Maladaptive daydreaming and emotional regulation difficulties: A Network Analysis

Supplementary material

The supplementary material contains the following:

1. The regularized partial correlation edge weights of the maladaptive daydreaming (MD) network (supplementary table 1), and of the maladaptive daydreaming and difficulties in emotional regulation (MD-DERS) network (supplementary table 2).

2. Strength centrality for the MD-only network (supplementary figure 1) and of the MD-DERS network (supplementary figure 2)

3. Stability of the centrality indices of the MD network (supplementary figure 3), and of the MD-DERS network (supplementary figure 4).

4. Significant differences in strength centrality of the MD (supplementary figure 5), and the expanded maladaptive network and difficulties in emotional regulation network (supplementary figure 6).

5. Significant differences between edge weights of the maladaptive daydreaming network items (supplementary figure 7), and between edge weights of the maladaptive daydreaming and difficulties in emotional regulation (supplementary figure 8).

6. Bootstrapped edge weight stability in the MD network (supplementary figure 9), and in the MD and difficulties in the emotional regulation network (supplementary figure 10)

7. The R code for the analyses.

LEGEND:

X1=Music acts as a trigger
X2=Feel an urge to return to the daydream
X3=Makes noises and expressions while daydreaming
X4=Get distressed if don't have time to daydream
X5=Daydreaming interferes with daily chores
X6=The amount of time spent daydreaming causes distress
X7=Find it difficult to stay focused
X8=Daydreaming hinders life goals
X9=Have difficulty controlling the daydream
X10=Get annoyed if interrupted during the daydream
X11=Daydreaming interferes with work
X12=Prefer to daydream
X13=Have a strong urge to daydream
X14=Daydreams accompanied by physical activity
X15=Daydreaming an enjoyable experience
X16=Need music to maintain the daydream
A=Non-acceptance of emotional responses
B=Difficulties with goal-directed behaviors
C=Impulse control difficulties
D=Lack of emotional awareness
E=Limited emotional regulation strategies
F=Lack of emotional clarity

1. Regularized partial correlation matrices

Supplementary table 1: Regularized partial correlation matrix of the MD network

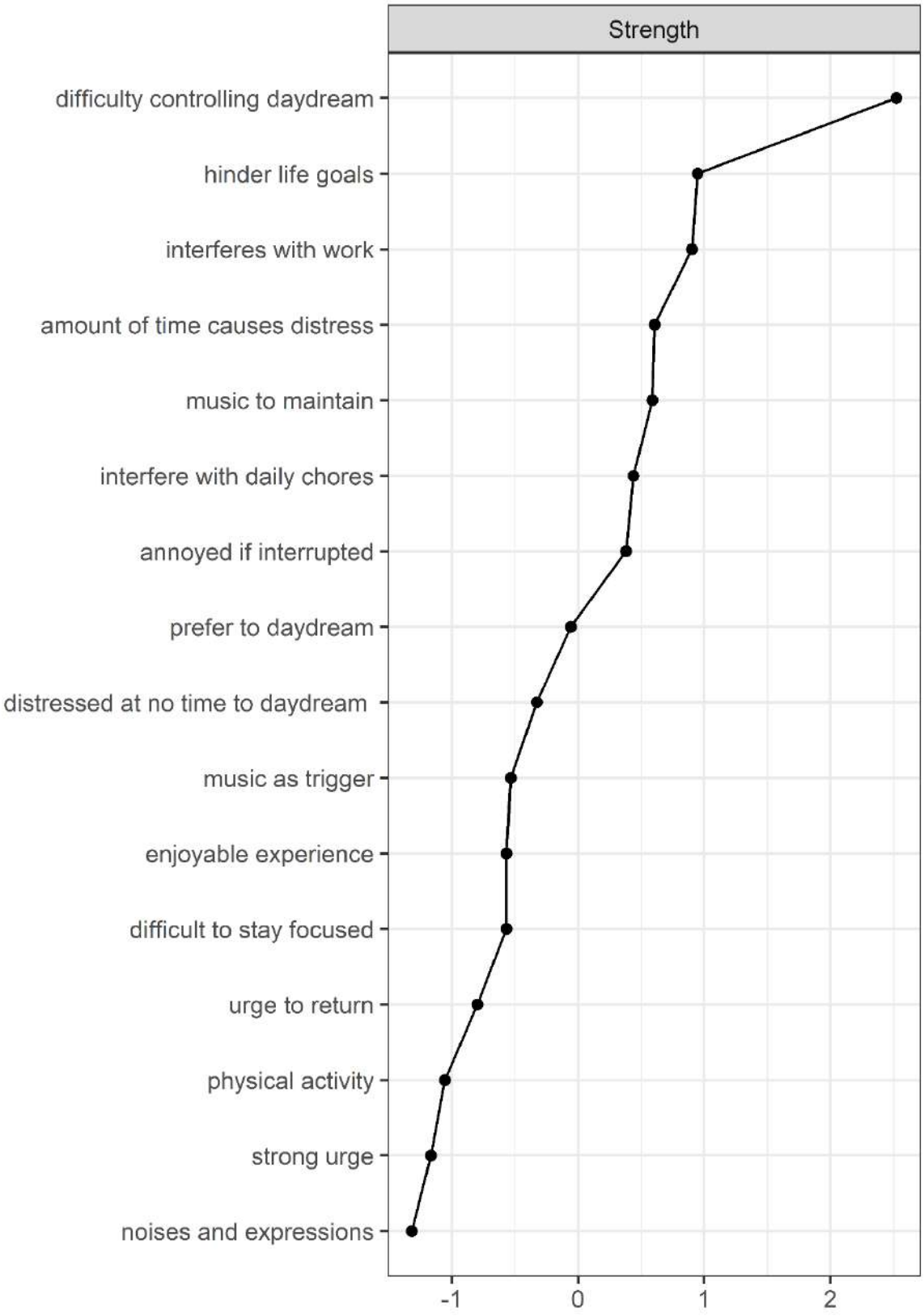
	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16
X1	0.00	0.00	0.00	0.02	0.00	0.00	0.06	0.00	0.13	0.00	0.01	0.00	0.02	0.04	0.17	0.40
X2	0.00	0.00	0.01	0.10	0.03	0.00	0.00	0.00	0.07	0.34	0.02	0.12	0.12	0.00	0.00	0.00
X3	0.00	0.01	0.00	0.04	0.05	0.02	0.01	0.00	0.10	0.01	0.00	0.04	0.00	0.29	0.10	-0.05
X4	0.02	0.10	0.04	0.00	0.04	0.00	0.00	0.00	0.03	0.27	0.00	0.16	0.12	0.05	0.00	0.04
X5	0.00	0.03	0.05	0.04	0.00	0.19	0.11	0.18	0.07	0.00	0.22	0.06	0.04	0.02	0.00	0.01
X6	0.00	0.00	0.02	0.00	0.19	0.00	0.10	0.25	0.28	0.00	0.07	0.00	0.00	0.00	-0.14	0.00
X7	0.06	0.00	0.01	0.00	0.11	0.10	0.00	0.07	0.19	0.00	0.20	0.04	0.03	0.03	0.00	0.00
X8	0.00	0.00	0.00	0.00	0.18	0.25	0.07	0.00	0.09	0.00	0.41	0.04	0.06	0.00	0.00	0.00
X9	0.13	0.07	0.10	0.03	0.07	0.28	0.19	0.09	0.00	0.05	0.04	0.05	0.11	0.05	-0.03	-0.09
X10	0.00	0.34	0.01	0.27	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.14	0.00	0.02	0.09	0.08
X11	0.01	0.02	0.00	0.00	0.22	0.07	0.20	0.41	0.04	0.00	0.00	0.06	0.03	0.00	0.00	0.04
X12	0.00	0.12	0.04	0.16	0.06	0.00	0.04	0.04	0.05	0.14	0.06	0.00	0.09	0.00	0.14	0.00
X13	0.02	0.12	0.00	0.12	0.04	0.00	0.03	0.06	0.11	0.00	0.03	0.09	0.00	0.00	0.12	-0.01
X14	0.04	0.00	0.29	0.05	0.02	0.00	0.03	0.00	0.05	0.02	0.00	0.00	0.00	0.00	0.00	0.26
X15	0.17	0.00	0.10	0.00	0.00	-0.14	0.00	0.00	-0.03	0.09	0.00	0.14	0.12	0.00	0.00	-0.07
X16	0.40	0.00	-0.05	0.04	0.01	0.00	0.00	0.00	-0.09	0.08	0.04	0.00	-0.01	0.26	-0.07	0.00

