35
## pp028 -0.11 -0.24 -0.06 -0.05 -0.09 -0.32  0.23 -0.16 -0.17 -0.16 -0.13
## pp029  0.44  0.28  0.22  0.22  0.37  0.28 -0.20  0.37  0.40  0.52  0.34
## pp030  0.28  0.26  0.26  0.20  0.20  0.25 -0.15  0.25  0.40  0.34  0.24
## pp031  0.37  0.22  0.29  0.25  0.30  0.21 -0.14  0.32  0.36  0.41  0.29
## pp032  0.29  0.22  0.31  0.24  0.23  0.22 -0.12  0.23  0.34  0.32  0.24
## pp033 -0.19 -0.28 -0.19 -0.13 -0.20 -0.29  0.26 -0.24 -0.28 -0.24 -0.17
## pp034 -0.18 -0.33 -0.13 -0.13 -0.19 -0.34  0.29 -0.23 -0.24 -0.23 -0.18
## pp035 -0.35 -0.21 -0.30 -0.18 -0.30 -0.20  0.19 -0.29 -0.33 -0.36 -0.28
## pp036 -0.33 -0.19 -0.27 -0.18 -0.27 -0.21  0.19 -0.27 -0.31 -0.36 -0.27
## pp037  0.09  0.28  0.06  0.07  0.06  0.39 -0.16  0.14  0.17  0.14  0.09
##       pp023 pp024 pp025 pp026 pp027 pp028 pp029 pp030 pp031 pp032 pp033
## pp001 -0.21  0.20  0.20 -0.04 -0.09  0.19 -0.20 -0.14 -0.12 -0.13  0.22
## pp002  0.35 -0.31 -0.24  0.06  0.13 -0.28  0.26  0.24  0.19  0.21 -0.31
## pp003  0.31 -0.28 -0.23  0.02  0.10 -0.29  0.22  0.21  0.17  0.17 -0.26
## pp004  0.31 -0.29 -0.19  0.05  0.08 -0.32  0.21  0.21  0.15  0.17 -0.27
## pp005  0.20 -0.11 -0.12  0.10  0.13 -0.14  0.19  0.16  0.15  0.18 -0.18
```

```
## pp006  0.32 -0.29 -0.19  0.03  0.12 -0.32  0.23  0.23  0.17  0.18 -0.26
## pp007  0.30 -0.28 -0.17 -0.01  0.08 -0.29  0.18  0.16  0.12  0.14 -0.20
## pp008 -0.16  0.37  0.17  0.02  0.01  0.23 -0.13 -0.08 -0.04 -0.03  0.17
## pp009  0.03  0.12 -0.01  0.34  0.20  0.05  0.14  0.21  0.23  0.25 -0.08
## pp010  0.29 -0.08 -0.17  0.22  0.34 -0.16  0.40  0.35  0.40  0.33 -0.24
## pp011  0.10  0.07  0.02  0.13  0.20 -0.01  0.17  0.22  0.24  0.17 -0.07
## pp012  0.20 -0.03 -0.13  0.25  0.36 -0.11  0.44  0.28  0.37  0.29 -0.19
## pp013  0.32 -0.22 -0.22  0.10  0.16 -0.24  0.28  0.26  0.22  0.22 -0.28
## pp014  0.13  0.01 -0.08  0.35  0.25 -0.06  0.22  0.26  0.29  0.31 -0.19
## pp015  0.12  0.05 -0.04  0.18  0.24 -0.05  0.22  0.20  0.25  0.24 -0.13
## pp016  0.17 -0.03 -0.10  0.23  0.29 -0.09  0.37  0.20  0.30  0.23 -0.20
## pp017  0.38 -0.29 -0.22  0.07  0.16 -0.32  0.28  0.25  0.21  0.22 -0.29
## pp018 -0.22  0.24  0.25  0.00 -0.15  0.23 -0.20 -0.15 -0.14 -0.12  0.26
## pp019  0.21 -0.09 -0.11  0.19  0.28 -0.16  0.37  0.25  0.32  0.23 -0.24
## pp020  0.30 -0.13 -0.19  0.22  0.29 -0.17  0.40  0.40  0.36  0.34 -0.28
## pp021  0.27 -0.10 -0.17  0.22  0.41 -0.16  0.52  0.34  0.41  0.32 -0.24
## pp022  0.24 -0.04 -0.09  0.19  0.35 -0.13  0.34  0.24  0.29  0.24 -0.17
## pp023  1.00 -0.31 -0.24  0.08  0.19 -0.32  0.36  0.31  0.24  0.27 -0.30
## pp024 -0.31  1.00  0.30  0.08 -0.01  0.38 -0.16 -0.10 -0.04 -0.08  0.27
## pp025 -0.24  0.30  1.00 -0.06 -0.11  0.25 -0.23 -0.18 -0.15 -0.16  0.30
## pp026  0.08  0.08 -0.06  1.00  0.27  0.00  0.22  0.25  0.29  0.28 -0.12
## pp027  0.19 -0.01 -0.11  0.27  1.00 -0.09  0.37  0.29  0.38  0.32 -0.19
## pp028 -0.32  0.38  0.25  0.00 -0.09  1.00 -0.23 -0.17 -0.15 -0.16  0.31
## pp029  0.36 -0.16 -0.23  0.22  0.37 -0.23  1.00  0.37  0.43  0.35 -0.28
## pp030  0.31 -0.10 -0.18  0.25  0.29 -0.17  0.37  1.00  0.55  0.43 -0.29
## pp031  0.24 -0.04 -0.15  0.29  0.38 -0.15  0.43  0.55  1.00  0.46 -0.27
## pp032  0.27 -0.08 -0.16  0.28  0.32 -0.16  0.35  0.43  0.46  1.00 -0.29
## pp033 -0.30  0.27  0.30 -0.12 -0.19  0.31 -0.28 -0.29 -0.27 -0.29  1.00
## pp034 -0.32  0.27  0.33 -0.09 -0.19  0.33 -0.27 -0.26 -0.25 -0.25  0.60
## pp035 -0.22  0.09  0.23 -0.29 -0.34  0.16 -0.36 -0.38 -0.42 -0.41  0.42
## pp036 -0.23  0.10  0.21 -0.28 -0.35  0.16 -0.37 -0.38 -0.42 -0.40  0.39
## pp037  0.31 -0.31 -0.19  0.01  0.10 -0.33  0.22  0.20  0.15  0.18 -0.27
##       pp034 pp035 pp036 pp037
## pp001  0.24  0.15  0.15 -0.15
## pp002 -0.33 -0.19 -0.18  0.29
## pp003 -0.28 -0.15 -0.15  0.30
## pp004 -0.28 -0.15 -0.16  0.35
## pp005 -0.19 -0.14 -0.15  0.19
## pp006 -0.26 -0.16 -0.15  0.34
## pp007 -0.22 -0.08 -0.08  0.40
## pp008  0.17  0.08  0.06 -0.16
## pp009 -0.03 -0.23 -0.21 -0.01
## pp010 -0.23 -0.33 -0.33  0.17
## pp011 -0.04 -0.14 -0.13  0.06
## pp012 -0.18 -0.35 -0.33  0.09
## pp013 -0.33 -0.21 -0.19  0.28
## pp014 -0.13 -0.30 -0.27  0.06
## pp015 -0.13 -0.18 -0.18  0.07
## pp016 -0.19 -0.30 -0.27  0.06
## pp017 -0.34 -0.20 -0.21  0.39
## pp018  0.29  0.19  0.19 -0.16
## pp019 -0.23 -0.29 -0.27  0.14
## pp020 -0.24 -0.33 -0.31  0.17
## pp021 -0.23 -0.36 -0.36  0.14
```

```
## pp022 -0.18 -0.28 -0.27  0.09
## pp023 -0.32 -0.22 -0.23  0.31
## pp024  0.27  0.09  0.10 -0.31
## pp025  0.33  0.23  0.21 -0.19
## pp026 -0.09 -0.29 -0.28  0.01
## pp027 -0.19 -0.34 -0.35  0.10
## pp028  0.33  0.16  0.16 -0.33
## pp029 -0.27 -0.36 -0.37  0.22
## pp030 -0.26 -0.38 -0.38  0.20
## pp031 -0.25 -0.42 -0.42  0.15
## pp032 -0.25 -0.41 -0.40  0.18
## pp033  0.60  0.42  0.39 -0.27
## pp034  1.00  0.36  0.35 -0.30
## pp035  0.36  1.00  0.74 -0.13
## pp036  0.35  0.74  1.00 -0.12
## pp037 -0.30 -0.13 -0.12  1.00
```

```
cor.plot(cor(fullScale, method="kendal", use="complete.obs"), numbers= TRUE)
```




```
# alpha
cronbach  <- alpha(fullScale)
```

```
## Warning: Some items were negatively correlated with total scale and were
## automatically reversed.
```

