setwd("C:/R files **BHMRA** ")

library(jagsUI); library(HDInterval); options(scipen=999)

library(loo)

D <- read.table("Example\_7\_16.txt",header=T)

head(D)

D <- as.list(D)

**#**

**# Truncated Normal assumption for Anxiety**

**#**

cat("model { for (i in 1:265) {**# centre ages**

age.c[i] <- (age[i]-mean(age[]))/sd(age[])

**# model for mediator**

anx[i] ~ dnorm(mu.anx[i],tau.anx) T(0,)

mu.anx[i] <- a[1] +a[2]\*treat[i] + a[3]\*age.c[i] + a[4]\*equals(edu[i],2)

+ a[5]\*equals(edu[i],3)+ a[6]\*equals(edu[i],4) + a[7]\*gend[i] +a[8]\*income[i]

**# mediator predictions according to treatment settings**

anx.1[i] ~ dnorm(mu.anx.1[i],tau.anx) T(0,)

anx.0[i] ~ dnorm(mu.anx.0[i],tau.anx) T(0,)

LL1[i] <- 0.5\*log(tau.anx)-2.51-0.5\*tau.anx\*(anx[i]-mu.anx[i])^2

mu.anx.1[i] <- a[1] +a[2] + a[3]\*age.c[i] + a[4]\*equals(edu[i],2)

+ a[5]\*equals(edu[i],3)+ a[6]\*equals(edu[i],4) + a[7]\*gend[i] +a[8]\*income[i]

mu.anx.0[i] <- a[1] + a[3]\*age.c[i] + a[4]\*equals(edu[i],2)

+ a[5]\*equals(edu[i],3)+ a[6]\*equals(edu[i],4) + a[7]\*gend[i] +a[8]\*income[i]

**# model for political outcome**

congmesg[i] ~ dbern(p[i])

p[i] <- phi(b[1] +b[2]\*treat[i] + b[3]\*anx[i]+ b[4]\*age.c[i] + b[5]\*equals(edu[i],2)+ b[6]\*equals(edu[i],3)+ b[7]\*equals(edu[i],4) + b[8]\*gend[i] +b[9]\*income[i])

LL2[i] <- congmesg[i]\*log(p[i]) +(1-congmesg[i])\*log(1-p[i])

**# regression settings of outcome under four prediction scenarios**

p11[i] <- phi(b[1] +b[2] + b[3]\*anx.1[i]+ b[4]\*age.c[i] + b[5]\*equals(edu[i],2)+ b[6]\*equals(edu[i],3)+ b[7]\*equals(edu[i],4) + b[8]\*gend[i] +b[9]\*income[i])

p01[i] <- phi(b[1] + b[3]\*anx.1[i]+ b[4]\*age.c[i] + b[5]\*equals(edu[i],2)+ b[6]\*equals(edu[i],3)+ b[7]\*equals(edu[i],4) + b[8]\*gend[i] +b[9]\*income[i])

p10[i] <- phi(b[1] +b[2]+ b[3]\*anx.0[i]+ b[4]\*age.c[i] + b[5]\*equals(edu[i],2)+ b[6]\*equals(edu[i],3)+ b[7]\*equals(edu[i],4) + b[8]\*gend[i] +b[9]\*income[i])

p00[i] <- phi(b[1] + b[3]\*anx.0[i]+ b[4]\*age.c[i] + b[5]\*equals(edu[i],2)+ b[6]\*equals(edu[i],3)+ b[7]\*equals(edu[i],4) + b[8]\*gend[i] +b[9]\*income[i])

**# predictions under scenarios**

y11[i] ~ dbern(p11[i])

y01[i] ~ dbern(p01[i])

y10[i] ~ dbern(p10[i])

y00[i] ~ dbern(p00[i])

**# effect measures by subject**

med1[i] <- y01[i]-y00[i]

med2[i] <- y11[i]-y10[i]

dir1[i] <- y10[i]-y00[i]

dir2[i] <- y11[i]-y01[i]

med.av[i] <- 0.5\*(med1[i]+med2[i])

dir.av[i] <- 0.5\*(dir1[i]+dir2[i])

del.TE[i] <- y11[i]-y00[i]}

**# Population effect measures (Average Direct, Average Median, Total)**

E[1] <- mean(dir.av[])

E[2] <- mean(med.av[])

E[3] <- mean(del.TE[])

**# Priors**

for (j in 1:8) {a[j] ~ dnorm(0,0.01)}

for (j in 1:9) {b[j] ~ dnorm(0,0.01)}

tau.anx ~ dgamma(1,0.01)}

", file="model1.jag")

**# Initial values and estimation**

inits <- function(){list(a=rnorm(8,0,0.1), b=rnorm(9,0,0.1),tau.anx=rexp(1,1))}

pars <- c("E","b","a","LL1","LL2")

R <- autojags(D, inits, pars,model.file="model1.jag",2,iter.increment=1000, n.burnin=250,Rhat.limit=1.1, max.iter=10000, seed=1234, codaOnly= c('LL1', 'LL2'))

R$summary

hdi(R)

