R version 4.3.1 (2023-06-16 ucrt) -- "Beagle Scouts"

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Platform: x86\_64-w64-mingw32/x64 (64-bit)

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> ###Install packages (first time only)

> install.packages("psych")

Installing package into ‘C:/Users/conta/AppData/Local/R/win-library/4.3’

(as ‘lib’ is unspecified)

--- Please select a CRAN mirror for use in this session ---

tr

Content type 'application/zip' length 3501923 bytes (3.3 MB)

downloaded 3.3 MB

package ‘psych’ successfully unpacked and MD5 sums checked

The downloaded binary packages are in

C:\Users\conta\AppData\Local\Temp\RtmpU5Jdc9\downloaded\_packages

> install.packages("GPArotation")

Installing package into ‘C:/Users/conta/AppData/Local/R/win-library/4.3’

(as ‘lib’ is unspecified)

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.3/GPArotation\_2024.3-1.zip'

Content type 'application/zip' length 392715 bytes (383 KB)

downloaded 383 KB

package ‘GPArotation’ successfully unpacked and MD5 sums checked

The downloaded binary packages are in

C:\Users\conta\AppData\Local\Temp\RtmpU5Jdc9\downloaded\_packages

> install.packages("gdata")

Installing package into ‘C:/Users/conta/AppData/Local/R/win-library/4.3’

(as ‘lib’ is unspecified)

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.3/gdata\_3.0.0.zip'

Content type 'application/zip' length 495740 bytes (484 KB)

downloaded 484 KB

package ‘gdata’ successfully unpacked and MD5 sums checked

The downloaded binary packages are in

C:\Users\conta\AppData\Local\Temp\RtmpU5Jdc9\downloaded\_packages

> install.packages("car")

Installing package into ‘C:/Users/conta/AppData/Local/R/win-library/4.3’

(as ‘lib’ is unspecified)

trying URL 'https://cloud.r-project.org/bin/windows/contrib/4.3/car\_3.1-2.zip'

Content type 'application/zip' length 1707988 bytes (1.6 MB)

downloaded 1.6 MB

package ‘car’ successfully unpacked and MD5 sums checked

The downloaded binary packages are in

C:\Users\conta\AppData\Local\Temp\RtmpU5Jdc9\downloaded\_packages

> setwd ("C:/Users/conta/OneDrive/PHD/Nimon/WD/Construct validity assignment")

> setwd ("C:/Users/conta/OneDrive/PHD/Nimon/WD/6355 Project")

> ###Load libraries

> library(foreign, pos=4)

> library(psych)

Warning message:

package ‘psych’ was built under R version 4.3.3

> library(GPArotation)

Attaching package: ‘GPArotation’

The following objects are masked from ‘package:psych’:

equamax, varimin

Warning message:

package ‘GPArotation’ was built under R version 4.3.3

> library(gdata)

Attaching package: ‘gdata’

The following object is masked from ‘package:stats’:

nobs

The following object is masked from ‘package:utils’:

object.size

The following object is masked from ‘package:base’:

startsWith

Warning message:

package ‘gdata’ was built under R version 4.3.3

> library(car)

Loading required package: carData

Attaching package: ‘car’

The following object is masked from ‘package:psych’:

logit

Warning message:

package ‘car’ was built under R version 4.3.3

>

> ###Change options for number of digits

> options(digits=2)

>

> ###Read in dataset

> ds <-

+ read.table("EWPAClean.csv",

+ header=TRUE, sep=",", na.strings="NA", dec=".", strip.white=TRUE)

>

> ###Look at dataset

> head(ds)