```
cronbach
```

```
##
## Reliability analysis
```

```
## Call: alpha(x = fullScale)
##
##   raw_alpha std.alpha G6(smc) average_r S/N    ase mean   sd
##        0.9       0.9    0.92       0.2 9.2 0.0033  3.8 0.38
##
##  lower alpha upper     95% confidence boundaries
## 0.89 0.9 0.9
##
##  Reliability if an item is dropped:
##        raw_alpha std.alpha G6(smc) average_r S/N alpha se
## pp001-      0.90       0.9    0.92      0.20 9.1   0.0034
## pp002       0.90       0.9    0.92      0.20 8.9   0.0034
## pp003       0.90       0.9    0.92      0.20 9.0   0.0034
## pp004       0.90       0.9    0.92      0.20 9.0   0.0034
## pp005       0.90       0.9    0.92      0.20 9.1   0.0034
## pp006       0.90       0.9    0.92      0.20 9.0   0.0034
## pp007       0.90       0.9    0.92      0.20 9.1   0.0034
## pp008-      0.90       0.9    0.92      0.21 9.4   0.0033
## pp009       0.90       0.9    0.92      0.20 9.2   0.0034
## pp010       0.89       0.9    0.92      0.20 8.8   0.0035
## pp011       0.90       0.9    0.92      0.20 9.3   0.0033
## pp012       0.89       0.9    0.92      0.20 8.8   0.0035
## pp013       0.89       0.9    0.92      0.20 8.9   0.0034
## pp014       0.89       0.9    0.92      0.20 9.0   0.0034
## pp015       0.90       0.9    0.92      0.20 9.1   0.0034
## pp016       0.89       0.9    0.92      0.20 8.9   0.0035
## pp017       0.89       0.9    0.92      0.20 8.9   0.0034
## pp018-      0.90       0.9    0.92      0.20 9.2   0.0034
## pp019       0.89       0.9    0.92      0.20 8.9   0.0034
## pp020       0.89       0.9    0.92      0.20 8.8   0.0035
## pp021       0.89       0.9    0.92      0.20 8.7   0.0035
## pp022       0.89       0.9    0.92      0.20 8.9   0.0034
## pp023       0.89       0.9    0.92      0.20 8.9   0.0034
## pp024-      0.90       0.9    0.92      0.21 9.3   0.0033
## pp025-      0.90       0.9    0.92      0.20 9.1   0.0034
## pp026       0.90       0.9    0.92      0.20 9.1   0.0034
## pp027       0.89       0.9    0.92      0.20 8.9   0.0035
## pp028-      0.90       0.9    0.92      0.20 9.2   0.0033
## pp029       0.89       0.9    0.92      0.19 8.7   0.0035
## pp030       0.89       0.9    0.92      0.20 8.8   0.0035
## pp031       0.89       0.9    0.92      0.20 8.7   0.0035
## pp032       0.89       0.9    0.92      0.20 8.8   0.0035
## pp033-      0.89       0.9    0.92      0.20 8.8   0.0035
## pp034-      0.89       0.9    0.92      0.20 8.9   0.0034
## pp035-      0.89       0.9    0.91      0.20 8.7   0.0035
## pp036-      0.89       0.9    0.92      0.20 8.8   0.0035
## pp037       0.90       0.9    0.92      0.20 9.1   0.0034
##
##  Item statistics
##            n    r r.cor r.drop mean   sd
## pp001- 3064 0.37  0.34   0.31  3.9 0.92
## pp002  3064 0.50  0.48   0.43  4.3 0.60
## pp003  3064 0.48  0.46   0.40  4.4 0.61
## pp004  3064 0.48  0.46   0.40  4.5 0.53
```

```
## pp005  3064 0.41  0.38   0.34  3.9 0.88
## pp006  3064 0.44  0.42   0.37  4.5 0.59
## pp007  3064 0.35  0.32   0.28  4.4 0.69
## pp008- 3064 0.20  0.16   0.12  4.0 0.89
## pp009  3064 0.33  0.30   0.29  2.4 0.90
## pp010  3064 0.56  0.55   0.53  3.9 0.78
## pp011  3064 0.29  0.25   0.24  3.5 0.96
## pp012  3064 0.57  0.56   0.55  3.5 0.91
## pp013  3064 0.50  0.48   0.44  4.1 0.70
## pp014  3064 0.48  0.46   0.45  2.9 0.92
## pp015  3064 0.37  0.34   0.33  3.2 1.01
## pp016  3064 0.52  0.51   0.49  3.3 0.96
## pp017  3064 0.54  0.52   0.48  4.3 0.62
## pp018- 3064 0.35  0.31   0.29  3.7 1.03
## pp019  3064 0.51  0.50   0.48  3.7 0.83
## pp020  3064 0.59  0.58   0.56  3.7 0.80
## pp021  3064 0.61  0.61   0.59  3.8 0.82
## pp022  3064 0.49  0.47   0.46  3.6 0.92
## pp023  3064 0.51  0.49   0.45  4.2 0.65
## pp024- 3064 0.26  0.22   0.18  4.3 0.76
## pp025- 3064 0.38  0.35   0.32  3.9 0.90
## pp026  3064 0.41  0.38   0.38  2.7 0.99
## pp027  3064 0.54  0.52   0.51  3.3 0.92
## pp028- 3064 0.31  0.27   0.24  4.3 0.92
## pp029  3064 0.65  0.64   0.62  3.9 0.76
## pp030  3064 0.59  0.58   0.55  3.9 0.75
## pp031  3064 0.62  0.61   0.59  3.7 0.78
## pp032  3064 0.57  0.56   0.54  3.6 0.90
## pp033- 3064 0.55  0.53   0.50  4.0 0.78
## pp034- 3064 0.53  0.52   0.48  4.1 0.78
## pp035- 3064 0.61  0.62   0.59  3.6 0.93
## pp036- 3064 0.59  0.59   0.57  3.7 0.91
## pp037  3064 0.36  0.33   0.29  4.3 0.71
##
## Non missing response frequency for each item
##          1    2    3    4    5 miss
## pp001 0.26 0.51 0.14 0.09 0.01    0
## pp002 0.00 0.01 0.03 0.57 0.39    0
## pp003 0.00 0.01 0.03 0.53 0.43    0
## pp004 0.00 0.00 0.01 0.43 0.56    0
## pp005 0.00 0.10 0.11 0.56 0.21    0
## pp006 0.00 0.01 0.02 0.42 0.55    0
## pp007 0.01 0.02 0.03 0.44 0.51    0
## pp008 0.31 0.49 0.13 0.06 0.01    0
## pp009 0.11 0.56 0.19 0.13 0.02    0
## pp010 0.01 0.06 0.13 0.63 0.17    0
## pp011 0.02 0.17 0.19 0.51 0.11    0
## pp012 0.02 0.14 0.22 0.52 0.10    0
## pp013 0.00 0.03 0.09 0.64 0.24    0
## pp014 0.03 0.38 0.30 0.26 0.03    0
## pp015 0.04 0.22 0.27 0.39 0.07    0
## pp016 0.02 0.20 0.26 0.43 0.08    0
## pp017 0.00 0.01 0.04 0.58 0.36    0
## pp018 0.20 0.51 0.13 0.13 0.03    0
```

```
## pp019 0.01 0.09 0.18 0.59 0.13    0
## pp020 0.01 0.08 0.20 0.59 0.12    0
## pp021 0.01 0.09 0.18 0.58 0.14    0
## pp022 0.02 0.14 0.20 0.53 0.11    0
## pp023 0.00 0.02 0.06 0.61 0.31    0
## pp024 0.43 0.48 0.05 0.03 0.01    0
## pp025 0.26 0.50 0.16 0.07 0.01    0
## pp026 0.07 0.40 0.28 0.21 0.04    0
## pp027 0.02 0.21 0.31 0.41 0.05    0
## pp028 0.48 0.43 0.03 0.04 0.03    0
## pp029 0.00 0.05 0.18 0.59 0.18    0
## pp030 0.00 0.06 0.15 0.61 0.18    0
## pp031 0.00 0.07 0.23 0.56 0.13    0
## pp032 0.01 0.13 0.21 0.52 0.13    0
## pp033 0.26 0.56 0.13 0.04 0.01    0
## pp034 0.32 0.54 0.09 0.04 0.00    0
## pp035 0.12 0.50 0.22 0.15 0.02    0
## pp036 0.13 0.55 0.17 0.13 0.01    0
## pp037 0.01 0.02 0.04 0.53 0.40    0
```

```
# EFA ----

## All items ----

## KMO
KMO(fullScale)
```

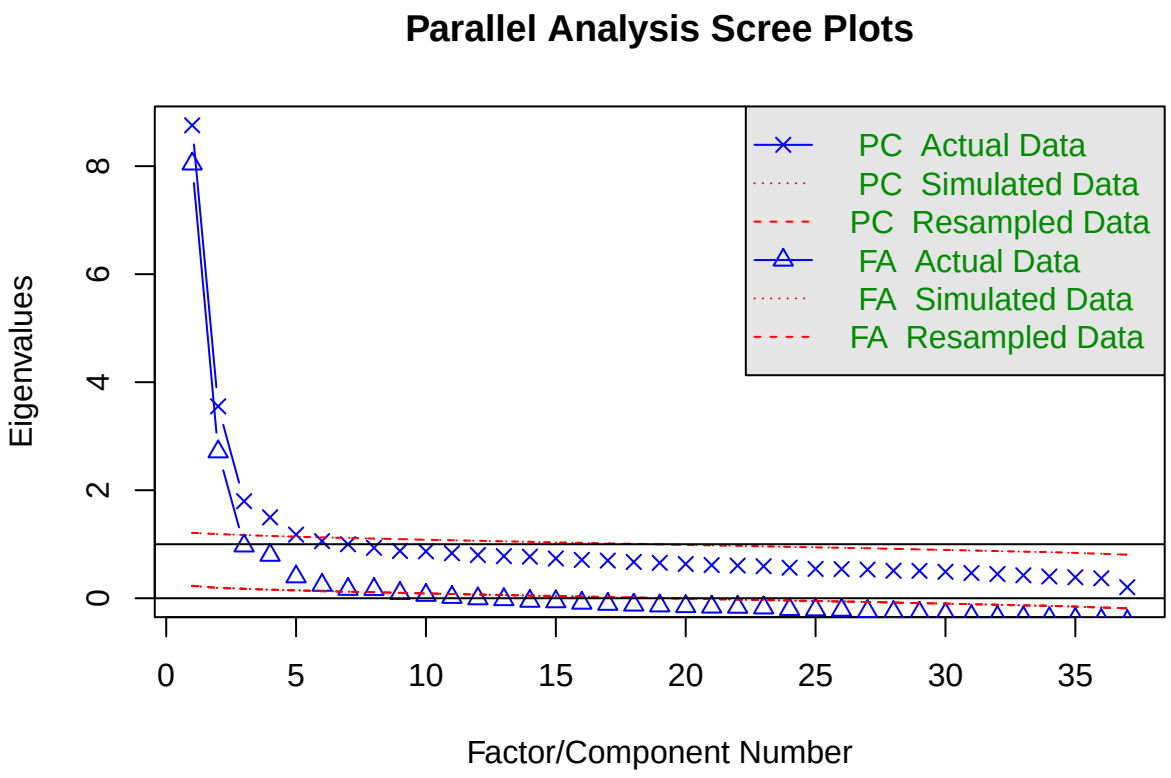
```
## Kaiser-Meyer-Olkin factor adequacy
## Call: KMO(r = fullScale)
## Overall MSA =  0.93
## MSA for each item =
## pp001 pp002 pp003 pp004 pp005 pp006 pp007 pp008 pp009 pp010 pp011 pp012
##  0.93  0.93  0.92  0.93  0.92  0.93  0.91  0.81  0.88  0.95  0.89  0.95
## pp013 pp014 pp015 pp016 pp017 pp018 pp019 pp020 pp021 pp022 pp023 pp024
##  0.96  0.92  0.95  0.94  0.95  0.92  0.96  0.97  0.95  0.96  0.96  0.86
## pp025 pp026 pp027 pp028 pp029 pp030 pp031 pp032 pp033 pp034 pp035 pp036
##  0.94  0.95  0.97  0.94  0.97  0.94  0.95  0.97  0.91  0.91  0.88  0.88
## pp037
##  0.93
```