Supplementary table 2: Regularized partial correlation matrix of the MD and difficulties in emotional regulation network

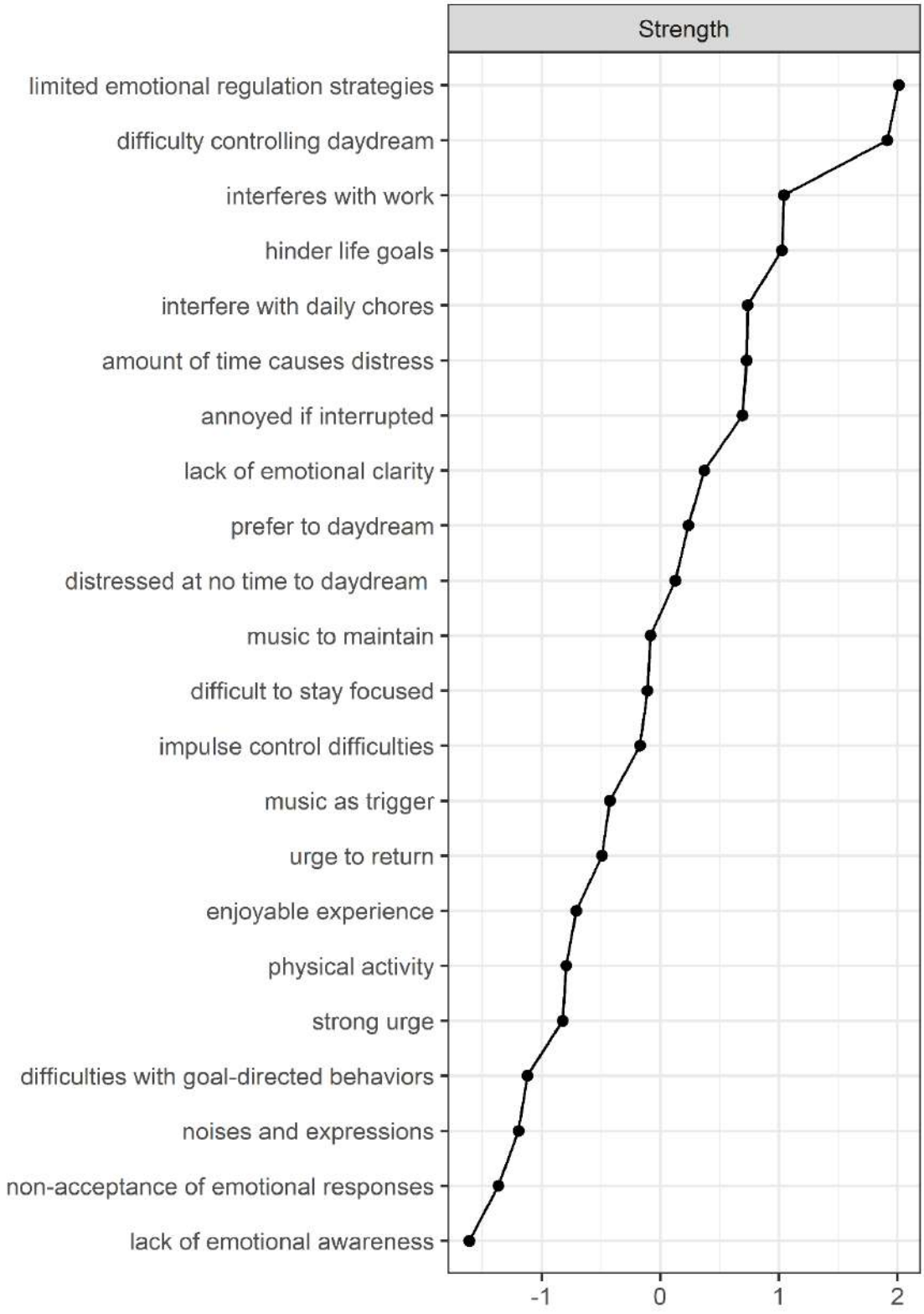
	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	A	B	C	D	E	F
X1	0	0	0	0.03	0	0	0.05	0	0.11	0.01	0.02	0	0.01	0.04	0.14	0.38	0	0	0.03	0	0	0
X2	0	0	0.01	0.1	0.03	0	0	0	0.07	0.33	0.02	0.12	0.12	0	0	0	0	0	0	0	0.01	0
X3	0	0.01	0	0.04	0.05	0.02	0.01	0	0.1	0.01	0	0.04	0	0.28	0.08	-0.02	0	0	0	0	0	-0.01
X4	0.03	0.1	0.04	0	0.03	0	0	0	0.03	0.26	0	0.16	0.12	0.05	0	0.02	0.01	0	0.02	0	0.01	0.04
X5	0	0.03	0.05	0.03	0	0.18	0.11	0.18	0.08	0	0.21	0.05	0.04	0.03	0	0	0	0.05	0	0	0	0
X6	0	0	0.02	0	0.18	0	0.1	0.24	0.27	0	0.07	0	0	0	-0.12	0	0	0	0	0	0	0.04
X7	0.05	0	0.01	0	0.11	0.1	0	0.08	0.18	0	0.2	0.03	0.03	0.03	0	0	0	0	0.05	0	0.01	0
X8	0	0	0	0	0.18	0.24	0.08	0	0.09	0	0.4	0.04	0.06	0	0	0	0	0	0.02	0	0	0
X9	0.11	0.07	0.1	0.03	0.08	0.27	0.18	0.09	0	0.04	0.04	0.05	0.1	0.04	0	-0.04	0	0	0	0.04	0	0
X10	0.01	0.33	0.01	0.26	0	0	0	0	0.04	0	0	0.13	0	0.03	0.08	0.06	0.05	0	0	0	0.04	0
X11	0.02	0.02	0	0	0.21	0.07	0.2	0.4	0.04	0	0	0.05	0.02	0	0	0.01	0	0.05	0	0	0	0
X12	0	0.12	0.04	0.16	0.05	0	0.03	0.04	0.05	0.13	0.05	0	0.09	0	0.13	0	0	0	0	0.01	0.04	0
X13	0.01	0.12	0	0.12	0.04	0	0.03	0.06	0.1	0	0.02	0.09	0	0	0.1	0	0	0	0	0	0.04	0
X14	0.04	0	0.28	0.05	0.03	0	0.03	0	0.04	0.03	0	0	0	0	0	0.24	0	0	0	0.01	0	0
X15	0.14	0	0.08	0	0	-0.12	0	0	0	0.08	0	0.13	0.1	0	0	-0.03	0.03	0	0	0	0	-0.06
X16	0.38	0	-0.02	0.02	0	0	0	0	-0.04	0.06	0.01	0	0	0.24	-0.03	0	0	0.01	0.05	0	0	0.02
A	0	0	0	0.01	0	0	0	0	0	0.05	0	0	0	0	0	0.03	0	0	0.02	0.07	0.34	0.11
B	0	0	0	0	0.05	0	0	0	0	0	0.05	0	0	0	0	0.01	0	0	0.22	-0.02	0.34	0
C	0.03	0	0	0.02	0	0	0.05	0.02	0	0	0	0	0	0	0	0.05	0.02	0.22	0	0	0.34	0.12
D	0	0	0	0	0	0	0	0	0.04	0	0	0.01	0	0.01	0	0	0.07	-0.02	0	0	0	0.43
E	0	0.01	0	0.01	0	0	0.01	0	0	0.04	0	0.04	0.04	0	0	0	0.34	0.34	0.34	0	0	0.13
F	0	0	-0.01	0.04	0	0.04	0	0	0	0	0	0	0	0	-0.06	0.02	0.11	0	0.12	0.43	0.13	0