StartDate EndDate Status IPAddress Progress Time

1 3/20/2024 14:29 3/20/2024 14:34 IP Address 73.234.212.220 100 5.3

2 3/20/2024 14:52 3/20/2024 14:57 IP Address 174.218.60.178 100 5.3

3 3/20/2024 14:55 3/20/2024 14:59 IP Address 104.251.240.96 100 4.1

4 3/20/2024 14:54 3/20/2024 15:00 IP Address 128.164.171.28 100 5.6

5 3/20/2024 15:02 3/20/2024 15:13 IP Address 50.96.225.169 100 10.2

6 3/20/2024 15:10 3/20/2024 15:14 IP Address 72.133.69.3 100 4.1

Finished RecordedDate ResponseId RecipientLastName

1 TRUE 3/20/2024 14:34 R\_2iVz22kgsG0YDzR NA

2 TRUE 3/20/2024 14:57 R\_1bJWTqz1iwRLS0N NA

3 TRUE 3/20/2024 14:59 R\_2kp2LaBNApuLkfu NA

4 TRUE 3/20/2024 15:00 R\_3wc8mwF69vysoo8 NA

5 TRUE 3/20/2024 15:13 R\_11d71W4kNe755zv NA

6 TRUE 3/20/2024 15:15 R\_3xhOPt3xFHAwUZX NA

RecipientFirstName RecipientEmail ExternalReference LocationLatitude

1 NA NA NA 42

2 NA NA NA 33

3 NA NA NA 35

4 NA NA NA 39

5 NA NA NA 43

6 NA NA NA 30

LocationLongitude DistributionChannel UserLanguage PROLIFICID

1 -71 anonymous EN 61242c81dba1388292653e09

2 -86 anonymous EN 650ca4eff5d56e16602567ba

3 -85 anonymous EN 5eb83f00de449a08d23547dd

4 -77 anonymous EN 61036710e1eb1d931b7a34a6

5 -76 anonymous EN 657228e3073464323075c94b

6 -98 anonymous EN 65de1ac696ee6f843eb0c646

BOT Consent

1 4 Yes

2 4 Yes

3 4 Yes

4 4 Yes

5 4 Yes

6 4 Yes

High

1

2 I have reviewed the research scenario and I am ready to answer questions

3

4

5

6

Neutral

1

2

3

4

5 I have reviewed the research scenario and I am ready to answer questions

6 I have reviewed the research scenario and I am ready to answer questions

LOW M9

1 I have reviewed the research scenario and I am ready to answer questions 1

2 4

3 I have reviewed the research scenario and I am ready to answer questions 0

4 I have reviewed the research scenario and I am ready to answer questions 2

5 4

6 3

B10 B11 B12 S13 S14 S15 S16 T1 T2 T3 T4 T5 M6 M7 M8 IMC1 IMC2 IMCfu GEN

1 0 0 0 1 1 1 0 1 1 0 1 1 1 1 0 NA 1 NA Female

2 4 4 4 4 3 4 3 4 4 4 3 4 4 4 4 NA 1 NA Female

3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 NA 1 NA Female

4 0 1 0 1 0 2 1 2 1 0 1 0 0 2 0 NA 1 NA Female

5 4 3 4 4 0 2 3 3 3 3 3 4 3 4 4 NA 1 NA Female

6 2 3 1 2 1 2 2 3 2 3 2 3 3 2 3 NA 1 NA Female

AGE TENURE COAGE COAGE\_1\_TEXT

1 25-34 1-2 years I don't know NA

2 25-34 less than 1 year I don't know NA

3 55-59 less than 1 year Yes 13

4 18-24 less than 1 year I don't know NA

5 45-54 more than 7 years Yes 75

6 18-24 less than 1 year I don't know NA

EDU

1 Bachelor's degree

2 High school or equivalent degree

3 Graduate or professional degree

4 Some college, no degree

5 Some college, no degree

6 Some college, no degree

INDST

1 Information

2 Arts, entertainment, recreation, accommodation, and food services

3 Professional, scientific, management, administrative, and waste management

4 Professional, scientific, management, administrative, and waste management

5 Educational services, health care, and social sciences

6 Arts, entertainment, recreation, accommodation, and food services

INC MAR POSITION

1 $1 to $9,999 or loss Never married Non-supervisory

2 $1 to $9,999 or loss Never married Non-supervisory

3 $100,000 or more Now married (except separated) Manager

4 $65,000 to $74,999 Never married Non-supervisory

5 $75,000 to $99,999 Now married (except separated) Non-supervisory

6 $10,000 to $14,999 Never married Non-supervisory

RACE ETH COSIZE

1 White Hispanic or Latino 100-499 employees

2 White Hispanic or Latino 1-4 employees

3 White Not Hispanic or Latino 500+ employees

4 Black or African American Not Hispanic or Latino 20-99 employees

5 White Not Hispanic or Latino 100-499 employees

6 White Not Hispanic or Latino 20-99 employees

PROLIFIC\_PID Country Source Delete sd IV

1 61242c81dba1388292653e09 US My Data Keep 0.50 Low

2 650ca4eff5d56e16602567ba US My Data Keep 0.40 High

3 5eb83f00de449a08d23547dd US My Data Keep 0.00 Low

4 61036710e1eb1d931b7a34a6 US My Data Keep 0.83 Low

5 657228e3073464323075c94b US My Data Keep 1.05 Neutral

6 65de1ac696ee6f843eb0c646 US My Data Keep 0.70 Neutral

>

> ###Get names of dataset

> names(ds)

[1] "StartDate" "EndDate" "Status"

[4] "IPAddress" "Progress" "Time"

[7] "Finished" "RecordedDate" "ResponseId"

[10] "RecipientLastName" "RecipientFirstName" "RecipientEmail"

[13] "ExternalReference" "LocationLatitude" "LocationLongitude"

[16] "DistributionChannel" "UserLanguage" "PROLIFICID"

[19] "BOT" "Consent" "High"

[22] "Neutral" "LOW" "M9"

[25] "B10" "B11" "B12"

[28] "S13" "S14" "S15"

[31] "S16" "T1" "T2"

[34] "T3" "T4" "T5"

[37] "M6" "M7" "M8"

[40] "IMC1" "IMC2" "IMCfu"

[43] "GEN" "AGE" "TENURE"

[46] "COAGE" "COAGE\_1\_TEXT" "EDU"

[49] "INDST" "INC" "MAR"

[52] "POSITION" "RACE" "ETH"

[55] "COSIZE" "PROLIFIC\_PID" "Country"