```
# Barlett test of homogeneity
bartlett.test(fullScale)
```

```
##
##  Bartlett test of homogeneity of variances
##
## data:  fullScale
## Bartlett's K-squared = 5723, df = 36, p-value < 2.2e-16
```

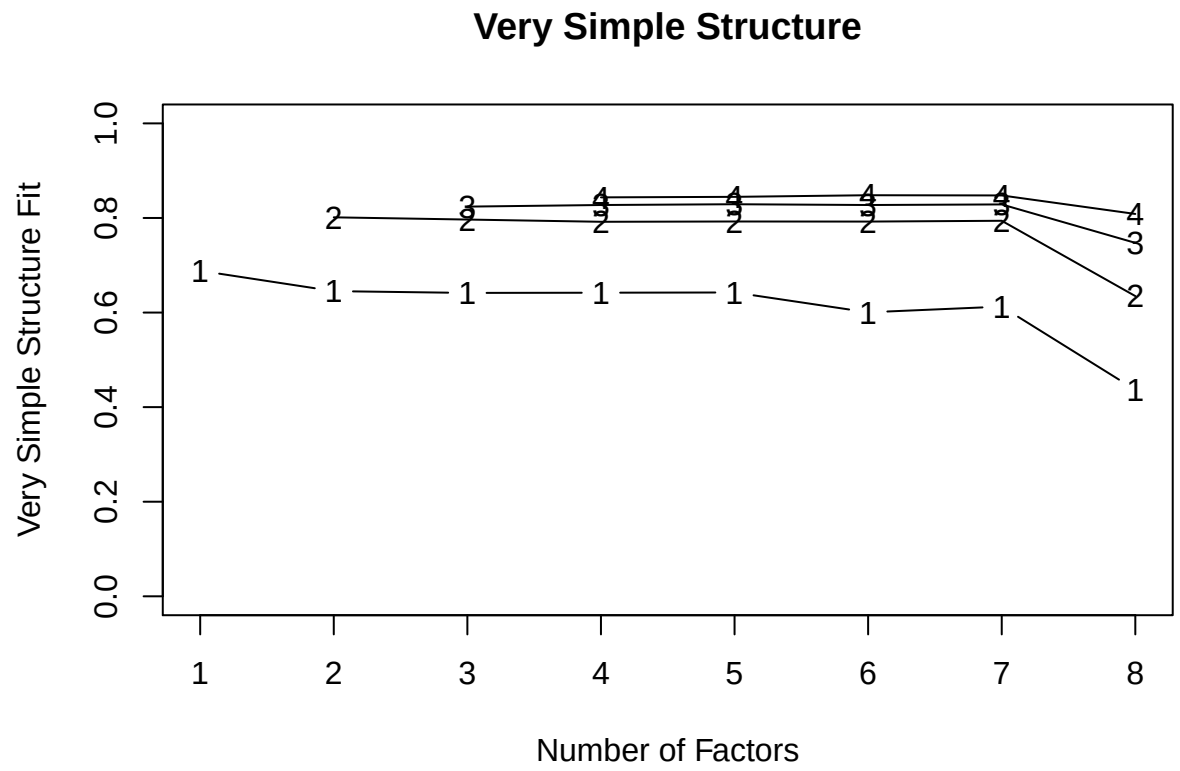
```
# Defining factors
fa.parallel(fullScale, fm="minres", fa="both", ylabel="Eigenvalues") # yields 4 components and 4 factor
```

```
## Loading required package: parallel
## Loading required package: MASS
```




```
## Parallel analysis suggests that the number of factors =  8  and the number of components =  5
```

```
VSS(fullScale, rotate="none") # VSS = 2; MAP = 4 factors
```



```
##
## Very Simple Structure
## Call: vss(x = x, n = n, rotate = rotate, diagonal = diagonal, fm = fm,
##     n.obs = n.obs, plot = plot, title = title)
## VSS complexity 1 achieves a maximimum of 0.69  with  1  factors
## VSS complexity 2 achieves a maximimum of 0.8  with  2  factors
##
## The Velicer MAP achieves a minimum of 0.01  with  4  factors
## BIC achieves a minimum of  -1706  with  7  factors
## Sample Size adjusted BIC achieves a minimum of  -346.1  with  7  factors
##
## Statistics by number of factors
##   vss1 vss2    map dof chisq     prob sqresid  fit RMSEA   BIC SABIC
## 1 0.69 0.00 0.0143 629 14478  0.0e+00      34 0.69 0.085  9428 11427
## 2 0.65 0.80 0.0072 593  8101  0.0e+00      22 0.80 0.064  3340  5224
## 3 0.64 0.80 0.0068 558  5610  0.0e+00      19 0.82 0.055  1131  2904
## 4 0.64 0.79 0.0064 524  3887  0.0e+00      17 0.84 0.046  -319  1346
## 5 0.64 0.79 0.0070 491  3089  0.0e+00      16 0.85 0.042  -852   708
## 6 0.60 0.79 0.0079 459  2252 8.6e-234      16 0.86 0.036 -1432    26
## 7 0.61 0.79 0.0087 428  1730 1.2e-155      15 0.87 0.032 -1706  -346
## 8 0.44 0.63 0.0096 398  1697 1.5e-159      15 0.87 0.033 -1498  -233
##   complex eChisq  eRMS eCRMS  eBIC
## 1     1.0  33627 0.091 0.093 28578
## 2     1.5   9541 0.048 0.051  4781
## 3     1.8   6187 0.039 0.043  1708
## 4     2.0   3475 0.029 0.033  -732
## 5     2.2   2662 0.026 0.030 -1279
## 6     2.3   2052 0.022 0.027 -1633
## 7     2.5   1516 0.019 0.024 -1919
## 8     3.7   1509 0.019 0.025 -1686
```

```
# Factor Analysis using polychoric correlations
faAll <- fa.poly(fullScale, nfactors = 2, rotate = "oblimin", fm="minres")
```

```
## Loading required package: mvtnorm
## Loading required package: GPArotation
```

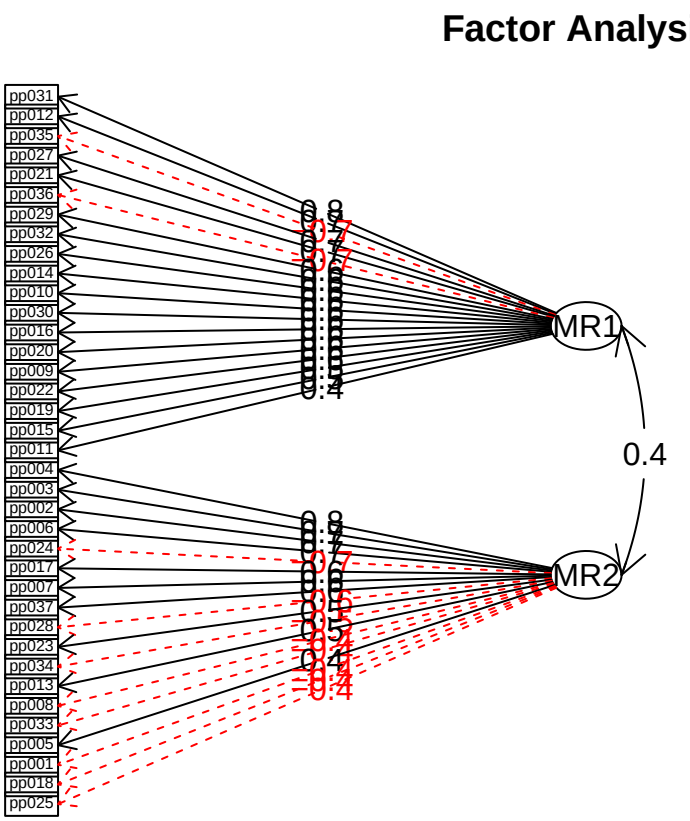
```
faAll$fa
```

```
## Factor Analysis using method =  minres
## Call: fa.poly(x = fullScale, nfactors = 2, rotate = "oblimin", fm = "minres")
## Standardized loadings (pattern matrix) based upon correlation matrix
##         MR1   MR2   h2   u2 com
## pp001 -0.07 -0.42 0.20 0.80 1.1
## pp002  0.07  0.68 0.51 0.49 1.0
## pp003 -0.01  0.73 0.53 0.47 1.0
## pp004 -0.02  0.77 0.58 0.42 1.0
## pp005  0.13  0.42 0.24 0.76 1.2
## pp006  0.03  0.68 0.47 0.53 1.0
## pp007 -0.06  0.64 0.38 0.62 1.0
## pp008  0.14 -0.45 0.17 0.83 1.2
## pp009  0.57 -0.28 0.27 0.73 1.4
## pp010  0.62  0.11 0.45 0.55 1.1
```