2. Strength centrality

Supplementary figure 1: Strength centrality of the MD network

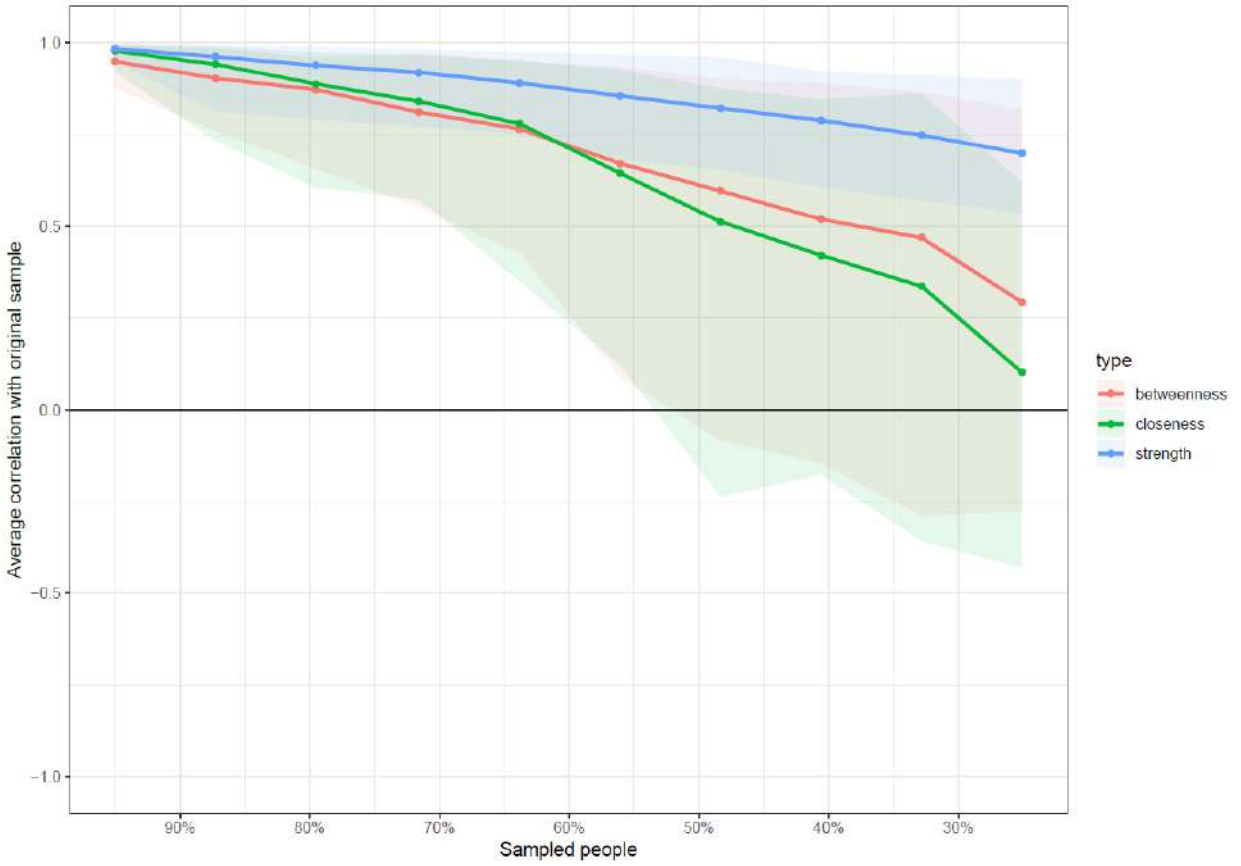


Supplementary figure 2: Strength centrality of the MD-DERS network

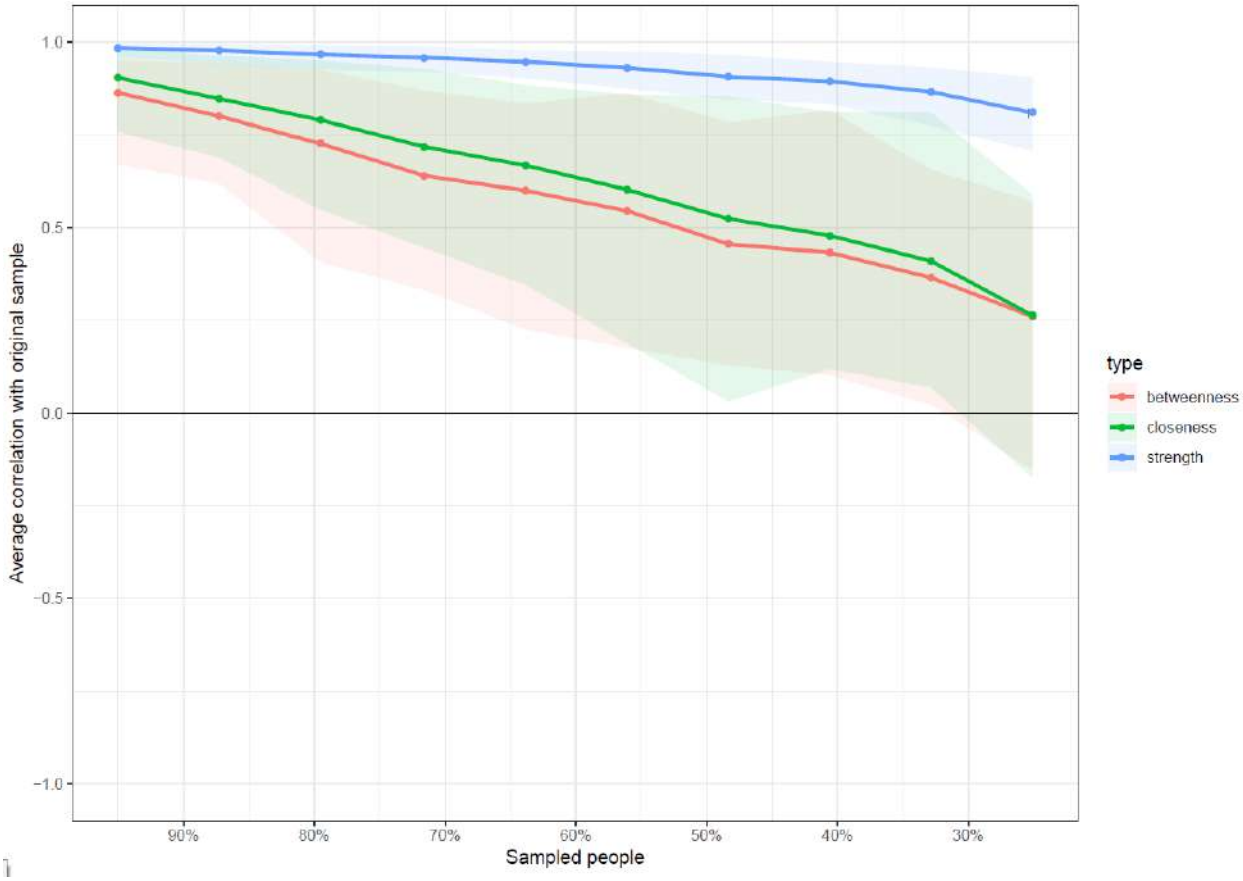


3. Bootstrapped centrality stability