**# Fit**

loo(as.array(R$sims.list$LL1))

loo(as.array(R$sims.list$LL2))

**#**

**# LN assumption for anxiety**

**#**

cat("model { for (i in 1:265) {**# centre ages**

age.c[i] <- (age[i]-mean(age[]))/sd(age[])

**# model for mediator**

anx[i] ~ dlnorm(mu.anx[i],tau.anx)

LL1[i] <- 0.5\*log(tau.anx)-log(anx[i])-2.51-0.5\*tau.anx\*(log(anx[i])-mu.anx[i])^2

mu.anx[i] <- a[1] +a[2]\*treat[i] + a[3]\*age.c[i] + a[4]\*equals(edu[i],2)

+ a[5]\*equals(edu[i],3)+ a[6]\*equals(edu[i],4) + a[7]\*gend[i] +a[8]\*income[i]

**# mediator predictions according to treatment settings**

anx.1[i] ~ dlnorm(mu.anx.1[i],tau.anx)

anx.0[i] ~ dlnorm(mu.anx.0[i],tau.anx)

mu.anx.1[i] <- a[1] +a[2] + a[3]\*age.c[i] + a[4]\*equals(edu[i],2)

+ a[5]\*equals(edu[i],3)+ a[6]\*equals(edu[i],4) + a[7]\*gend[i] +a[8]\*income[i]

mu.anx.0[i] <- a[1] + a[3]\*age.c[i] + a[4]\*equals(edu[i],2)

+ a[5]\*equals(edu[i],3)+ a[6]\*equals(edu[i],4) + a[7]\*gend[i] +a[8]\*income[i]

**# model for political outcome**

congmesg[i] ~ dbern(p[i])

LL2[i] <- congmesg[i]\*log(p[i]) +(1-congmesg[i])\*log(1-p[i])

p[i] <- phi(b[1] +b[2]\*treat[i] + b[3]\*anx[i]+ b[4]\*age.c[i] + b[5]\*equals(edu[i],2)+ b[6]\*equals(edu[i],3)+ b[7]\*equals(edu[i],4) + b[8]\*gend[i] +b[9]\*income[i])

**# regression settings of outcome under four prediction scenarios**

p11[i] <- phi(b[1] +b[2] + b[3]\*anx.1[i]+ b[4]\*age.c[i] + b[5]\*equals(edu[i],2)+ b[6]\*equals(edu[i],3)+ b[7]\*equals(edu[i],4) + b[8]\*gend[i] +b[9]\*income[i])

p01[i] <- phi(b[1] + b[3]\*anx.1[i]+ b[4]\*age.c[i] + b[5]\*equals(edu[i],2)+ b[6]\*equals(edu[i],3)+ b[7]\*equals(edu[i],4) + b[8]\*gend[i] +b[9]\*income[i])

p10[i] <- phi(b[1] +b[2]+ b[3]\*anx.0[i]+ b[4]\*age.c[i] + b[5]\*equals(edu[i],2)+ b[6]\*equals(edu[i],3)+ b[7]\*equals(edu[i],4) + b[8]\*gend[i] +b[9]\*income[i])

p00[i] <- phi(b[1] + b[3]\*anx.0[i]+ b[4]\*age.c[i] + b[5]\*equals(edu[i],2)+ b[6]\*equals(edu[i],3)+ b[7]\*equals(edu[i],4) + b[8]\*gend[i] +b[9]\*income[i])

**# predictions under scenarios**

y11[i] ~ dbern(p11[i])

y01[i] ~ dbern(p01[i])

y10[i] ~ dbern(p10[i])

y00[i] ~ dbern(p00[i])

**# effect measures by subject**

med1[i] <- y01[i]-y00[i]

med2[i] <- y11[i]-y10[i]

dir1[i] <- y10[i]-y00[i]

dir2[i] <- y11[i]-y01[i]

med.av[i] <- 0.5\*(med1[i]+med2[i])

dir.av[i] <- 0.5\*(dir1[i]+dir2[i])

del.TE[i] <- y11[i]-y00[i]}

**# Population effect measures (Average Direct, Average Median, Total)**

E[1] <- mean(dir.av[])

E[2] <- mean(med.av[])

E[3] <- mean(del.TE[])

**# Priors**

for (j in 1:8) {a[j] ~ dnorm(0,0.01)}

for (j in 1:9) {b[j] ~ dnorm(0,0.01)}

tau.anx ~ dgamma(1,0.01)}

", file="model2.jag")

**# Initial values and estimation**

inits <- function(){list(a=rnorm(8,0,0.1), b=rnorm(9,0,0.1),tau.anx=rexp(1,1))}

pars <- c("E","b","a","LL1","LL2")

R <- autojags(D, inits, pars,model.file="model2.jag",2,iter.increment=1000, n.burnin=250,Rhat.limit=1.1, max.iter=10000, seed=1234, codaOnly= c('LL1', 'LL2'))

R$summary

hdi(R)

**# Fit**

loo(as.array(R$sims.list$LL1))

loo(as.array(R$sims.list$LL2))