```
## pp011  0.39 -0.05 0.14 0.86 1.0
## pp012  0.71 -0.03 0.49 0.51 1.0
## pp013  0.22  0.49 0.37 0.63 1.4
## pp014  0.63 -0.11 0.35 0.65 1.1
## pp015  0.47 -0.06 0.20 0.80 1.0
## pp016  0.61  0.00 0.37 0.63 1.0
## pp017  0.14  0.64 0.50 0.50 1.1
## pp018 -0.08 -0.40 0.19 0.81 1.1
## pp019  0.53  0.13 0.35 0.65 1.1
## pp020  0.58  0.18 0.44 0.56 1.2
## pp021  0.70  0.07 0.54 0.46 1.0
## pp022  0.56  0.03 0.33 0.67 1.0
## pp023  0.23  0.51 0.41 0.59 1.4
## pp024  0.22 -0.67 0.38 0.62 1.2
## pp025 -0.11 -0.40 0.21 0.79 1.1
## pp026  0.63 -0.22 0.33 0.67 1.2
## pp027  0.70 -0.08 0.45 0.55 1.0
## pp028  0.01 -0.57 0.32 0.68 1.0
## pp029  0.64  0.18 0.54 0.46 1.2
## pp030  0.61  0.15 0.47 0.53 1.1
## pp031  0.75  0.01 0.57 0.43 1.0
## pp032  0.64  0.07 0.45 0.55 1.0
## pp033 -0.30 -0.43 0.38 0.62 1.8
## pp034 -0.24 -0.49 0.40 0.60 1.5
## pp035 -0.71 -0.04 0.52 0.48 1.0
## pp036 -0.69 -0.04 0.50 0.50 1.0
## pp037 -0.02  0.60 0.35 0.65 1.0
##
##                        MR1  MR2
## SS loadings           8.04 6.33
## Proportion Var        0.22 0.17
## Cumulative Var        0.22 0.39
## Proportion Explained  0.56 0.44
## Cumulative Proportion 0.56 1.00
##
##  With factor correlations of
##     MR1 MR2
## MR1 1.0 0.4
## MR2 0.4 1.0
##
## Mean item complexity =  1.1
## Test of the hypothesis that 2 factors are sufficient.
##
## The degrees of freedom for the null model are  666  and the objective function was  18.31 with Chi S
## The degrees of freedom for the model are 593  and the objective function was  4.44
##
## The root mean square of the residuals (RMSR) is  0.06
## The df corrected root mean square of the residuals is  0.06
##
## The harmonic number of observations is  3064 with the empirical chi square  12413  with prob <  0
## The total number of observations was  3064  with MLE Chi Square =  13522  with prob <  0
##
## Tucker Lewis Index of factoring reliability =  0.737
## RMSEA index =  0.085  and the 90 % confidence intervals are  NA NA
```

```
## BIC =  8761
## Fit based upon off diagonal values = 0.97
## Measures of factor score adequacy
##                                                  MR1  MR2
## Correlation of scores with factors              0.97 0.96
## Multiple R square of scores with factors        0.93 0.92
## Minimum correlation of possible factor scores   0.87 0.83
```

```
# Diagram
fa.diagram(faAll)
```



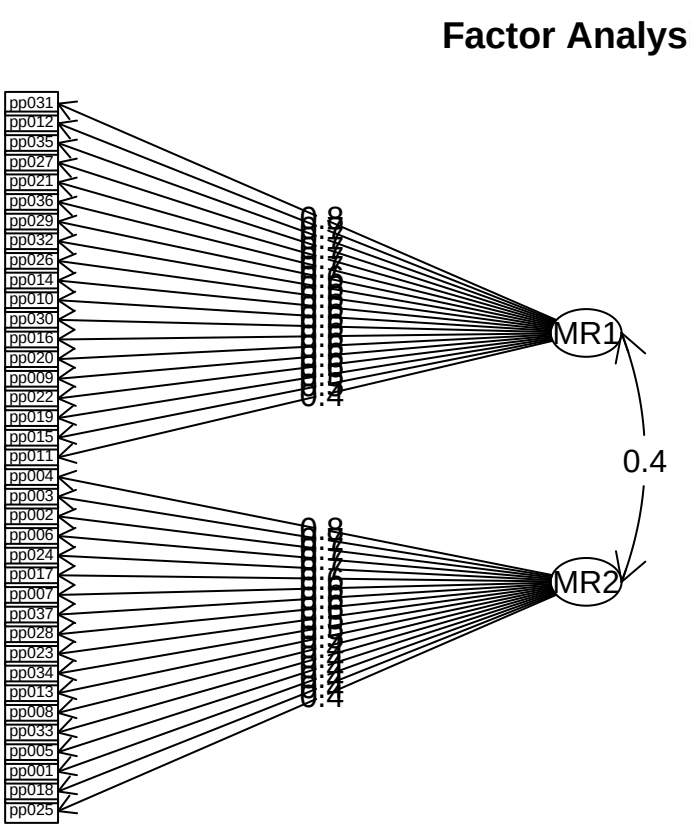

```
# Items per factor #
# MR1   : 9,10,11,12,14,15,16,19,20,21,22,26,27,29,30,31,32,-35,-36
# MR2   : -1,2,3,4,5,6,7,-8,13,17,-18,23,-24,-25,-28,-33,-34,37

# Recode negative items
for (i in c(1,8,18,24,25,28,33,34,35,36)){
  fullScale[,i]   <-  Recode(fullScale[,i], "5=1 ; 4=2 ; 3 = 3; 2 = 4; 1 = 5; else = NA")
}

# Factor Analysis using polychoric correlations
faAll <- fa.poly(fullScale, nfactors = 2, rotate = "oblimin", fm="minres")
faAll$fa
```

```
## Factor Analysis using method =  minres
## Call: fa.poly(x = fullScale, nfactors = 2, rotate = "oblimin", fm = "minres")
## Standardized loadings (pattern matrix) based upon correlation matrix
```

```
##          MR1   MR2   h2   u2 com
## pp001  0.07  0.42 0.20 0.80 1.1
## pp002  0.07  0.68 0.51 0.49 1.0
## pp003 -0.01  0.73 0.53 0.47 1.0
## pp004 -0.02  0.77 0.58 0.42 1.0
## pp005  0.13  0.42 0.24 0.76 1.2
## pp006  0.03  0.68 0.47 0.53 1.0
## pp007 -0.06  0.64 0.38 0.62 1.0
## pp008 -0.14  0.45 0.17 0.83 1.2
## pp009  0.57 -0.28 0.27 0.73 1.4
## pp010  0.62  0.11 0.45 0.55 1.1
## pp011  0.39 -0.05 0.14 0.86 1.0
## pp012  0.71 -0.03 0.49 0.51 1.0
## pp013  0.22  0.49 0.37 0.63 1.4
## pp014  0.63 -0.11 0.35 0.65 1.1
## pp015  0.47 -0.06 0.20 0.80 1.0
## pp016  0.61  0.00 0.37 0.63 1.0
## pp017  0.14  0.64 0.50 0.50 1.1
## pp018  0.08  0.40 0.19 0.81 1.1
## pp019  0.53  0.13 0.35 0.65 1.1
## pp020  0.58  0.18 0.44 0.56 1.2
## pp021  0.70  0.07 0.54 0.46 1.0
## pp022  0.56  0.03 0.33 0.67 1.0
## pp023  0.23  0.51 0.41 0.59 1.4
## pp024 -0.22  0.67 0.38 0.62 1.2
## pp025  0.11  0.40 0.21 0.79 1.1
## pp026  0.63 -0.22 0.33 0.67 1.2
## pp027  0.70 -0.08 0.45 0.55 1.0
## pp028 -0.01  0.57 0.32 0.68 1.0
## pp029  0.64  0.18 0.54 0.46 1.2
## pp030  0.61  0.15 0.47 0.53 1.1
## pp031  0.75  0.01 0.57 0.43 1.0
## pp032  0.64  0.07 0.45 0.55 1.0
## pp033  0.30  0.43 0.38 0.62 1.8
## pp034  0.24  0.49 0.40 0.60 1.5
## pp035  0.71  0.04 0.52 0.48 1.0
## pp036  0.69  0.04 0.50 0.50 1.0
## pp037 -0.02  0.60 0.35 0.65 1.0
##
##                        MR1  MR2
## SS loadings           8.04 6.33
## Proportion Var        0.22 0.17
## Cumulative Var        0.22 0.39
## Proportion Explained  0.56 0.44
## Cumulative Proportion 0.56 1.00
##
##  With factor correlations of
##     MR1 MR2
## MR1 1.0 0.4
## MR2 0.4 1.0
##
## Mean item complexity =  1.1
## Test of the hypothesis that 2 factors are sufficient.
##
```

```
## The degrees of freedom for the null model are  666  and the objective function was  18.31 with Chi Sq
## The degrees of freedom for the model are 593  and the objective function was  4.44
##
## The root mean square of the residuals (RMSR) is  0.06
## The df corrected root mean square of the residuals is  0.06
##
## The harmonic number of observations is  3064 with the empirical chi square  12413  with prob <  0
## The total number of observations was  3064  with MLE Chi Square =  13522  with prob <  0
##
## Tucker Lewis Index of factoring reliability =  0.737
## RMSEA index =  0.085  and the 90 % confidence intervals are  NA NA
## BIC =  8761
## Fit based upon off diagonal values = 0.97
## Measures of factor score adequacy
##                                                 MR1  MR2
## Correlation of scores with factors             0.97 0.96
## Multiple R square of scores with factors       0.93 0.92
## Minimum correlation of possible factor scores  0.87 0.83
```