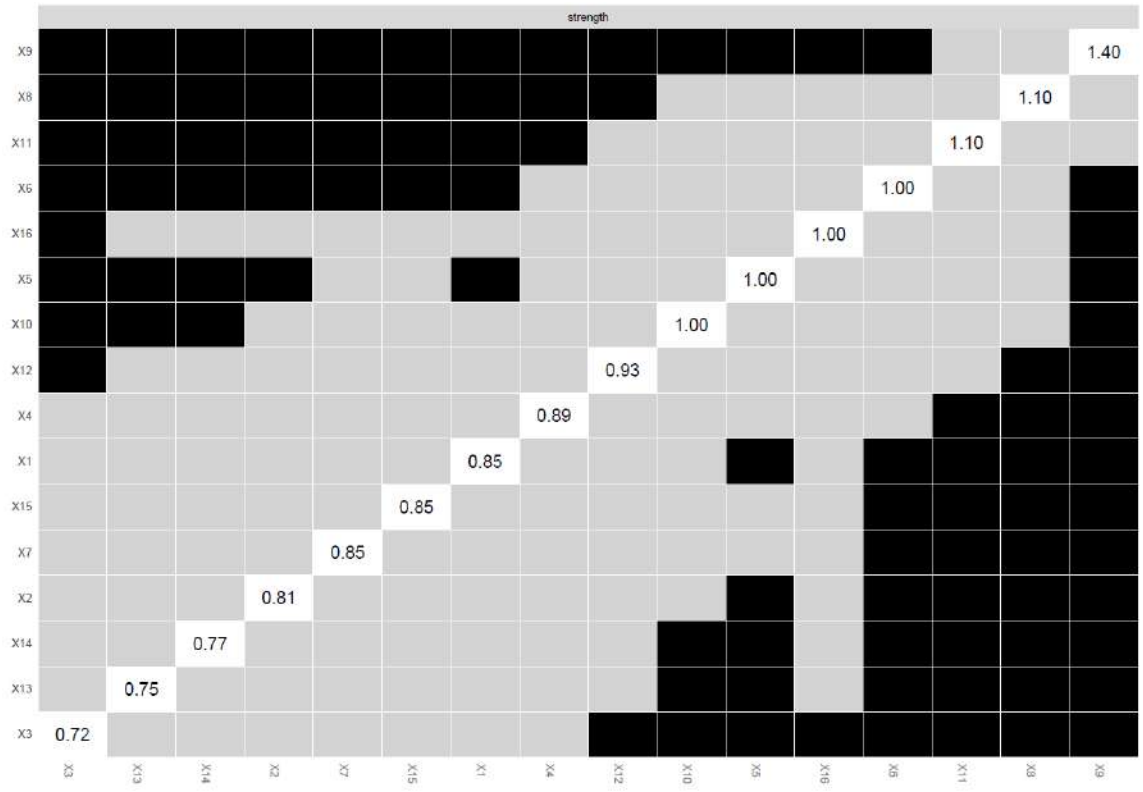
Supplementary figure 3: Bootstrapped stability of the centrality indices of the MD network



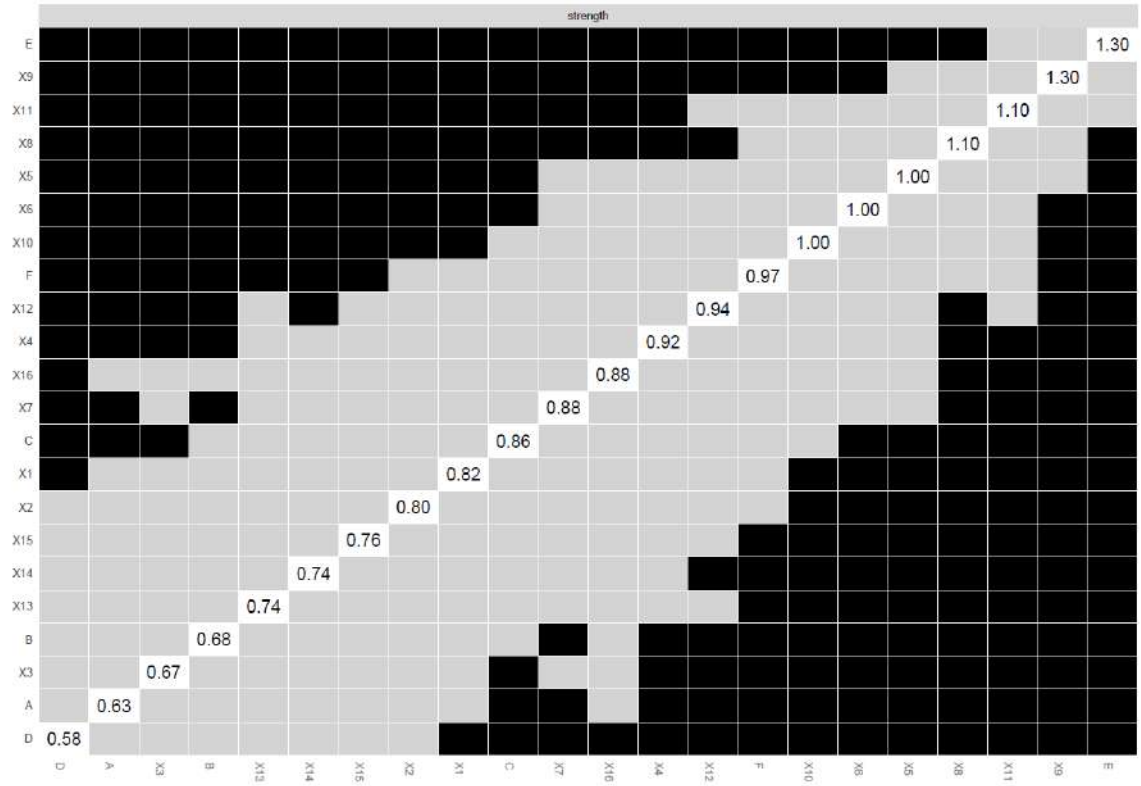
Supplementary figure 4: Bootstrapped centrality stability of the MD and difficulties in emotional regulation network