[58] "Source" "Delete" "sd"

[61] "IV"

>

> ###Check frequencies of IV

> table(ds$IV)

High Low Neutral

83 79 83

>

> ###Trim levels of IV

> ds$IV<-as.factor(ds$IV)

> levels(ds$IV)<-trim(levels(ds$IV))

>

> ###Get only age groups with reasonable sample sizes

> #ds<-subset(ds,(IV!="75-84"))

> #ds$AGE<-droplevels(ds$AGE)

>

> ###Check frequencies of IV

> table(ds$AGE)

18-24 25-34 35-44 45-54 55-59 60-64 65-74

25 85 72 30 15 12 6

>

> ###Combine levels

> #levels(ds$AGE)<-c("18-34","18-34","34-44","45-74","45-74","45-74","45-74")

>

> ###Check frequencies of IV

> table(ds$AGE)

18-24 25-34 35-44 45-54 55-59 60-64 65-74

25 85 72 30 15 12 6

>

> ###Get dataset with just dependent variable items

> ds1<-subset(ds, select=c(M9:M8))

> head(ds1)

M9 B10 B11 B12 S13 S14 S15 S16 T1 T2 T3 T4 T5 M6 M7 M8

1 1 0 0 0 1 1 1 0 1 1 0 1 1 1 1 0

2 4 4 4 4 4 3 4 3 4 4 4 3 4 4 4 4

3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

4 2 0 1 0 1 0 2 1 2 1 0 1 0 0 2 0

5 4 4 3 4 4 0 2 3 3 3 3 3 4 3 4 4

6 3 2 3 1 2 1 2 2 3 2 3 2 3 3 2 3

>

> ###Check correlations

> cor(ds1)

M9 B10 B11 B12 S13 S14 S15 S16 T1 T2 T3 T4 T5 M6 M7

M9 1.00 0.78 0.77 0.82 0.85 0.80 0.77 0.78 0.76 0.80 0.82 0.73 0.71 0.78 0.87

B10 0.78 1.00 0.69 0.85 0.84 0.79 0.82 0.80 0.66 0.79 0.83 0.67 0.68 0.73 0.69

B11 0.77 0.69 1.00 0.79 0.77 0.71 0.74 0.77 0.73 0.75 0.74 0.67 0.67 0.73 0.71

B12 0.82 0.85 0.79 1.00 0.92 0.84 0.86 0.85 0.72 0.86 0.89 0.69 0.74 0.79 0.79

S13 0.85 0.84 0.77 0.92 1.00 0.83 0.85 0.86 0.73 0.89 0.90 0.71 0.74 0.81 0.79

S14 0.80 0.79 0.71 0.84 0.83 1.00 0.83 0.79 0.67 0.81 0.82 0.66 0.68 0.75 0.75

S15 0.77 0.82 0.74 0.86 0.85 0.83 1.00 0.83 0.69 0.82 0.84 0.68 0.74 0.75 0.71

S16 0.78 0.80 0.77 0.85 0.86 0.79 0.83 1.00 0.72 0.83 0.84 0.69 0.74 0.73 0.71

T1 0.76 0.66 0.73 0.72 0.73 0.67 0.69 0.72 1.00 0.75 0.73 0.78 0.70 0.74 0.74

T2 0.80 0.79 0.75 0.86 0.89 0.81 0.82 0.83 0.75 1.00 0.88 0.73 0.73 0.79 0.77

T3 0.82 0.83 0.74 0.89 0.90 0.82 0.84 0.84 0.73 0.88 1.00 0.69 0.74 0.78 0.76

T4 0.73 0.67 0.67 0.69 0.71 0.66 0.68 0.69 0.78 0.73 0.69 1.00 0.68 0.68 0.70

T5 0.71 0.68 0.67 0.74 0.74 0.68 0.74 0.74 0.70 0.73 0.74 0.68 1.00 0.76 0.73

M6 0.78 0.73 0.73 0.79 0.81 0.75 0.75 0.73 0.74 0.79 0.78 0.68 0.76 1.00 0.77

M7 0.87 0.69 0.71 0.79 0.79 0.75 0.71 0.71 0.74 0.77 0.76 0.70 0.73 0.77 1.00

M8 0.92 0.80 0.77 0.86 0.87 0.82 0.80 0.80 0.74 0.82 0.85 0.72 0.76 0.78 0.87

M8

M9 0.92

B10 0.80

B11 0.77

B12 0.86

S13 0.87

S14 0.82

S15 0.80

S16 0.80

T1 0.74

T2 0.82

T3 0.85

T4 0.72

T5 0.76

M6 0.78

M7 0.87

M8 1.00

> write.csv(cor(ds1),"itemcor.csv")

> sum(abs(cor(ds1))[lower.tri(cor(ds1))]>.8)

[1] 39

> sum(abs(cor(ds1))[lower.tri(cor(ds1))]>.8)/length(cor(ds1)[lower.tri(cor(ds1))])