```
# Diagram
fa.diagram(faAll)
```




```
# CFA ---- Not implemented yet.
### Exploratory factor analysis
### Bifactor Model
library(mirt)
factors  <- c(2,2,2,2,2,2,2,2,1,1,1,1,2,1,1,1,2,2,1,1,1,1,2,2,2,1,1,2,1,1,1,1,2,2,1,1,2) # based on efa
mbi  <- bfactor(fullScale, factors)
```

```
##
Iteration: 1, Log-Lik: -124030.267, Max-Change: 1.77019
Iteration: 2, Log-Lik: -114821.619, Max-Change: 1.23004
Iteration: 3, Log-Lik: -112193.763, Max-Change: 0.56287
Iteration: 4, Log-Lik: -111300.639, Max-Change: 0.49095
Iteration: 5, Log-Lik: -110830.941, Max-Change: 0.36259
Iteration: 6, Log-Lik: -110536.129, Max-Change: 0.32780
Iteration: 7, Log-Lik: -110340.940, Max-Change: 0.21344
Iteration: 8, Log-Lik: -110204.821, Max-Change: 0.24576
Iteration: 9, Log-Lik: -110102.802, Max-Change: 0.30879
Iteration: 10, Log-Lik: -109918.375, Max-Change: 0.14050
Iteration: 11, Log-Lik: -109833.746, Max-Change: 0.09365
Iteration: 12, Log-Lik: -109791.187, Max-Change: 0.07194
Iteration: 13, Log-Lik: -109763.134, Max-Change: 0.06386
Iteration: 14, Log-Lik: -109742.815, Max-Change: 0.05942
Iteration: 15, Log-Lik: -109726.998, Max-Change: 0.05680
Iteration: 16, Log-Lik: -109713.816, Max-Change: 0.05408
Iteration: 17, Log-Lik: -109702.531, Max-Change: 0.05196
Iteration: 18, Log-Lik: -109692.680, Max-Change: 0.05268
Iteration: 19, Log-Lik: -109684.126, Max-Change: 0.05363
Iteration: 20, Log-Lik: -109676.648, Max-Change: 0.05430
Iteration: 21, Log-Lik: -109670.318, Max-Change: 0.05181
Iteration: 22, Log-Lik: -109664.892, Max-Change: 0.05034
Iteration: 23, Log-Lik: -109660.333, Max-Change: 0.04634
Iteration: 24, Log-Lik: -109656.549, Max-Change: 0.26622
Iteration: 25, Log-Lik: -109642.881, Max-Change: 0.01905
Iteration: 26, Log-Lik: -109642.092, Max-Change: 0.01285
Iteration: 27, Log-Lik: -109641.443, Max-Change: 0.07145
Iteration: 28, Log-Lik: -109638.643, Max-Change: 0.00725
Iteration: 29, Log-Lik: -109638.359, Max-Change: 0.00616
Iteration: 30, Log-Lik: -109638.085, Max-Change: 0.02422
Iteration: 31, Log-Lik: -109637.139, Max-Change: 0.01199
Iteration: 32, Log-Lik: -109636.925, Max-Change: 0.00592
Iteration: 33, Log-Lik: -109636.737, Max-Change: 0.01487
Iteration: 34, Log-Lik: -109636.426, Max-Change: 0.00579
Iteration: 35, Log-Lik: -109636.263, Max-Change: 0.00507
Iteration: 36, Log-Lik: -109636.117, Max-Change: 0.03024
Iteration: 37, Log-Lik: -109635.358, Max-Change: 0.01161
Iteration: 38, Log-Lik: -109635.244, Max-Change: 0.00395
Iteration: 39, Log-Lik: -109635.140, Max-Change: 0.01859
Iteration: 40, Log-Lik: -109634.751, Max-Change: 0.01044
Iteration: 41, Log-Lik: -109634.650, Max-Change: 0.00395
Iteration: 42, Log-Lik: -109634.580, Max-Change: 0.01747
Iteration: 43, Log-Lik: -109634.269, Max-Change: 0.00292
Iteration: 44, Log-Lik: -109634.221, Max-Change: 0.00302
Iteration: 45, Log-Lik: -109634.177, Max-Change: 0.01727
Iteration: 46, Log-Lik: -109633.940, Max-Change: 0.00464
Iteration: 47, Log-Lik: -109633.905, Max-Change: 0.00236
Iteration: 48, Log-Lik: -109633.875, Max-Change: 0.01453
Iteration: 49, Log-Lik: -109633.712, Max-Change: 0.00521
Iteration: 50, Log-Lik: -109633.684, Max-Change: 0.00189
Iteration: 51, Log-Lik: -109633.663, Max-Change: 0.00718
```

```
Iteration: 52, Log-Lik: -109633.600, Max-Change: 0.00239
Iteration: 53, Log-Lik: -109633.583, Max-Change: 0.00180
Iteration: 54, Log-Lik: -109633.569, Max-Change: 0.01039
Iteration: 55, Log-Lik: -109633.491, Max-Change: 0.00130
Iteration: 56, Log-Lik: -109633.483, Max-Change: 0.00136
Iteration: 57, Log-Lik: -109633.475, Max-Change: 0.00812
Iteration: 58, Log-Lik: -109633.428, Max-Change: 0.00112
Iteration: 59, Log-Lik: -109633.423, Max-Change: 0.00109
Iteration: 60, Log-Lik: -109633.417, Max-Change: 0.00614
Iteration: 61, Log-Lik: -109633.390, Max-Change: 0.00087
Iteration: 62, Log-Lik: -109633.388, Max-Change: 0.00110
Iteration: 63, Log-Lik: -109633.386, Max-Change: 0.00112
Iteration: 64, Log-Lik: -109633.384, Max-Change: 0.00117
Iteration: 65, Log-Lik: -109633.382, Max-Change: 0.00146
Iteration: 66, Log-Lik: -109633.380, Max-Change: 0.00129
Iteration: 67, Log-Lik: -109633.378, Max-Change: 0.00106
Iteration: 68, Log-Lik: -109633.376, Max-Change: 0.00134
Iteration: 69, Log-Lik: -109633.375, Max-Change: 0.00118
Iteration: 70, Log-Lik: -109633.373, Max-Change: 0.00100
Iteration: 71, Log-Lik: -109633.372, Max-Change: 0.00125
Iteration: 72, Log-Lik: -109633.370, Max-Change: 0.00112
Iteration: 73, Log-Lik: -109633.369, Max-Change: 0.00094
Iteration: 74, Log-Lik: -109633.367, Max-Change: 0.00119
Iteration: 75, Log-Lik: -109633.366, Max-Change: 0.00105
Iteration: 76, Log-Lik: -109633.365, Max-Change: 0.00089
Iteration: 77, Log-Lik: -109633.364, Max-Change: 0.00111
Iteration: 78, Log-Lik: -109633.362, Max-Change: 0.00099
Iteration: 79, Log-Lik: -109633.361, Max-Change: 0.00083
Iteration: 80, Log-Lik: -109633.360, Max-Change: 0.00106
Iteration: 81, Log-Lik: -109633.359, Max-Change: 0.00093
Iteration: 82, Log-Lik: -109633.358, Max-Change: 0.00079
Iteration: 83, Log-Lik: -109633.357, Max-Change: 0.00099
Iteration: 84, Log-Lik: -109633.356, Max-Change: 0.00089
Iteration: 85, Log-Lik: -109633.356, Max-Change: 0.00074
Iteration: 86, Log-Lik: -109633.355, Max-Change: 0.00094
Iteration: 87, Log-Lik: -109633.354, Max-Change: 0.00083
Iteration: 88, Log-Lik: -109633.353, Max-Change: 0.00071
Iteration: 89, Log-Lik: -109633.352, Max-Change: 0.00088
Iteration: 90, Log-Lik: -109633.352, Max-Change: 0.00079
Iteration: 91, Log-Lik: -109633.351, Max-Change: 0.00066
Iteration: 92, Log-Lik: -109633.350, Max-Change: 0.00084
Iteration: 93, Log-Lik: -109633.350, Max-Change: 0.00074
Iteration: 94, Log-Lik: -109633.349, Max-Change: 0.00063
Iteration: 95, Log-Lik: -109633.348, Max-Change: 0.00078
Iteration: 96, Log-Lik: -109633.348, Max-Change: 0.00070
Iteration: 97, Log-Lik: -109633.347, Max-Change: 0.00059
Iteration: 98, Log-Lik: -109633.347, Max-Change: 0.00075
Iteration: 99, Log-Lik: -109633.346, Max-Change: 0.00066
Iteration: 100, Log-Lik: -109633.346, Max-Change: 0.00056
Iteration: 101, Log-Lik: -109633.345, Max-Change: 0.00070
Iteration: 102, Log-Lik: -109633.345, Max-Change: 0.00063
Iteration: 103, Log-Lik: -109633.344, Max-Change: 0.00053
Iteration: 104, Log-Lik: -109633.344, Max-Change: 0.00067
Iteration: 105, Log-Lik: -109633.343, Max-Change: 0.00059
```