4. Strength centrality differences



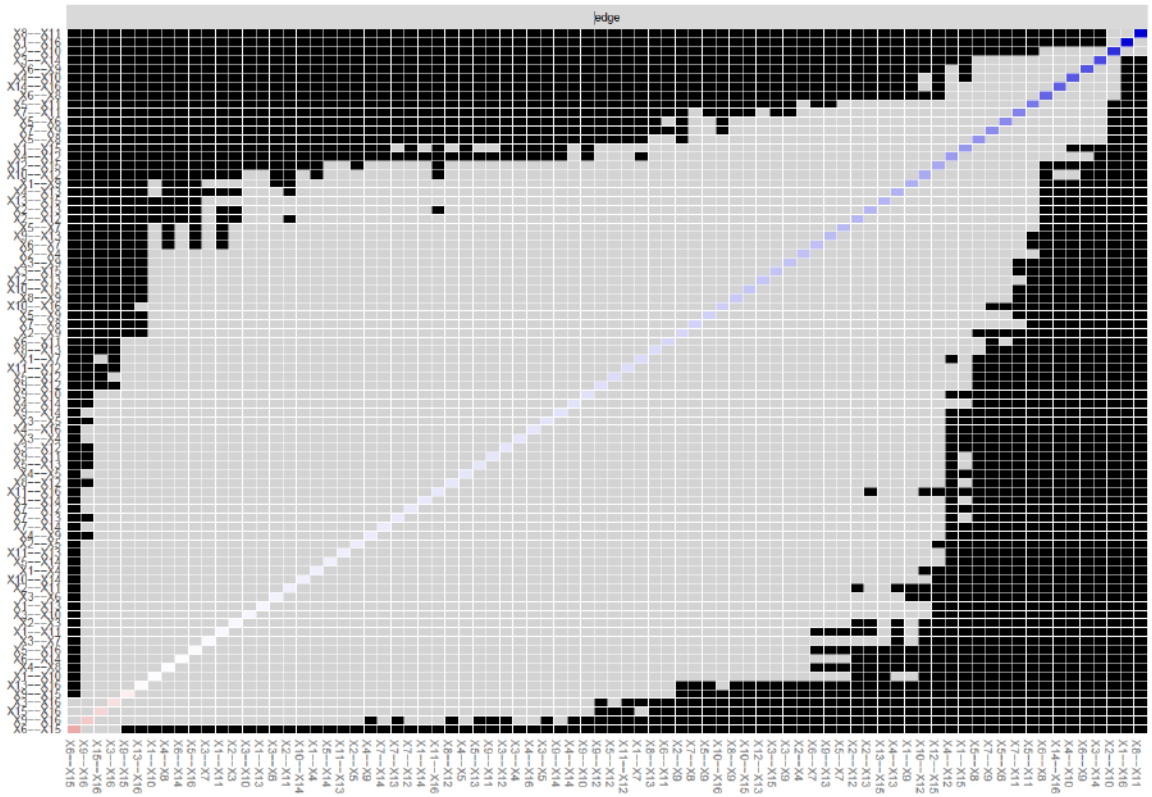
Supplementary figure 5: Strength centrality differences of items in the MD network
Note – black indicates significant difference



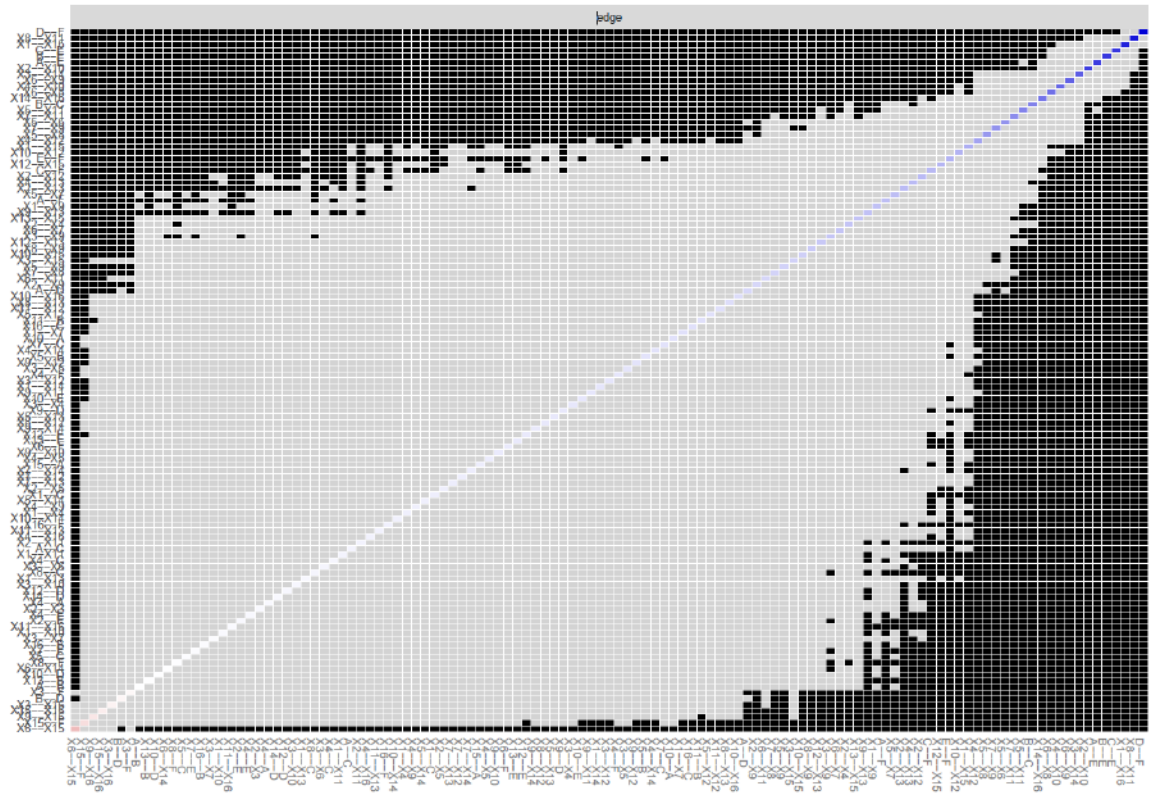
Supplementary figure 6: Strength centrality differences of items in the MD and difficulties in emotional regulation network
Note – black indicates significant differences

5. Edge weight differences

Supplementary figure 7 : Significant differences between edge weights in the MD network
Note – black indicates significant differences