[1] 0.32

>

> ###Factor analysis using principal axis factoring, 3 factors, promax rotation

> fa1<-fa(ds1,fm="pa",nfactors=4,rotate="promax")

maximum iteration exceeded

>

> ###Results

> print.psych(fa1,sort=TRUE)

Factor Analysis using method = pa

Call: fa(r = ds1, nfactors = 4, rotate = "promax", fm = "pa")

Standardized loadings (pattern matrix) based upon correlation matrix

item PA1 PA3 PA2 PA4 h2 u2 com

B10 2 0.87 0.05 -0.02 -0.01 0.79 0.210 1.0

S15 7 0.86 -0.06 0.02 0.10 0.84 0.164 1.0

B12 4 0.86 0.14 -0.03 0.01 0.91 0.092 1.1

S13 5 0.81 0.18 0.00 -0.01 0.91 0.090 1.1

T3 11 0.81 0.09 0.03 0.03 0.87 0.132 1.0

S16 8 0.80 -0.07 0.16 0.05 0.83 0.173 1.1

S14 6 0.74 0.22 -0.03 -0.03 0.79 0.208 1.2

T2 10 0.69 0.06 0.19 0.03 0.84 0.156 1.2

B11 3 0.44 0.16 0.32 -0.03 0.70 0.299 2.1

M6 14 0.31 0.24 0.15 0.25 0.75 0.246 3.3

M7 15 -0.04 0.78 0.08 0.14 0.86 0.144 1.1

M9 1 0.22 0.76 0.12 -0.12 0.91 0.085 1.3

M8 16 0.31 0.69 -0.04 0.03 0.92 0.081 1.4

T1 9 -0.03 0.03 0.98 -0.02 0.92 0.084 1.0

T4 12 0.14 0.10 0.56 0.08 0.69 0.311 1.2

T5 13 0.11 0.05 0.04 0.77 0.86 0.145 1.1

PA1 PA3 PA2 PA4

SS loadings 7.10 3.02 2.17 1.08

Proportion Var 0.44 0.19 0.14 0.07

Cumulative Var 0.44 0.63 0.77 0.84

Proportion Explained 0.53 0.23 0.16 0.08

Cumulative Proportion 0.53 0.76 0.92 1.00

With factor correlations of

PA1 PA3 PA2 PA4

PA1 1.00 0.83 0.79 0.77

PA3 0.83 1.00 0.79 0.74

PA2 0.79 0.79 1.00 0.76

PA4 0.77 0.74 0.76 1.00

Mean item complexity = 1.3

Test of the hypothesis that 4 factors are sufficient.

df null model = 120 with the objective function = 23 with Chi Square = 5377

df of the model are 62 and the objective function was 0.43

The root mean square of the residuals (RMSR) is 0.01

The df corrected root mean square of the residuals is 0.01

The harmonic n.obs is 245 with the empirical chi square 5.5 with prob < 1

The total n.obs was 245 with Likelihood Chi Square = 102 with prob < 0.0011

Tucker Lewis Index of factoring reliability = 0.98

RMSEA index = 0.051 and the 90 % confidence intervals are 0.032 0.069

BIC = -239

Fit based upon off diagonal values = 1

Measures of factor score adequacy

PA1 PA3 PA2 PA4

Correlation of (regression) scores with factors 0.99 0.98 0.97 0.93

Multiple R square of scores with factors 0.98 0.95 0.94 0.87

Minimum correlation of possible factor scores 0.95 0.90 0.88 0.74

> print(fa1$Structure,cut=NULL)

Loadings:

PA1 PA3 PA2 PA4

M9 0.85 0.94 0.80 0.70

B10 0.89 0.75 0.70 0.68

B11 0.80 0.76 0.77 0.67

B12 0.95 0.83 0.76 0.74

S13 0.95 0.84 0.77 0.74

S14 0.88 0.80 0.71 0.68

S15 0.91 0.75 0.74 0.74

S16 0.90 0.75 0.77 0.73

T1 0.75 0.75 0.96 0.72

T2 0.91 0.80 0.80 0.74

T3 0.93 0.81 0.76 0.74

T4 0.73 0.72 0.81 0.69

T5 0.77 0.74 0.75 0.92

M6 0.82 0.80 0.77 0.78

M7 0.78 0.92 0.77 0.75

M8 0.88 0.94 0.78 0.75

PA1 PA3 PA2 PA4

SS loadings 11.82 10.48 9.7 8.72

Proportion Var 0.74 0.66 0.6 0.54

Cumulative Var 0.74 1.39 2.0 2.54

> write.csv(cbind(fa1$loadings[,],fa1$communality),"InitialPattern.csv")

> write.csv(fa1$Structure[,],"InitialStructure.csv")

>

> ###Factor analyss using principal axis factoring, 2 factors, promax rotation

> fa2<-fa(ds1,fm="pa",nfactors=3,rotate="promax")

>

> ###Results

> print.psych(fa2)

Factor Analysis using method = pa

Call: fa(r = ds1, nfactors = 3, rotate = "promax", fm = "pa")