```
Iteration: 106, Log-Lik: -109633.343, Max-Change: 0.00050
Iteration: 107, Log-Lik: -109633.343, Max-Change: 0.00062
Iteration: 108, Log-Lik: -109633.342, Max-Change: 0.00056
Iteration: 109, Log-Lik: -109633.342, Max-Change: 0.00047
Iteration: 110, Log-Lik: -109633.342, Max-Change: 0.00060
Iteration: 111, Log-Lik: -109633.341, Max-Change: 0.00053
Iteration: 112, Log-Lik: -109633.341, Max-Change: 0.00045
Iteration: 113, Log-Lik: -109633.341, Max-Change: 0.00056
Iteration: 114, Log-Lik: -109633.340, Max-Change: 0.00050
Iteration: 115, Log-Lik: -109633.340, Max-Change: 0.00042
Iteration: 116, Log-Lik: -109633.340, Max-Change: 0.00054
Iteration: 117, Log-Lik: -109633.340, Max-Change: 0.00047
Iteration: 118, Log-Lik: -109633.339, Max-Change: 0.00041
Iteration: 119, Log-Lik: -109633.339, Max-Change: 0.00050
Iteration: 120, Log-Lik: -109633.339, Max-Change: 0.00045
Iteration: 121, Log-Lik: -109633.339, Max-Change: 0.00038
Iteration: 122, Log-Lik: -109633.338, Max-Change: 0.00048
Iteration: 123, Log-Lik: -109633.338, Max-Change: 0.00042
Iteration: 124, Log-Lik: -109633.338, Max-Change: 0.00036
Iteration: 125, Log-Lik: -109633.338, Max-Change: 0.00045
Iteration: 126, Log-Lik: -109633.338, Max-Change: 0.00041
Iteration: 127, Log-Lik: -109633.337, Max-Change: 0.00034
Iteration: 128, Log-Lik: -109633.337, Max-Change: 0.00043
Iteration: 129, Log-Lik: -109633.337, Max-Change: 0.00038
Iteration: 130, Log-Lik: -109633.337, Max-Change: 0.00033
Iteration: 131, Log-Lik: -109633.337, Max-Change: 0.00040
Iteration: 132, Log-Lik: -109633.337, Max-Change: 0.00036
Iteration: 133, Log-Lik: -109633.336, Max-Change: 0.00030
Iteration: 134, Log-Lik: -109633.336, Max-Change: 0.00039
Iteration: 135, Log-Lik: -109633.336, Max-Change: 0.00034
Iteration: 136, Log-Lik: -109633.336, Max-Change: 0.00029
Iteration: 137, Log-Lik: -109633.336, Max-Change: 0.00036
Iteration: 138, Log-Lik: -109633.336, Max-Change: 0.00033
Iteration: 139, Log-Lik: -109633.336, Max-Change: 0.00027
Iteration: 140, Log-Lik: -109633.335, Max-Change: 0.00035
Iteration: 141, Log-Lik: -109633.335, Max-Change: 0.00031
Iteration: 142, Log-Lik: -109633.335, Max-Change: 0.00027
Iteration: 143, Log-Lik: -109633.335, Max-Change: 0.00033
Iteration: 144, Log-Lik: -109633.335, Max-Change: 0.00030
Iteration: 145, Log-Lik: -109633.335, Max-Change: 0.00025
Iteration: 146, Log-Lik: -109633.335, Max-Change: 0.00032
Iteration: 147, Log-Lik: -109633.335, Max-Change: 0.00028
Iteration: 148, Log-Lik: -109633.335, Max-Change: 0.00024
Iteration: 149, Log-Lik: -109633.335, Max-Change: 0.00029
Iteration: 150, Log-Lik: -109633.335, Max-Change: 0.00027
Iteration: 151, Log-Lik: -109633.334, Max-Change: 0.00022
Iteration: 152, Log-Lik: -109633.334, Max-Change: 0.00029
Iteration: 153, Log-Lik: -109633.334, Max-Change: 0.00025
Iteration: 154, Log-Lik: -109633.334, Max-Change: 0.00022
Iteration: 155, Log-Lik: -109633.334, Max-Change: 0.00026
Iteration: 156, Log-Lik: -109633.334, Max-Change: 0.00024
Iteration: 157, Log-Lik: -109633.334, Max-Change: 0.00020
Iteration: 158, Log-Lik: -109633.334, Max-Change: 0.00026
Iteration: 159, Log-Lik: -109633.334, Max-Change: 0.00023
```

```
Iteration: 160, Log-Lik: -109633.334, Max-Change: 0.00020
Iteration: 161, Log-Lik: -109633.334, Max-Change: 0.00024
Iteration: 162, Log-Lik: -109633.334, Max-Change: 0.00022
Iteration: 163, Log-Lik: -109633.334, Max-Change: 0.00018
Iteration: 164, Log-Lik: -109633.334, Max-Change: 0.00023
Iteration: 165, Log-Lik: -109633.334, Max-Change: 0.00020
Iteration: 166, Log-Lik: -109633.334, Max-Change: 0.00018
Iteration: 167, Log-Lik: -109633.333, Max-Change: 0.00022
Iteration: 168, Log-Lik: -109633.333, Max-Change: 0.00020
Iteration: 169, Log-Lik: -109633.333, Max-Change: 0.00016
Iteration: 170, Log-Lik: -109633.333, Max-Change: 0.00021
Iteration: 171, Log-Lik: -109633.333, Max-Change: 0.00019
Iteration: 172, Log-Lik: -109633.333, Max-Change: 0.00016
Iteration: 173, Log-Lik: -109633.333, Max-Change: 0.00020
Iteration: 174, Log-Lik: -109633.333, Max-Change: 0.00018
Iteration: 175, Log-Lik: -109633.333, Max-Change: 0.00015
Iteration: 176, Log-Lik: -109633.333, Max-Change: 0.00019
Iteration: 177, Log-Lik: -109633.333, Max-Change: 0.00017
Iteration: 178, Log-Lik: -109633.333, Max-Change: 0.00015
Iteration: 179, Log-Lik: -109633.333, Max-Change: 0.00018
Iteration: 180, Log-Lik: -109633.333, Max-Change: 0.00016
Iteration: 181, Log-Lik: -109633.333, Max-Change: 0.00014
Iteration: 182, Log-Lik: -109633.333, Max-Change: 0.00018
Iteration: 183, Log-Lik: -109633.333, Max-Change: 0.00015
Iteration: 184, Log-Lik: -109633.333, Max-Change: 0.00013
Iteration: 185, Log-Lik: -109633.333, Max-Change: 0.00016
Iteration: 186, Log-Lik: -109633.333, Max-Change: 0.00015
Iteration: 187, Log-Lik: -109633.333, Max-Change: 0.00012
Iteration: 188, Log-Lik: -109633.333, Max-Change: 0.00016
Iteration: 189, Log-Lik: -109633.333, Max-Change: 0.00014
Iteration: 190, Log-Lik: -109633.333, Max-Change: 0.00012
Iteration: 191, Log-Lik: -109633.333, Max-Change: 0.00015
Iteration: 192, Log-Lik: -109633.333, Max-Change: 0.00014
Iteration: 193, Log-Lik: -109633.333, Max-Change: 0.00011
Iteration: 194, Log-Lik: -109633.333, Max-Change: 0.00015
Iteration: 195, Log-Lik: -109633.333, Max-Change: 0.00013
Iteration: 196, Log-Lik: -109633.333, Max-Change: 0.00011
Iteration: 197, Log-Lik: -109633.333, Max-Change: 0.00014
Iteration: 198, Log-Lik: -109633.333, Max-Change: 0.00012
Iteration: 199, Log-Lik: -109633.333, Max-Change: 0.00010
Iteration: 200, Log-Lik: -109633.333, Max-Change: 0.00013
Iteration: 201, Log-Lik: -109633.333, Max-Change: 0.00012
Iteration: 202, Log-Lik: -109633.333, Max-Change: 0.00010
Iteration: 203, Log-Lik: -109633.332, Max-Change: 0.00012
Iteration: 204, Log-Lik: -109633.332, Max-Change: 0.00011
Iteration: 205, Log-Lik: -109633.332, Max-Change: 0.00009
Iteration: 206, Log-Lik: -109633.332, Max-Change: 0.00012
Iteration: 207, Log-Lik: -109633.332, Max-Change: 0.00011
Iteration: 208, Log-Lik: -109633.332, Max-Change: 0.00009
Iteration: 209, Log-Lik: -109633.332, Max-Change: 0.00011
Iteration: 210, Log-Lik: -109633.332, Max-Change: 0.00010
Iteration: 211, Log-Lik: -109633.332, Max-Change: 0.00009
Iteration: 212, Log-Lik: -109633.332, Max-Change: 0.00011
Iteration: 213, Log-Lik: -109633.332, Max-Change: 0.00010
```

```r
summary(mbi)
```

```
##
## Factor loadings metric:
##            G    S1       S2    h2
## pp001 0.4496 0.000  0.19861 0.242
## pp002 0.5629 0.000  0.49677 0.564
## pp003 0.4852 0.000  0.63628 0.640
## pp004 0.4847 0.000  0.70689 0.735
## pp005 0.3111 0.000  0.46704 0.315
## pp006 0.4655 0.000  0.60963 0.588
## pp007 0.3706 0.000  0.60472 0.503
## pp008 0.3588 0.000  0.16444 0.156
## pp009 0.0056 0.585  0.00000 0.343
## pp010 0.4325 0.576  0.00000 0.519
## pp011 0.0922 0.450  0.00000 0.211
## pp012 0.3656 0.654  0.00000 0.562
## pp013 0.5451 0.000  0.35343 0.422
## pp014 0.2159 0.595  0.00000 0.401
## pp015 0.1949 0.468  0.00000 0.257
## pp016 0.3443 0.550  0.00000 0.421
## pp017 0.5767 0.000  0.48701 0.570
## pp018 0.5307 0.000  0.10051 0.292
## pp019 0.4353 0.472  0.00000 0.412
## pp020 0.5100 0.491  0.00000 0.501
## pp021 0.4776 0.623  0.00000 0.616
## pp022 0.3597 0.506  0.00000 0.385
## pp023 0.6003 0.000  0.30331 0.452
## pp024 0.5171 0.000  0.28027 0.346
## pp025 0.5611 0.000  0.06070 0.319
## pp026 0.1346 0.589  0.00000 0.365
## pp027 0.3484 0.612  0.00000 0.495
## pp028 0.5667 0.000  0.26628 0.392
## pp029 0.5552 0.548  0.00000 0.608
## pp030 0.5093 0.517  0.00000 0.526
## pp031 0.4708 0.642  0.00000 0.634
## pp032 0.4685 0.535  0.00000 0.506
## pp033 0.8229 0.000 -0.04990 0.680
## pp034 0.8357 0.000 -0.00883 0.698
## pp035 0.6135 0.481  0.00000 0.608
## pp036 0.5990 0.478  0.00000 0.588
## pp037 0.4796 0.000  0.40614 0.395
##
## SS loadings:  8.573 5.734 2.958
##
## Factor covariance:
##    F1 F2 F3
## F1  1  0  0
## F2  0  1  0
## F3  0  0  1
```