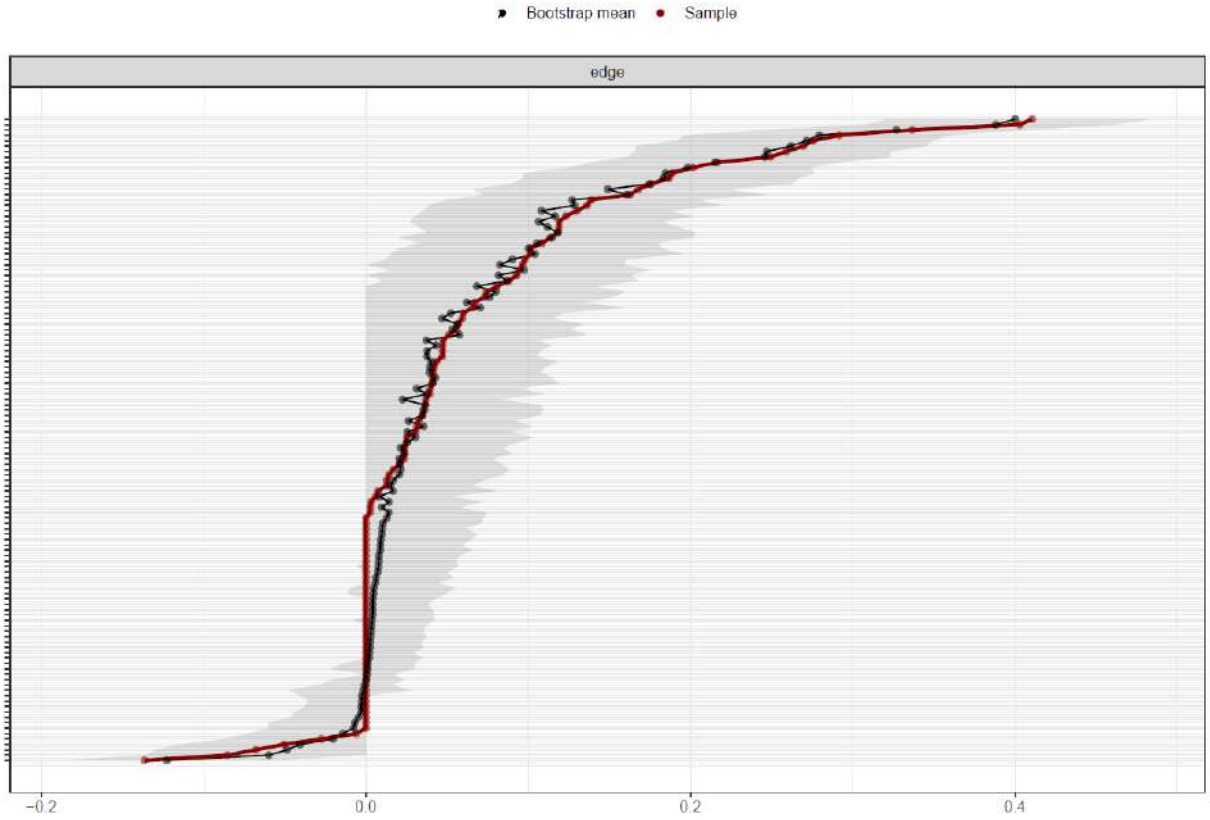


Supplementary figure 8: Significant differences between edge weights in the MD and difficulties in emotional regulation network
Note – black indicates significant differences

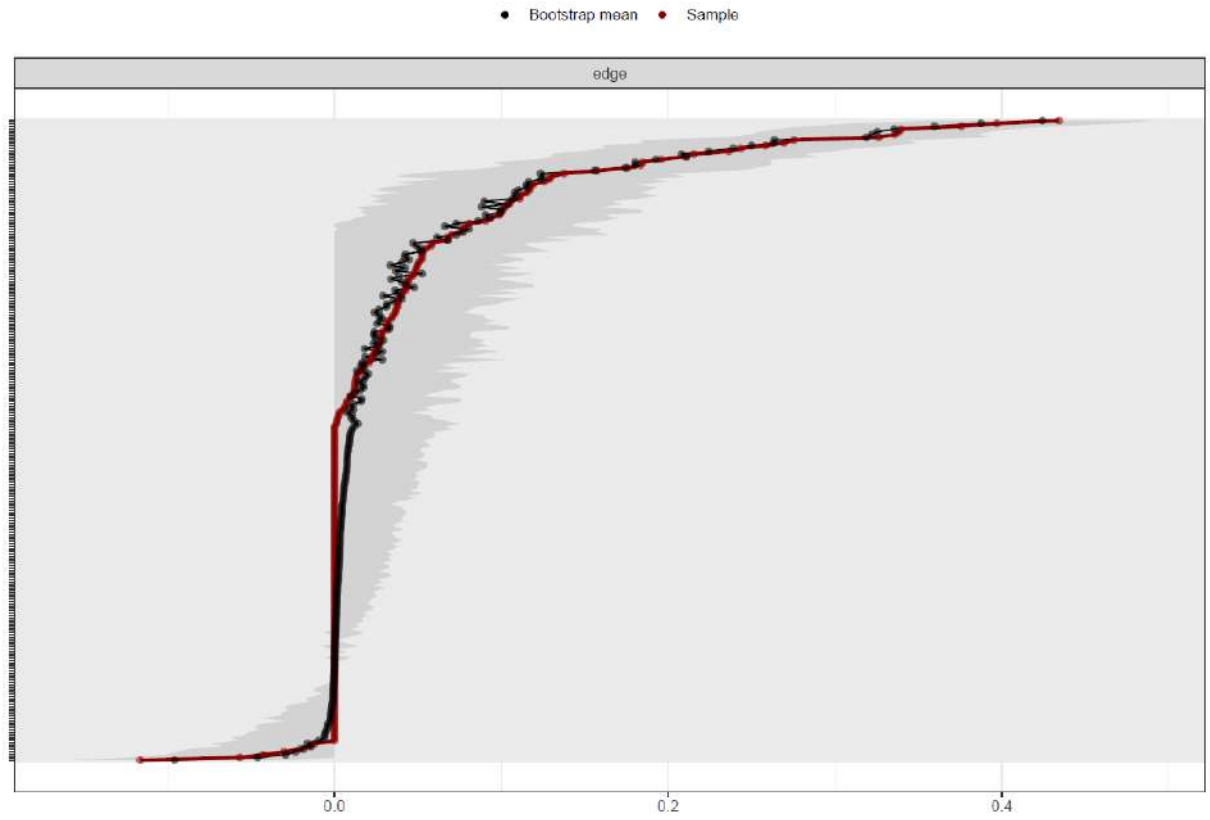


6. Bootstrapped edge weight stability

Supplementary figure 9: bootstrapped edge weight stability of the MD network



Supplementary figure 10: bootstrapped edge weight stability of the MD and difficulties in emotional regulation network