Standardized loadings (pattern matrix) based upon correlation matrix

PA1 PA3 PA2 h2 u2 com

M9 0.18 0.70 0.10 0.89 0.107 1.2

B10 0.85 0.06 -0.01 0.79 0.211 1.0

B11 0.40 0.15 0.34 0.70 0.303 2.2

B12 0.84 0.15 -0.02 0.91 0.092 1.1

S13 0.78 0.19 0.01 0.91 0.091 1.1

S14 0.72 0.23 -0.03 0.79 0.209 1.2

S15 0.87 -0.04 0.10 0.84 0.165 1.0

S16 0.79 -0.07 0.21 0.83 0.172 1.2

T1 -0.03 0.04 0.92 0.85 0.146 1.0

T2 0.67 0.06 0.23 0.84 0.156 1.3

T3 0.79 0.10 0.06 0.87 0.131 1.0

T4 0.11 0.08 0.69 0.71 0.294 1.1

T5 0.32 0.17 0.39 0.68 0.324 2.3

M6 0.35 0.27 0.30 0.75 0.254 2.9

M7 -0.03 0.80 0.18 0.86 0.142 1.1

M8 0.30 0.70 -0.01 0.92 0.078 1.4

PA1 PA3 PA2

SS loadings 7.08 3.15 2.90

Proportion Var 0.44 0.20 0.18

Cumulative Var 0.44 0.64 0.82

Proportion Explained 0.54 0.24 0.22

Cumulative Proportion 0.54 0.78 1.00

With factor correlations of

PA1 PA3 PA2

PA1 1.00 0.83 0.81

PA3 0.83 1.00 0.80

PA2 0.81 0.80 1.00

Mean item complexity = 1.4

Test of the hypothesis that 3 factors are sufficient.

df null model = 120 with the objective function = 23 with Chi Square = 5377

df of the model are 75 and the objective function was 0.55

The root mean square of the residuals (RMSR) is 0.01

The df corrected root mean square of the residuals is 0.02

The harmonic n.obs is 245 with the empirical chi square 8.7 with prob < 1

The total n.obs was 245 with Likelihood Chi Square = 130 with prob < 8.1e-05

Tucker Lewis Index of factoring reliability = 0.98

RMSEA index = 0.055 and the 90 % confidence intervals are 0.039 0.07

BIC = -282

Fit based upon off diagonal values = 1

Measures of factor score adequacy

PA1 PA3 PA2

Correlation of (regression) scores with factors 0.99 0.97 0.96

Multiple R square of scores with factors 0.98 0.95 0.92

Minimum correlation of possible factor scores 0.95 0.90 0.84

> print(fa2$Structure,cut=NULL)

Loadings:

PA1 PA3 PA2

M9 0.84 0.93 0.81

B10 0.89 0.75 0.72

B11 0.80 0.75 0.78

B12 0.95 0.83 0.78

S13 0.95 0.84 0.79

S14 0.88 0.80 0.73

S15 0.91 0.76 0.76

S16 0.90 0.75 0.79

T1 0.74 0.75 0.92

T2 0.91 0.80 0.82

T3 0.93 0.81 0.78

T4 0.72 0.71 0.83

T5 0.77 0.74 0.78

M6 0.82 0.80 0.80

M7 0.78 0.92 0.80

M8 0.88 0.95 0.80

PA1 PA3 PA2

SS loadings 11.76 10.48 10.11

Proportion Var 0.73 0.66 0.63

Cumulative Var 0.73 1.39 2.02

>

>

> ###Eliminate variables that did not load on theoretical factor

> #ds2<-subset(ds1,select=-c(ITE2))

>

> ###Factor analyss using principal axis factoring, 2 factors, promax rotation

> fa3<-fa(ds2,fm="pa",nfactors=2,rotate="promax")

Error: object 'ds2' not found

>

> ###Results

> print.psych(fa3,sort=TRUE)

Error: object 'fa3' not found

> print(fa3$Structure,cut=NULL)

Error: object 'fa3' not found

>

> ###Run following code when simple order factor structure obtained for factor analyis object

>

> ###Set dsx to dataset where simple order factor structure obtained

> ###Set fa to factor analyses for retained factor structure

> dsx<-ds1

> fa<-fa2

>

> ###Results

> print.psych(fa)

Factor Analysis using method = pa

Call: fa(r = ds1, nfactors = 3, rotate = "promax", fm = "pa")