```
residuals(mbi)
```

```
## LD matrix (lower triangle) and standardized values:

##         pp001    pp002    pp003    pp004    pp005    pp006    pp007
## pp001      NA    0.125    0.102   -0.098    0.100   -0.108   -0.114
## pp002  192.56       NA    0.142    0.115    0.100    0.104    0.114
## pp003  127.59  247.371       NA    0.143    0.122    0.100    0.128
## pp004 -117.30  161.085  249.714       NA    0.124    0.122    0.152
## pp005  122.55  121.885  182.941  188.307       NA    0.124    0.133
## pp006 -143.09  133.245  123.610  182.750  187.670       NA    0.197
## pp007 -160.26  157.934  202.225  284.320  216.936  477.391       NA
## pp008  144.27   99.353 -121.850   90.326 -163.527  136.819 -186.935
## pp009 -230.38 -177.559 -272.523 -263.248 -158.407 -224.766 -252.205
## pp010 -176.21 -263.786 -336.251 -293.350 -151.278 -259.616 -341.447
## pp011 -137.09 -213.548 -195.607 -159.784  141.496 -157.721 -216.133
## pp012 -113.33 -345.873 -565.574 -691.944 -212.041 -503.858 -539.360
## pp013  -79.06  134.093  152.077  154.612  165.914  175.555  169.364
## pp014 -156.11 -150.724 -271.609 -334.865 -167.161 -253.113 -292.864
## pp015 -138.31 -207.523 -299.255 -274.061 -160.612 -217.430 -275.392
## pp016 -144.70 -236.712 -259.158 -351.484 -125.986 -324.241 -348.971
## pp017  -78.53   59.243  142.943  135.870  156.585  144.873  219.209
## pp018  208.36 -185.597 -194.984 -169.762  163.160 -230.249 -236.306
## pp019  -77.22 -218.197 -240.704 -340.312 -117.765 -287.501 -273.458
## pp020  -78.80 -108.628 -208.461 -219.242 -156.757 -190.902 -372.832
## pp021 -182.22 -318.034 -558.627 -563.237 -250.340 -379.641 -554.640
## pp022  -89.33 -189.530 -284.542 -334.087 -129.272 -255.843 -335.593
## pp023 -106.24   71.873   88.909  125.483   77.172  108.825  137.886
## pp024  148.41  119.426  172.382  103.606 -217.226  161.231  184.376
## pp025  125.46 -149.913 -101.094 -112.182  -95.879 -135.023 -115.442
## pp026 -124.46 -212.269 -361.483 -326.757 -129.545 -317.006 -386.831
## pp027 -213.30 -313.158 -481.165 -530.461 -209.260 -349.154 -403.689
## pp028 -139.29 -210.034 -263.322  249.101 -176.334  285.845  308.663
## pp029 -101.36 -231.849 -457.213 -666.315 -140.715 -297.585 -299.698
## pp030 -109.98 -133.608 -292.809 -299.768  -97.580 -203.318 -282.188
## pp031 -187.50 -410.372 -547.833 -626.193 -202.029 -410.441 -492.603
## pp032 -147.01 -241.785 -388.836 -423.082 -119.481 -290.228 -278.968
## pp033 -107.58  -95.196 -127.424 -111.116  -89.995 -146.576 -124.498
## pp034 -110.55 -109.147  -70.487 -101.871  -78.663 -154.408 -114.453
## pp035 -154.22 -400.984 -528.847 -559.638 -199.098 -401.840 -470.787
## pp036 -160.30 -404.188 -568.587 -590.991 -174.147 -433.727 -458.133
## pp037  -98.52 -102.714 -123.991  130.709  -90.467  150.978  240.463
##          pp008    pp009    pp010    pp011    pp012    pp013    pp014
## pp001    0.108   -0.137   -0.120   -0.106   -0.096   -0.080   -0.113
## pp002    0.090   -0.120   -0.147   -0.132   -0.168    0.105   -0.111
## pp003   -0.100   -0.149   -0.166   -0.126   -0.215    0.111   -0.149
## pp004    0.086   -0.147   -0.155   -0.114   -0.238    0.112   -0.165
## pp005   -0.116   -0.114   -0.111    0.107   -0.132    0.116   -0.117
## pp006    0.106   -0.135   -0.146   -0.113   -0.203    0.120   -0.144
## pp007   -0.124   -0.143   -0.167   -0.133   -0.210    0.118   -0.155
## pp008       NA   -0.191   -0.147   -0.131   -0.161   -0.111   -0.158
## pp009 -445.238       NA    0.144    0.137    0.156   -0.137    0.275
## pp010 -266.590  253.287       NA    0.255    0.191   -0.142    0.125
```

```
## pp011 -211.824  230.867  798.276       NA    0.179    0.151    0.141
## pp012 -316.232  298.723  445.986  393.054       NA   -0.166    0.140
## pp013 -150.586 -229.293 -248.661  279.867 -337.772       NA    0.158
## pp014 -305.385  924.546  192.861  243.555  239.993  307.716       NA
## pp015 -440.414  264.001  332.222  267.367  368.900 -274.517  504.969
## pp016 -216.926  266.543  235.265  243.505  575.214  259.663  314.950
## pp017 -106.235 -163.540 -360.558 -187.225 -470.802  204.301 -155.999
## pp018  151.667 -254.076 -344.225 -333.654 -325.251 -291.729 -285.693
## pp019 -167.222 -181.788  186.415  258.796  315.817  181.003  260.149
## pp020 -181.765  263.646  191.923  316.003  254.472 -208.691  347.540
## pp021 -226.722 -240.637  376.492  319.462  397.472 -444.576 -271.449
## pp022 -163.848  173.214 -255.637  327.387  326.448 -227.647  191.102
## pp023 -123.222 -172.437  176.127  191.064 -262.966  165.809 -162.808
## pp024  418.064 -460.444 -532.790 -338.442 -697.770 -189.317 -479.927
## pp025  136.028 -189.154 -158.691 -255.247 -245.770 -147.495 -169.530
## pp026 -214.401  546.149  193.661  211.443  229.753 -285.728  504.565
## pp027 -356.980  291.995  300.733  333.113  333.436 -278.788  285.114
## pp028  186.797 -231.841 -372.130 -238.180 -405.215 -385.669 -292.073
## pp029 -131.880 -133.903  228.487  251.572  299.199 -228.880 -140.126
## pp030 -160.253  234.652  140.568  238.171 -208.530 -185.098  183.649
## pp031 -323.668  256.292  207.915  335.639  221.740 -353.593  273.182
## pp032 -305.371  311.150  179.220  247.795 -278.092 -240.051  334.691
## pp033 -111.372  189.280 -191.965  210.616 -229.578 -173.469  131.399
## pp034 -120.635  150.618 -147.290 -196.115 -231.046 -101.035 -105.693
## pp035 -216.580  263.350 -188.684  293.925  162.272 -312.214  184.504
## pp036 -215.748  242.128 -177.114 -329.941 -183.980 -312.580  165.067
## pp037  113.208 -248.564 -224.883 -180.894 -457.401  125.631 -217.816
##          pp015    pp016    pp017    pp018    pp019    pp020    pp021
## pp001   -0.106   -0.109   -0.080    0.130   -0.079   -0.080   -0.122
## pp002   -0.130   -0.139    0.070   -0.123   -0.133   -0.094   -0.161
## pp003   -0.156   -0.145    0.108   -0.126   -0.140   -0.130   -0.213
## pp004   -0.150   -0.169    0.105   -0.118   -0.167   -0.134   -0.214
## pp005   -0.114   -0.101    0.113    0.115   -0.098   -0.113   -0.143
## pp006   -0.133   -0.163    0.109   -0.137   -0.153   -0.125   -0.176
## pp007   -0.150   -0.169    0.134   -0.139   -0.149   -0.174   -0.213
## pp008   -0.190   -0.133   -0.093    0.111   -0.117   -0.122   -0.136
## pp009    0.147    0.147   -0.116   -0.144   -0.122    0.147   -0.140
## pp010    0.165    0.139   -0.172   -0.168    0.123    0.125    0.175
## pp011    0.148    0.141   -0.124   -0.165    0.145    0.161    0.161
## pp012    0.173    0.217   -0.196   -0.163    0.161    0.144    0.180
## pp013   -0.150    0.146    0.129   -0.154    0.122   -0.130   -0.190
## pp014    0.203    0.160   -0.113   -0.153    0.146    0.168   -0.149
## pp015       NA    0.194   -0.136   -0.153    0.181    0.172    0.183
## pp016  463.320       NA   -0.169   -0.179    0.202    0.150    0.180
## pp017 -228.206 -350.095       NA   -0.177   -0.132   -0.122   -0.184
## pp018 -287.208 -393.822 -383.543       NA   -0.177   -0.201   -0.219
## pp019  399.926  501.965 -212.589 -385.072       NA    0.141    0.165
## pp020  363.798  275.814 -181.231 -493.451  242.720       NA    0.178
## pp021  409.102  397.462 -414.969 -590.313  332.461  390.054       NA
## pp022  274.113  520.947 -210.455 -265.140  286.011  313.834  411.409
## pp023 -185.461 -221.421  119.737 -318.563 -208.793  255.352 -344.980
## pp024 -547.133 -533.294  182.409  222.772 -458.275 -406.802 -646.204
## pp025 -198.703 -184.949 -201.261  262.708 -211.438 -204.846 -219.368
## pp026  201.814  229.522 -259.049 -252.502  220.509  282.065 -215.774
```