7. Code for analyses

```
#------------------------------------------------------------------------------
#                    1. Install/load the libraries
#------------------------------------------------------------------------------



setwd("C:/Users/Talya/Dropbox/Maladaptive Daydreaming/New analyses")
devtools::install_github('sachaepskamp/bootnet')
devtools::install_github('hfgolino/EGA')
devtools::install_github('jmbh/mgm')
devtools::install_github('sachaepskamp/qgraph')
install.packages("igraph")
install.packages("plotly")
library("plotly")
library('qgraph')
library('IsingFit')
library('bootnet')
library('networktools')
library('EGA')
library('igraph')
library('dplyr')
library('mgm')
library('ggplot2')



#------------------------------------------------------------------------------
#                    2. Get data
#------------------------------------------------------------------------------

#read in the csv file
data<-read.csv("data2.csv",header=TRUE)

#names of the variables
vars <- c("1", "2", "3", "4", "5",
```

```
        "6", "7", "8", "9", "10", "11", "12", "13", "14", "15", "16")


#-------------------------------------------------------------------------------
#                   3. Estimate model
#-------------------------------------------------------------------------------



# estimate gaussian graphical model using spearman correlations (see
file:///C:/Users/Talya/Downloads/Briganti2018NA_Empathy.pdf)
Model<- estimateNetwork(data, default="EBICglasso", corMethod="cor", corArgs=list(method="spearman",
use="pairwise.complete.obs"))



#save the model
#save(Model, file="ModelMD.Rdata")


#load the model (if you don't want to rerun it next time)
load(file="ModelMD.Rdata")


names<- c("music as trigger", "urge to return", "noises and expressions", "distressed at no time to daydream ",
"interfere with daily chores",
        "amount of time causes distress", "difficult to stay focused", "hinder life goals", "difficulty controlling
daydream", "annoyed if interrupted", "interferes with work", "prefer to daydream", "strong urge", "physical
activity", "enjoyable experience", "music to maintain")



#-------------------------------------------------------------------------------
#                   4. Plot initial network model
#-------------------------------------------------------------------------------



#plot the network
Network <- plot(Model, title="Daydream Network2", theme="colorblind", labels=TRUE,
```

```
nodeNames= names, legend.cex=.32,  border.width=1.5, border.color="black",negDashed=TRUE, cut = 0)

#get the layout for later
L<-averageLayout(Network)

#plot the network and save it as a pdf
pdf("Daydreaming Network2.pdf",width=10.5,height=6)
plot(Network, vsize=6.3, title = "Daydreaming Network2",nodeNames=names, labels=TRUE, theme = "colorblind",
legend.cex=.32,  border.width=1.5, border.color="black", cut = 0, layout = L, cut=0)
dev.off()



#-------------------------------------------------------------------------------
#                    5. Centrality and edge weights initial network model
#-------------------------------------------------------------------------------


#Save the centrality plots as a pdf
pdf("centrality.pdf",width=10.5,height=6)
centralityPlot(Network, signed=FALSE, labels=names, orderBy="Strength")
dev.off()


#Also the strength plots as a pdf and tiff
pdf("Strength.pdf", width=8, height=6)
centralityPlot(Network, include=c("Strength"), signed=FALSE, labels=names, orderBy="Strength")
dev.off()

tiff("Strength.tiff", width=5, height=7, units="in", res=800, compression="lzw")
centralityPlot(Network, include=c("Strength"), signed=FALSE, labels=names, orderBy="Strength")
dev.off()


#Get the centrality indices
centrality_auto(Network)
```

```
centralityIndices <- centrality_auto(Network)
centrality<-as.data.frame(centralityIndices$node.centrality)
centrality_auto <- as.data.frame(centralityIndices)
View(centrality_auto)


#create an edge weights table
DataFrame<-as.data.frame(Network$Edgelist)
View(DataFrame)
write.csv(DataFrame, "./Edgeweights.csv") # save matrix as table

#to create the partial correlation matrix
pcorMat <- getWmat(Model)
TableMat <- as.data.frame(pcorMat)
write.csv(TableMat, "./Correlationmatrix.csv")

#------------------------------------------------------------------------------
#                    6. Stability and accuracy initial network model
#------------------------------------------------------------------------------



### Non-parametric bootstrap ###
# Bootstrap 1000 values, using 8 cores:
# stabilility
boot1 <- bootnet(Model, ncores=7, nboots=2000)
boot2 <- bootnet(Model, ncores=7, nboots=2000, type="case")
#save(boot1, file = "boot1.Rdata")
#save(boot2, file = "boot2.Rdata")

#load the boots: modify file path
#load(file = "boot1.Rdata")
#load(file = "boot2.Rdata")

# Edge weight bootstrap
```

```
edgeWeightFig <- plot(boot1, labels = FALSE, order = "sample")
pdf("Edge weight bootstrap.pdf", width=10, height=7)
plot(boot1, labels = FALSE, order = "sample")
dev.off()

# Edge weight difference: is edge X significantly larger than edge Y? Black=Y Gray=N
boot3 <- plot(boot1, "edge", plot = "difference", onlyNonZero = TRUE, order = "sample")
plot(boot3)
pdf("Edge weight difference.pdf", width=10, height=7)
plot(boot3)
dev.off()

#Centrality Bootstrap
plot(boot2)
cs1 <- corStability(boot2)
pdf("Centrality bootstrap.pdf", width=10, height=7)
plot(boot2)
dev.off()

cs1
#betweenness   closeness    strength
#0.1286765     0.2058824    0.4393382

#Centrality difference: is node X significantly more central than node Y? Black=Yes, Gray=N
boot4 <- plot(boot1, "strength", order="sample", labels=TRUE)
pdf("Centrality difference.pdf", width=10, height=7)
plot(boot4)
dev.off()



#Fig - Edge weight difference: is edge X significantly larger than edge Y? Black=Y Gray=N
boot3 <- plot(boot1, "edge", plot = "difference", onlyNonZero = TRUE, order = "sample")
plot(boot3)
pdf("Edge weight difference.pdf", width=10, height=7)
```

```
plot(boot3)
dev.off()
```

```
#-------------------------------------------------------------------------------
#                    7. Communities in the initial network model
#-------------------------------------------------------------------------------

### eigenvalues
eigen(cor_auto(data))$values

#Run EGA
ega<- EGA(data, plot.EGA=TRUE)
#there are 3 communities in the data
# 1 = 1, 3, 14, 16
# 2 = 2, 4, 10, 12, 13, 15
#3 = 5, 6, 7, 8, 9, 11

#Create the factors object
egaFac <- list("Factor 1 - Kinesthesia and music"=c( 1, 3, 14, 16), "Factor 2 - Yearning"=c(2, 4, 10, 12, 13, 15), "Factor 3 - Impairment" =c(5, 6, 7, 8, 9, 11))
# 1 music as trigger, noises and expressions, physical activity, music to maintain (stimuli?)
# 2 urge to return, distressed at no time to daydream, annoyed if interrupted, prefer to daydream, stronge urge, enjoyable (desire to daydream)
# 3 interfere with daily chores, difficult to stay focused, hinder life goals, difficulty controlling daydream, interferes (impairment and lack of control)

#save as pdf
pdf("EGA.pdf",width=10.5, height=6)
qgraph(Network, vsize=6.3, title = "", labels=TRUE, nodenames=names, negDashed=TRUE, groups= egaFac, legend.cex=.5,  border.width=1.5, border.color="black", cut = 0, layout = L, cut=0)
dev.off()
```

```
# save as tiff

tiff("EGA.tiff", width=10.5, height=6, units="in", res=800, compression="lzw")