Standardized loadings (pattern matrix) based upon correlation matrix

PA1 PA3 PA2 h2 u2 com

M9 0.18 0.70 0.10 0.89 0.107 1.2

B10 0.85 0.06 -0.01 0.79 0.211 1.0

B11 0.40 0.15 0.34 0.70 0.303 2.2

B12 0.84 0.15 -0.02 0.91 0.092 1.1

S13 0.78 0.19 0.01 0.91 0.091 1.1

S14 0.72 0.23 -0.03 0.79 0.209 1.2

S15 0.87 -0.04 0.10 0.84 0.165 1.0

S16 0.79 -0.07 0.21 0.83 0.172 1.2

T1 -0.03 0.04 0.92 0.85 0.146 1.0

T2 0.67 0.06 0.23 0.84 0.156 1.3

T3 0.79 0.10 0.06 0.87 0.131 1.0

T4 0.11 0.08 0.69 0.71 0.294 1.1

T5 0.32 0.17 0.39 0.68 0.324 2.3

M6 0.35 0.27 0.30 0.75 0.254 2.9

M7 -0.03 0.80 0.18 0.86 0.142 1.1

M8 0.30 0.70 -0.01 0.92 0.078 1.4

PA1 PA3 PA2

SS loadings 7.08 3.15 2.90

Proportion Var 0.44 0.20 0.18

Cumulative Var 0.44 0.64 0.82

Proportion Explained 0.54 0.24 0.22

Cumulative Proportion 0.54 0.78 1.00

With factor correlations of

PA1 PA3 PA2

PA1 1.00 0.83 0.81

PA3 0.83 1.00 0.80

PA2 0.81 0.80 1.00

Mean item complexity = 1.4

Test of the hypothesis that 3 factors are sufficient.

df null model = 120 with the objective function = 23 with Chi Square = 5377

df of the model are 75 and the objective function was 0.55

The root mean square of the residuals (RMSR) is 0.01

The df corrected root mean square of the residuals is 0.02

The harmonic n.obs is 245 with the empirical chi square 8.7 with prob < 1

The total n.obs was 245 with Likelihood Chi Square = 130 with prob < 8.1e-05

Tucker Lewis Index of factoring reliability = 0.98

RMSEA index = 0.055 and the 90 % confidence intervals are 0.039 0.07

BIC = -282

Fit based upon off diagonal values = 1

Measures of factor score adequacy

PA1 PA3 PA2

Correlation of (regression) scores with factors 0.99 0.97 0.96

Multiple R square of scores with factors 0.98 0.95 0.92

Minimum correlation of possible factor scores 0.95 0.90 0.84

> print(fa$Structure,cut=NULL)

Loadings:

PA1 PA3 PA2

M9 0.84 0.93 0.81

B10 0.89 0.75 0.72

B11 0.80 0.75 0.78

B12 0.95 0.83 0.78

S13 0.95 0.84 0.79

S14 0.88 0.80 0.73

S15 0.91 0.76 0.76

S16 0.90 0.75 0.79

T1 0.74 0.75 0.92

T2 0.91 0.80 0.82

T3 0.93 0.81 0.78

T4 0.72 0.71 0.83

T5 0.77 0.74 0.78

M6 0.82 0.80 0.80

M7 0.78 0.92 0.80

M8 0.88 0.95 0.80

PA1 PA3 PA2

SS loadings 11.76 10.48 10.11

Proportion Var 0.73 0.66 0.63

Cumulative Var 0.73 1.39 2.02

>

> ###Run following code when simple order factor structure obtained for factor analyis object

> write.csv(cbind(fa$loadings[,],h2=fa$communality),"FinalPattern.csv")

> write.csv(fa$Structure[,],"FinalStructure.csv")

> fa$e.values

[1] 12.604 0.613 0.421 0.364 0.323 0.259 0.228 0.215 0.190 0.148

[11] 0.140 0.134 0.121 0.103 0.073 0.066

>

> ###Check assumptions

>

> ###Get determinant (should be greater than 0)

> det(cor(dsx))

[1] 1.5e-10

>

> ###Get KMO (should be greater than .5)

> KMO(cor(dsx))

Kaiser-Meyer-Olkin factor adequacy

Call: KMO(r = cor(dsx))

Overall MSA = 0.97

MSA for each item =

M9 B10 B11 B12 S13 S14 S15 S16 T1 T2 T3 T4 T5 M6 M7 M8

0.96 0.98 0.98 0.97 0.97 0.98 0.98 0.98 0.97 0.98 0.98 0.97 0.97 0.98 0.97 0.96

>

> ###Check if correlation matrix is an identity matrix (p should be less than .05)

> cortest.bartlett(cor(dsx),n=nrow(dsx))

$chisq

[1] 5377

$p.value

[1] 0

$df

[1] 120

>

> ###Recode if necessary

> #dsx$VI1r<-recode(dsx$VI1,'1=7; 2=6; 3=5; 4=4; 5=3; 6=2; 7=1')

>

> ###Reliability

> names(dsx)

[1] "M9" "B10" "B11" "B12" "S13" "S14" "S15" "S16" "T1" "T2" "T3" "T4"

[13] "T5" "M6" "M7" "M8"

> B=c("B10","B11","B12")

> M=c("M6","M7","M8","M9")

> T=c("T1","T2","T3","T4","T5")

> S=c("S13","S14","S15","S16")

> keys.list<-list(M=M,B=B,S=S,T=T)

> keys<-make.keys(dsx,keys.list)

> scores<-scoreItems(keys,dsx)

