setwd("C:/R files BHMRA")

library(rjags); require(mcmcse); require(loo); library(MCMCvis)

library(ggplot2); library(reshape); options(scipen=999)

attach("DS\_12\_5.Rdata")

library(jagsUI)

**# MODEL 1**

cat("model { for (i in 1:2184) {y[i] ~ dnorm(mu[cycle[i],time[i]+9],tau)

LL[i] <- -0.5\*log(6.283\*sig2)-0.5\*tau\*pow(y[i]- mu[cycle[i],time[i]+9],2)}

for (i in 1:n) {for (t in 1:T) {mu[i,t] <- m.prog[G[i],t]}}

for (g in 1:2) {for (t in 1:T) {m.prog[g,t] <- alpha[g]+c[g,t]-mean(c[g,1:T])

c[g,t] <-sum(bs.terms[g,t,1:Kstar])

for (k in 1:Kstar) {bs.terms[g,t,k] <- b[g,k]\*bs.cycval[t,k]}}}

for (j in 1:2) {alpha[j] ~ dnorm(0,0.001)

phi[j] ~ dgamma(1,0.001)

inv.phi[j] <- 1/phi[j]

for (k in 1:Kstar) {b[j,k] ~ dnorm(0,phi[j])}}

tau ~ dgamma(1,0.001); sig2 <- 1/tau}

", file="model1.jag")

**# Initial Values**

init1 <- list(tau=1,phi=c(10,10),alpha=c(0,0))

init2 <- list(tau=10,phi=c(100,100),alpha=c(0,0))

inits <- list(init1,init2)

pars <- c("b","m.prog","sig2","alpha","inv.phi","LL")

R1= autojags(DS\_12\_5, inits, pars,model.file="model1.jag",2,

iter.increment=2500, n.burnin=500, Rhat.limit=1.1, max.iter=10000, seed=1234,codaOnly=c("LL"))

**# Estimates, Fit and Effective Sample Sizes**

R1$summary

loo(R1$sims.list$LL)

ess(as.data.frame(R1$sims.list))

**# MODEL 2 Subject Effects**

cat("model { for (i in 1:2184) {y[i] ~ dnorm(mu[cycle[i],time[i]+9],tau)

LL[i] <- -0.5\*log(6.283\*sig2)-0.5\*tau\*pow(y[i]-mu[cycle[i],time[i]+9],2)}

# average growth curve smooths

for (t in 1:T) {m.prog[1,t] <- mean(mu[1:69,t])

m.prog[2,t] <- mean(mu[70:91,t])}

for (i in 1:n) { for (t in 1:T) {mu[i,t] <- alpha[G[i]]+ b0[i]+sum(bs.terms[i,t,1:Kstar])

for (k in 1:Kstar) {bs.terms[i,t,k] <- b1[i,k]\*bs.cycval[t,k]}}}

# priors on subject effects

for (i in 1:n) {b0[i] ~ dnorm(0,tau0)

b1[i,1] <- 0

for (k in 2:Kstar) {b1[i,k] ~ dnorm(b1[i,k-1],phi[G[i]])}}

# other priors

for (j in 1:2) {alpha[j] ~ dnorm(0,0.001); phi[j] ~ dgamma(1,0.001); inv.phi[j] <- 1/phi[j]}

tau ~ dgamma(1,0.001); sig2 <- 1/tau; sig0.2 <- 1/tau0; tau0 ~ dgamma(1,0.001)}

", file="model2.jag")

**# Initial values and estimation**

init1 <- list(tau=1,phi=c(10,10),alpha=c(0,0),b0=rep(0,91))

init2 <- list(tau=10,phi=c(100,100),alpha=c(0,0),b0=rep(0,91))

inits <- list(init1,init2)

pars <- c("b0","m.prog","sig2","sig0.2","alpha","inv.phi","LL")

R2= autojags(DS\_12\_5, inits, pars,model.file="model2.jag",2,

iter.increment=2500, n.burnin=500, Rhat.limit=1.1, max.iter=10000, seed=1234,codaOnly=c("LL"))

**# Estimates, Fit and Effective Sample Sizes**

R2$summary

loo(R2$sims.list$LL)

ess(as.data.frame(R2$sims.list))