```
## pp027  279.129  320.284 -361.181 -432.187  322.369  276.384  407.080
## pp028 -259.121 -309.589  394.150 -356.817 -301.722 -276.723 -394.753
## pp029  337.551  378.205 -312.809 -465.256  212.914  187.018  413.677
## pp030  259.424 -169.438 -204.431 -273.095 -148.340  200.247 -178.569
## pp031  312.421 -226.154 -342.852 -402.386  218.736  314.778  281.585
## pp032  314.692 -235.343 -226.809 -325.679 -165.433  228.237 -207.490
## pp033  240.796 -153.586 -116.757 -262.350 -196.696 -206.830 -253.102
## pp034  180.466 -121.997  -92.550 -240.519 -160.986 -175.479 -232.711
## pp035 -282.215  136.247 -368.726 -350.801 -157.229 -157.300 -254.229
## pp036 -241.549 -162.861 -368.984 -331.200 -190.700 -165.485 -281.620
## pp037 -246.233 -401.160  149.851 -199.912 -241.626 -137.467 -514.957
##          pp022    pp023    pp024    pp025    pp026    pp027    pp028
## pp001   -0.085   -0.093    0.110    0.101   -0.101   -0.132   -0.107
## pp002   -0.124    0.077    0.099   -0.111   -0.132   -0.160   -0.131
## pp003   -0.152    0.085    0.119   -0.091   -0.172   -0.198   -0.147
## pp004   -0.165    0.101    0.092   -0.096   -0.163   -0.208    0.143
## pp005   -0.103    0.079   -0.133   -0.088   -0.103   -0.131   -0.120
## pp006   -0.144    0.094    0.115   -0.105   -0.161   -0.169    0.153
## pp007   -0.165    0.106    0.123   -0.097   -0.178   -0.181    0.159
## pp008   -0.116   -0.100    0.185    0.105   -0.132   -0.171    0.123
## pp009    0.119   -0.119   -0.194   -0.124    0.211    0.154   -0.138
## pp010   -0.144    0.120   -0.208   -0.114    0.126    0.157   -0.174
## pp011    0.163    0.125   -0.166   -0.144    0.131    0.165   -0.139
## pp012    0.163   -0.146   -0.239   -0.142    0.137    0.165   -0.182
## pp013   -0.136    0.116   -0.124   -0.110   -0.153   -0.151   -0.177
## pp014    0.125   -0.115   -0.198   -0.118    0.203    0.153   -0.154
## pp015    0.150   -0.123   -0.211   -0.127    0.128    0.151   -0.145
## pp016    0.206   -0.134   -0.209   -0.123    0.137    0.162   -0.159
## pp017   -0.131    0.099    0.122   -0.128   -0.145   -0.172    0.179
## pp018   -0.147   -0.161    0.135    0.146   -0.144   -0.188   -0.171
## pp019    0.153   -0.131   -0.193   -0.131    0.134    0.162   -0.157
## pp020    0.160    0.144   -0.182   -0.129    0.152    0.150   -0.150
## pp021    0.183   -0.168   -0.230   -0.134   -0.133    0.182   -0.179
## pp022       NA    0.162   -0.193   -0.146    0.150    0.206   -0.130
## pp023  321.781       NA    0.147   -0.141   -0.124   -0.143    0.149
## pp024 -454.417  263.395       NA    0.174   -0.219   -0.260    0.187
## pp025 -262.551 -243.948  372.525       NA   -0.113   -0.144    0.168
## pp026  276.846 -187.145 -587.888 -155.985       NA    0.175   -0.164
## pp027  521.052 -251.923 -828.809 -254.678  375.112       NA   -0.207
## pp028 -207.614  271.170  427.252  344.178 -329.184 -527.644       NA
## pp029  305.024  243.522 -445.147 -212.263  198.712  410.618 -497.792
## pp030 -183.650  172.051 -403.664 -181.841  283.866  228.746 -398.271
## pp031 -225.356 -242.055 -888.839 -235.242  254.653  275.038 -519.375
## pp032 -216.248 -203.994 -488.170 -217.323  343.825  254.869 -401.687
## pp033 -165.434 -186.707 -225.851 -228.874  196.289 -263.323 -308.304
## pp034 -139.786 -180.984 -256.448 -245.333  152.312 -172.698 -387.508
## pp035 -191.176 -239.588 -678.219 -173.333  275.346  256.202 -497.873
## pp036 -215.395 -225.916 -633.399 -221.806  284.425  287.021 -517.436
## pp037 -322.755   98.977  153.173 -177.996 -283.510 -365.127  352.210
##          pp029    pp030    pp031    pp032    pp033    pp034    pp035
## pp001   -0.091   -0.095   -0.124   -0.110   -0.094   -0.095   -0.112
## pp002   -0.138   -0.104   -0.183   -0.140   -0.088   -0.094   -0.181
## pp003   -0.193   -0.155   -0.211   -0.178   -0.102   -0.076   -0.208
## pp004   -0.233   -0.156   -0.226   -0.186   -0.095   -0.091   -0.214
```

```
## pp005   -0.107   -0.089   -0.128   -0.099   -0.086   -0.080   -0.127
## pp006   -0.156   -0.129   -0.183   -0.154   -0.109   -0.112   -0.181
## pp007   -0.156   -0.152   -0.200   -0.151   -0.101   -0.097   -0.196
## pp008   -0.104   -0.114   -0.163   -0.158   -0.095   -0.099   -0.133
## pp009   -0.105    0.138    0.145    0.159    0.124    0.111    0.147
## pp010    0.137    0.107    0.130    0.121   -0.125   -0.110   -0.124
## pp011    0.143    0.139    0.165    0.142    0.131   -0.126    0.155
## pp012    0.156   -0.130    0.135   -0.151   -0.137   -0.137    0.115
## pp013   -0.137   -0.123   -0.170   -0.140   -0.119   -0.091   -0.160
## pp014   -0.107    0.122    0.149    0.165    0.104   -0.093    0.123
## pp015    0.166    0.145    0.160    0.160    0.140    0.121   -0.152
## pp016    0.176   -0.118   -0.136   -0.139   -0.112   -0.100    0.105
## pp017   -0.160   -0.129   -0.167   -0.136   -0.098   -0.087   -0.173
## pp018   -0.195   -0.149   -0.181   -0.163   -0.146   -0.140   -0.169
## pp019    0.132   -0.110    0.134   -0.116   -0.127   -0.115   -0.113
## pp020    0.124    0.128    0.160    0.136   -0.130   -0.120   -0.113
## pp021    0.184   -0.121    0.152   -0.130   -0.144   -0.138   -0.144
## pp022    0.158   -0.122   -0.136   -0.133   -0.116   -0.107   -0.125
## pp023    0.141    0.118   -0.141   -0.129   -0.123   -0.122   -0.140
## pp024   -0.191   -0.181   -0.269   -0.200   -0.136   -0.145   -0.235
## pp025   -0.132   -0.122   -0.139   -0.133   -0.137   -0.141   -0.119
## pp026    0.127    0.152    0.144    0.167    0.127    0.111    0.150
## pp027    0.183    0.137    0.150    0.144   -0.147   -0.119    0.145
## pp028   -0.202   -0.180   -0.206   -0.181   -0.159   -0.178   -0.202
## pp029       NA    0.109    0.140   -0.107   -0.127   -0.147   -0.116
## pp030  145.929       NA    0.233    0.175   -0.133   -0.108    0.097
## pp031  240.009  665.275       NA    0.188   -0.178   -0.143    0.129
## pp032 -140.305  375.959  431.773       NA   -0.154   -0.129    0.131
## pp033 -197.047 -217.903 -386.751 -292.094       NA    0.184    0.178
## pp034 -266.023 -143.165 -249.029 -204.612  416.613       NA   -0.176
## pp035 -166.132  114.317  204.986  210.905  388.446 -379.466       NA
## pp036 -176.464  118.313  179.771  220.393  306.280 -406.538 1435.351
## pp037 -255.179 -209.156 -390.519 -286.920 -168.332 -181.032 -492.334
##          pp036  pp037
## pp001   -0.114 -0.090
## pp002   -0.182 -0.092
## pp003   -0.215 -0.101
## pp004   -0.220  0.103
## pp005   -0.119 -0.086
## pp006   -0.188  0.111
## pp007   -0.193  0.140
## pp008   -0.133  0.096
## pp009    0.141 -0.142
## pp010   -0.120 -0.135
## pp011   -0.164 -0.121
## pp012   -0.123 -0.193
## pp013   -0.160  0.101
## pp014    0.116 -0.133
## pp015   -0.140 -0.142
## pp016   -0.115 -0.181
## pp017   -0.174  0.111
## pp018   -0.164 -0.128
## pp019   -0.125 -0.140
## pp020   -0.116 -0.106
```

```
## pp021   -0.152 -0.205
## pp022   -0.133 -0.162
## pp023   -0.136  0.090
## pp024   -0.227  0.112
## pp025   -0.135 -0.121
## pp026    0.152 -0.152
## pp027    0.153 -0.173
## pp028   -0.205  0.170
## pp029   -0.120 -0.144
## pp030    0.098 -0.131
## pp031    0.121 -0.179
## pp032    0.134 -0.153
## pp033    0.158 -0.117
## pp034   -0.182 -0.122
## pp035    0.342 -0.200
## pp036       NA -0.215
## pp037 -566.945     NA
```