> scores$alpha

M B S T

alpha 0.95 0.91 0.95 0.93

>

> ###Check if alpha could be increased by dropping an item

> alpha(dsx[,B])$alpha.drop

raw\_alpha std.alpha G6(smc) average\_r S/N alpha se var.r med.r

B10 0.88 0.88 0.79 0.79 7.7 0.015 NA 0.79

B11 0.92 0.92 0.85 0.85 11.6 0.010 NA 0.85

B12 0.82 0.82 0.69 0.69 4.5 0.023 NA 0.69

> alpha(dsx[,S])$alpha.drop

raw\_alpha std.alpha G6(smc) average\_r S/N alpha se var.r med.r

S13 0.93 0.93 0.90 0.82 14 0.0077 5.0e-04 0.83

S14 0.94 0.94 0.92 0.84 16 0.0065 1.7e-04 0.85

S15 0.93 0.94 0.91 0.83 14 0.0072 1.0e-03 0.83

S16 0.94 0.94 0.91 0.84 16 0.0068 7.6e-05 0.83

> alpha(dsx[,T])$alpha.drop

raw\_alpha std.alpha G6(smc) average\_r S/N alpha se var.r med.r

T1 0.92 0.92 0.91 0.74 11 0.0081 0.0049 0.73

T2 0.91 0.91 0.89 0.72 10 0.0094 0.0013 0.72

T3 0.91 0.92 0.89 0.73 11 0.0089 0.0012 0.73

T4 0.92 0.93 0.91 0.76 12 0.0076 0.0037 0.73

T5 0.92 0.93 0.92 0.76 13 0.0077 0.0041 0.74

> alpha(dsx[,M])$alpha.drop

raw\_alpha std.alpha G6(smc) average\_r S/N alpha se var.r med.r

M6 0.96 0.96 0.94 0.88 23 0.0046 0.00081 0.87

M7 0.94 0.94 0.92 0.83 14 0.0073 0.00604 0.78

M8 0.93 0.93 0.90 0.81 13 0.0082 0.00269 0.78

M9 0.93 0.93 0.90 0.81 13 0.0081 0.00269 0.78

>

> ###Add scales scores to ds

> ds<-cbind(ds,scores$scores)

> head(ds)