qgraph(Network, vsize=6.3, title = "", labels=TRUE, nodenames=names, negDashed=TRUE, groups= egaFac,
legend.cex=.5,  border.width=1.5, border.color="black", cut = 0, layout = L, cut=0)

dev.off()




#------------------------------------------------------------------------------

#                    8. MD and Emotional regulation

#------------------------------------------------------------------------------

#read in the csv file

dataMDER<-read.csv("data3.csv",header=TRUE)


#names of the variables

vars <- c("1", "2", "3", "4", "5",

        "6", "7", "8", "9", "10", "11", "12", "13", "14", "15", "16", "A", "B", "C", "D", "E", "F")

#------------------------------------------------------------------------------

#                    9. Estimate model

#------------------------------------------------------------------------------




# estimate gaussian graphical model using spearman correlations (see
file:///C:/Users/Talya/Downloads/Briganti2018NA_Empathy.pdf)

ModelMDER<- estimateNetwork(dataMDER, default="EBICglasso", corMethod="cor",
corArgs=list(method="spearman", use="pairwise.complete.obs"))




#save the model

save(ModelMDER, file="MDERmodel.Rdata")


#load the model (if you don't want to rerun it next time)

load(file="MDERmodel.Rdata")
```

```
namesMDER<- c("music as trigger", "urge to return", "noises and expressions", "distressed at no time to daydream ", "interfere with daily chores",

    "amount of time causes distress", "difficult to stay focused", "hinder life goals", "difficulty controlling daydream", "annoyed if interrupted", "interferes with work", "prefer to daydream", "strong urge", "physical activity", "enjoyable experience", "music to maintain",

    "non-acceptance of emotional responses", "difficulties with goal-directed behaviors", "impulse control difficulties", "lack of emotional awareness", "limited emotional regulation strategies", "lack of emotional clarity")


clusters <- list("Factor 1 - Kinesthesia and music"=c( 1, 3, 14, 16), "Factor 2 - Yearning"=c(2, 4, 10, 12, 13, 15), "Factor 3 - Impairment" =c(5, 6, 7, 8, 9, 11), "Emotional Regulation Factors"=c(17:22))

#

#-------------------------------------------------------------------------------

#                   10. Plot MDER network model

#-------------------------------------------------------------------------------



#plot the network

NetworkMDER <- plot(ModelMDER, title="", theme="colorblind", labels=TRUE, groups=clusters,

          nodeNames= namesMDER, legend.cex=.32,  border.width=1.5, negDashed=TRUE, border.color="black", cut = 0)


#get the layout for later

LMDER<-averageLayout(NetworkMDER)


#plot the network and save it as a pdf

pdf("Daydreaming NetworkMDER.pdf",width=10.5,height=6)

plot(NetworkMDER, vsize=6.3, title = "", groups=clusters, nodeNames=namesMDER, negDashed=TRUE, labels=TRUE, theme = "colorblind", legend.cex=.4,  border.width=1.5, border.color="black", cut = 0, layout = L, cut=0)

dev.off()


#plot the network and save it as tiff

tiff("Daydreaming NetworkMDER.tiff", width=10.5, height=6, units="in", res=800, compression="lzw")

plot(NetworkMDER, vsize=6.3, title = "", groups=clusters, nodeNames=namesMDER, negDashed=TRUE, labels=TRUE, theme = "colorblind", legend.cex=.4,  border.width=1.5, border.color="black", cut = 0, layout = L, cut=0)

dev.off()


#################2. Plot only the bridge connections#########################
```

```
#First define the bridge:

c<-qgraph(NetworkMDER, vsize=7, title = "Bridge Network", theme = "colorblind", legend.cex=.82,
border.width=1.5, border.color="black", cut = 0, layout = LMDER)

communities<-c(rep(1,16), rep(17,22)) #16 MD + 6 ER clusters

c_b<-bridge(c, communities=communities, directed=FALSE)

#plot bridge strengths without adjusting the strength indices

pdf("Bridge strengthMDER.pdf",width=6.75,height=8)

plot(c_b, include=c("Bridge Strength"))

dev.off()

tiff("Bridge StrengthMDER.tiff", width=10.5, height=6, units="in", res=800, compression="lzw")

plot(c_b, include=c("Bridge Strength"))

dev.off()

#Here we get the inter-community strength indices for the  network

c_adj_b<-getWmat(c)  # c = network, adj=adjacency matrix, b= bridge or between community

c_adj_b[c(1:16),c(1:16)]<-0 #Set all intra-risk relations to 0

c_adj_b[c(17:22),c(17:22)]<-0 #Set all intra-PTSD cluster relations to 0

c_adj<-getWmat(c)

#save as pdf

pdf("Bridge networkMDER.pdf",width=10.5,height=6)

qgraph(c_adj_b, vsize=6.3, title = "", groups=clusters, negDashed=TRUE, nodeNames=namesMDER, labels=TRUE,
theme = "colorblind", legend.cex=.4,  border.width=1.5, border.color="black", cut = 0, layout = LMDER,
maximum=max(abs(c_adj)))

dev.off()

#save as tiff

tiff("Bridge NetworkMDER.tiff", width=10.5, height=6, units="in", res=800, compression="lzw")
```

```
qgraph(c_adj_b, vsize=6.3, title = "", groups=clusters, negDashed=TRUE, nodeNames=namesMDER, labels=TRUE,
theme = "colorblind", legend.cex=.4,  border.width=1.5, border.color="black", cut = 0, layout = LMDER,
maximum=max(abs(c_adj)))

dev.off()


c_adj_b


#to create the partial correlation matrix

pcorMatMDER <- getWmat(ModelMDER)

TableMatMDER <- as.data.frame(pcorMatMDER)

write.csv(TableMatMDER, "./CorrelationmatrixMDER.csv")


#-------------------------------------------------------------------------------

#        11. Stability and accuracy MDER network model

#-------------------------------------------------------------------------------




### Non-parametric bootstrap ###

# Bootstrap 1000 values, using 8 cores:

# stabilility

boot1MDER <- bootnet(ModelMDER, ncores=7, nboots=2000)

boot2MDER <- bootnet(ModelMDER, ncores=7, nboots=2000, type="case")

#save(boot1, file = "boot1.Rdata")

#save(boot2, file = "boot2.Rdata")


#load the boots: modify file path

#load(file = "boot1.Rdata")

#load(file = "boot2.Rdata")


# Edge weight bootstrap

edgeWeightFigMDER <- plot(boot1MDER, labels = FALSE, order = "sample")

pdf("Edge weight bootstrapMDER.pdf", width=10, height=7)

plot(boot1MDER, labels = FALSE, order = "sample")

dev.off()
```

```
# Edge weight difference: is edge X significantly larger than edge Y? Black=Y Gray=N
boot3MDER <- plot(boot1MDER, "edge", plot = "difference", onlyNonZero = TRUE, order = "sample")
plot(boot3MDER)
pdf("Edge weight differenceMDER.pdf", width=10, height=7)
plot(boot3MDER)
dev.off()

#Centrality Bootstrap
plot(boot2MDER)
cs1MDER <- corStability(boot2MDER)
pdf("Centrality bootstrapMDER.pdf", width=10, height=7)
plot(boot2MDER)
dev.off()

cs1MDER
#betweenness   closeness    strength
#0.0498155   0.1273063   0.7490775

#Centrality difference: is node X significantly more central than node Y? Black=Yes, Gray=N
boot4MDER <- plot(boot1MDER, "strength", order="sample", labels=TRUE)
pdf("Centrality differenceMDER.pdf", width=10, height=7)
plot(boot4MDER)
dev.off()



#Fig - Edge weight difference: is edge X significantly larger than edge Y? Black=Y Gray=N
boot3MDER <- plot(boot1MDER, "edge", plot = "difference", onlyNonZero = TRUE, order = "sample")
plot(boot3MDER)
pdf("Edge weight differenceMDER.pdf", width=10, height=7)
plot(boot3MDER)
dev.off()
```

```
pdf("StrengthMDER.pdf", width=6, height=8)
centralityPlot(NetworkMDER, include=c("Strength"), signed=FALSE, labels=namesMDER, orderBy="Strength")
dev.off()

tiff("StrengthMDER.tiff", width=5, height=7, units="in", res=800, compression="lzw")
centralityPlot(NetworkMDER, include=c("Strength"), signed=FALSE, labels=namesMDER, orderBy="Strength")
dev.off()
```