StartDate EndDate Status IPAddress Progress Time

1 3/20/2024 14:29 3/20/2024 14:34 IP Address 73.234.212.220 100 5.3

2 3/20/2024 14:52 3/20/2024 14:57 IP Address 174.218.60.178 100 5.3

3 3/20/2024 14:55 3/20/2024 14:59 IP Address 104.251.240.96 100 4.1

4 3/20/2024 14:54 3/20/2024 15:00 IP Address 128.164.171.28 100 5.6

5 3/20/2024 15:02 3/20/2024 15:13 IP Address 50.96.225.169 100 10.2

6 3/20/2024 15:10 3/20/2024 15:14 IP Address 72.133.69.3 100 4.1

Finished RecordedDate ResponseId RecipientLastName

1 TRUE 3/20/2024 14:34 R\_2iVz22kgsG0YDzR NA

2 TRUE 3/20/2024 14:57 R\_1bJWTqz1iwRLS0N NA

3 TRUE 3/20/2024 14:59 R\_2kp2LaBNApuLkfu NA

4 TRUE 3/20/2024 15:00 R\_3wc8mwF69vysoo8 NA

5 TRUE 3/20/2024 15:13 R\_11d71W4kNe755zv NA

6 TRUE 3/20/2024 15:15 R\_3xhOPt3xFHAwUZX NA

RecipientFirstName RecipientEmail ExternalReference LocationLatitude

1 NA NA NA 42

2 NA NA NA 33

3 NA NA NA 35

4 NA NA NA 39

5 NA NA NA 43

6 NA NA NA 30

LocationLongitude DistributionChannel UserLanguage PROLIFICID

1 -71 anonymous EN 61242c81dba1388292653e09

2 -86 anonymous EN 650ca4eff5d56e16602567ba

3 -85 anonymous EN 5eb83f00de449a08d23547dd

4 -77 anonymous EN 61036710e1eb1d931b7a34a6

5 -76 anonymous EN 657228e3073464323075c94b

6 -98 anonymous EN 65de1ac696ee6f843eb0c646

BOT Consent

1 4 Yes

2 4 Yes

3 4 Yes

4 4 Yes

5 4 Yes

6 4 Yes

High

1

2 I have reviewed the research scenario and I am ready to answer questions

3

4

5

6

Neutral

1

2

3

4

5 I have reviewed the research scenario and I am ready to answer questions

6 I have reviewed the research scenario and I am ready to answer questions

LOW M9

1 I have reviewed the research scenario and I am ready to answer questions 1

2 4

3 I have reviewed the research scenario and I am ready to answer questions 0

4 I have reviewed the research scenario and I am ready to answer questions 2

5 4

6 3

B10 B11 B12 S13 S14 S15 S16 T1 T2 T3 T4 T5 M6 M7 M8 IMC1 IMC2 IMCfu GEN

1 0 0 0 1 1 1 0 1 1 0 1 1 1 1 0 NA 1 NA Female

2 4 4 4 4 3 4 3 4 4 4 3 4 4 4 4 NA 1 NA Female

3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 NA 1 NA Female

4 0 1 0 1 0 2 1 2 1 0 1 0 0 2 0 NA 1 NA Female

5 4 3 4 4 0 2 3 3 3 3 3 4 3 4 4 NA 1 NA Female

6 2 3 1 2 1 2 2 3 2 3 2 3 3 2 3 NA 1 NA Female

AGE TENURE COAGE COAGE\_1\_TEXT

1 25-34 1-2 years I don't know NA

2 25-34 less than 1 year I don't know NA

3 55-59 less than 1 year Yes 13

4 18-24 less than 1 year I don't know NA

5 45-54 more than 7 years Yes 75

6 18-24 less than 1 year I don't know NA

EDU

1 Bachelor's degree

2 High school or equivalent degree

3 Graduate or professional degree

4 Some college, no degree

5 Some college, no degree

6 Some college, no degree

INDST

1 Information

2 Arts, entertainment, recreation, accommodation, and food services

3 Professional, scientific, management, administrative, and waste management

4 Professional, scientific, management, administrative, and waste management

5 Educational services, health care, and social sciences

6 Arts, entertainment, recreation, accommodation, and food services

INC MAR POSITION

1 $1 to $9,999 or loss Never married Non-supervisory

2 $1 to $9,999 or loss Never married Non-supervisory

3 $100,000 or more Now married (except separated) Manager

4 $65,000 to $74,999 Never married Non-supervisory

5 $75,000 to $99,999 Now married (except separated) Non-supervisory

6 $10,000 to $14,999 Never married Non-supervisory

RACE ETH COSIZE

1 White Hispanic or Latino 100-499 employees

2 White Hispanic or Latino 1-4 employees

3 White Not Hispanic or Latino 500+ employees

4 Black or African American Not Hispanic or Latino 20-99 employees

5 White Not Hispanic or Latino 100-499 employees

6 White Not Hispanic or Latino 20-99 employees

PROLIFIC\_PID Country Source Delete sd IV M B S

1 61242c81dba1388292653e09 US My Data Keep 0.50 Low 0.75 0.00 0.75

2 650ca4eff5d56e16602567ba US My Data Keep 0.40 High 4.00 4.00 3.50

3 5eb83f00de449a08d23547dd US My Data Keep 0.00 Low 0.00 0.00 0.00

4 61036710e1eb1d931b7a34a6 US My Data Keep 0.83 Low 1.00 0.33 1.00

5 657228e3073464323075c94b US My Data Keep 1.05 Neutral 3.75 3.67 2.25

6 65de1ac696ee6f843eb0c646 US My Data Keep 0.70 Neutral 2.75 2.00 1.75

T

1 0.8

2 3.8

3 0.0

4 0.8

5 3.2

6 2.6

>

> sc<-subset(ds,select=c(M:T))

> (corm<-cor(sc))

M B S T

M 1.00 0.89 0.90 0.91

B 0.89 1.00 0.94 0.90

S 0.90 0.94 1.00 0.92

T 0.91 0.90 0.92 1.00

> (dstat<-describe(sc))

vars n mean sd median trimmed mad min max range skew kurtosis se

M 1 245 2.2 1.4 2.5 2.3 1.8 0 4 4 -0.33 -1.3 0.09

B 2 245 2.2 1.3 2.3 2.2 1.5 0 4 4 -0.34 -1.2 0.09

S 3 245 2.0 1.3 2.2 2.0 1.5 0 4 4 -0.31 -1.3 0.08

T 4 245 2.1 1.2 2.4 2.2 1.2 0 4 4 -0.38 -1.1 0.08

> (dstab<-rbind(corm,M=dstat$mean))

M B S T

M 1.00 0.89 0.90 0.91

B 0.89 1.00 0.94 0.90

S 0.90 0.94 1.00 0.92

T 0.91 0.90 0.92 1.00

M 2.23 2.20 2.02 2.11

> (dstab<-rbind(dstab,SD=dstat$sd))

M B S T

M 1.00 0.89 0.90 0.91

B 0.89 1.00 0.94 0.90

S 0.90 0.94 1.00 0.92

T 0.91 0.90 0.92 1.00

M 2.23 2.20 2.02 2.11

SD 1.41 1.33 1.32 1.22

> (dstab<-rbind(dstab,n=dstat$n))

M B S T

M 1.00 0.89 0.90 0.91

B 0.89 1.00 0.94 0.90

S 0.90 0.94 1.00 0.92

T 0.91 0.90 0.92 1.00

M 2.23 2.20 2.02 2.11

SD 1.41 1.33 1.32 1.22

n 245.00 245.00 245.00 245.00

> diag(dstab[-c((length(scores$alpha)+1):nrow(dstab)),])<-scores$alpha

> dstab

M B S T

M 0.95 0.89 0.90 0.91

B 0.89 0.91 0.94 0.90

S 0.90 0.94 0.95 0.92

T 0.91 0.90 0.92 0.93

M 2.23 2.20 2.02 2.11

SD 1.41 1.33 1.32 1.22

n 245.00 245.00 245.00 245.00

>

> write.csv(dstab,"dstab.csv")

>

> write.csv(ds,"ewpass.csv")

>