**R code for analysis**

library(panelr)

library(statmod)

library(lme4)

library(lmerTest)

library(MuMIn)

#import csv files

wave1\_df <- read.csv("[location of file 1 on computer here]")

wave2\_df <- read.csv("[location of file 2 on computer here]")

#merge

combined\_df <- merge(wave1\_df, wave2\_df, by='zid01', all=TRUE)

rm(wave1\_df)

rm(wave2\_df)

#rename variables

names(combined\_df)[names(combined\_df) == 'zid01'] <- 'PID'

names(combined\_df)[names(combined\_df) == 'aded10f'] <- 'Social\_Difficulties\_W1'

names(combined\_df)[names(combined\_df) == 'bded10f'] <- 'Social\_Difficulties\_W2'

names(combined\_df)[names(combined\_df) == 'adcd01d'] <- 'Verbal\_W1'

names(combined\_df)[names(combined\_df) == 'bdcd01d'] <- 'Verbal\_W2'

names(combined\_df)[names(combined\_df) == 'adcd02d'] <- 'Numerical\_W1'

names(combined\_df)[names(combined\_df) == 'bdcd02d'] <- 'Numerical\_W2'

names(combined\_df)[names(combined\_df) == 'aphc02a'] <- 'Gender'

names(combined\_df)[names(combined\_df) == 'apcb02'] <- 'Preterm\_4cat'

names(combined\_df)[names(combined\_df) == 'bdsd59a'] <- 'Equivalised\_Income'

names(combined\_df)[names(combined\_df) == 'adph20p'] <- 'Depression\_P\_W1'

names(combined\_df)[names(combined\_df) == 'adph20s'] <- 'Depression\_S\_W1'

names(combined\_df)[names(combined\_df) == 'bdph20p'] <- 'Depression\_P\_W2'

names(combined\_df)[names(combined\_df) == 'bdph20s'] <- 'Depression\_S\_W2'

names(combined\_df)[names(combined\_df) == 'aphc01d'] <- 'Relation\_to\_Child\_P1'

names(combined\_df)[names(combined\_df) == 'aphc03d'] <- 'Relation\_to\_Child\_P3'

names(combined\_df)[names(combined\_df) == 'aphc01a'] <- 'Gender\_P1'

names(combined\_df)[names(combined\_df) == 'aphc03a'] <- 'Gender\_P3'

names(combined\_df)[names(combined\_df) == 'apcb04a'] <- 'Neonatal'

names(combined\_df)[names(combined\_df) == 'apcb04b'] <- 'Neonatal\_Length'

names(combined\_df)[names(combined\_df) == 'adcr18p'] <- 'Conflict\_P1'

names(combined\_df)[names(combined\_df) == 'adcr18s'] <- 'Conflict\_S1'

names(combined\_df)[names(combined\_df) == 'adcr19p'] <- 'Closeness\_P1'

names(combined\_df)[names(combined\_df) == 'adcr19s'] <- 'Closeness\_S1'

names(combined\_df)[names(combined\_df) == 'bdcr18p'] <- 'Conflict\_P2'

names(combined\_df)[names(combined\_df) == 'bdcr18s'] <- 'Conflict\_S2'

names(combined\_df)[names(combined\_df) == 'bdcr19p'] <- 'Closeness\_P2'

names(combined\_df)[names(combined\_df) == 'bdcr19s'] <- 'Closeness\_S2'

names(combined\_df)[names(combined\_df) == 'aphc00c'] <- 'identify\_gender\_p'

names(combined\_df)[names(combined\_df) == 'ashc00c'] <- 'identify\_gender\_s'

names(combined\_df)[names(combined\_df) == 'aphc00d'] <- 'identify\_relation\_p'

names(combined\_df)[names(combined\_df) == 'ashc00d'] <- 'identify\_relation\_s'

names(combined\_df)[names(combined\_df) == 'azid06'] <- 'partner'

names(combined\_df)[names(combined\_df) == 'apsd01'] <- 'Religious'

names(combined\_df)[names(combined\_df) == 'apsd02'] <- 'denomination'

names(combined\_df)[names(combined\_df) == 'aphc02b'] <- 'age\_W1'

names(combined\_df)[names(combined\_df) == 'bphc02b'] <- 'age\_W2'

names(combined\_df)[names(combined\_df) == 'bzid08'] <- 'took\_part\_wave\_2'

names(combined\_df)[names(combined\_df) == 'azid07'] <- 'secondary\_interview'

#create new variables with IF...THEN statements

combined\_df$female <- NA

combined\_df$female[combined\_df$Gender==1] <- 0

combined\_df$female[combined\_df$Gender==2] <- 1

combined\_df$Preterm\_3cat <- NA

combined\_df$Preterm\_3cat[combined\_df$Preterm\_4cat==1 | combined\_df$Preterm\_4cat==2] <- 0

combined\_df$Preterm\_3cat[combined\_df$Preterm\_4cat==3] <- 1

combined\_df$Preterm\_3cat[combined\_df$Preterm\_4cat==4] <- 2

combined\_df$Neonatal\_3cat <- NA

combined\_df$Neonatal\_3cat[combined\_df$Neonatal==2] <- 0

combined\_df$Neonatal\_3cat[combined\_df$Neonatal==1 & combined\_df$Neonatal\_Length == 1] <- 1

combined\_df$Neonatal\_3cat[combined\_df$Neonatal==1 & (combined\_df$Neonatal\_Length==2 | combined\_df$Neonatal\_Length==3)] <- 2

combined\_df$Mother\_Close\_W1 <- ifelse(combined\_df$Gender\_P1==2 & combined\_df$Relation\_to\_Child\_P1==3, combined\_df$Closeness\_P1,

 ifelse(combined\_df$Gender\_P3==2 & combined\_df$Relation\_to\_Child\_P3==3,combined\_df$Closeness\_S1,NA))

combined\_df$Father\_Close\_W1 <- ifelse(combined\_df$Gender\_P1==1 & combined\_df$Relation\_to\_Child\_P1==3, combined\_df$Closeness\_P1,

 ifelse(combined\_df$Gender\_P3==1 & combined\_df$Relation\_to\_Child\_P3==3,combined\_df$Closeness\_S1,NA))

combined\_df$Mother\_Close\_W2 <- ifelse(combined\_df$Gender\_P1==2 & combined\_df$Relation\_to\_Child\_P1==3, combined\_df$Closeness\_P2,

 ifelse(combined\_df$Gender\_P3==2 & combined\_df$Relation\_to\_Child\_P3==3,combined\_df$Closeness\_S2,NA))

combined\_df$Father\_Close\_W2 <- ifelse(combined\_df$Gender\_P1==1 & combined\_df$Relation\_to\_Child\_P1==3, combined\_df$Closeness\_P2,

 ifelse(combined\_df$Gender\_P3==1 & combined\_df$Relation\_to\_Child\_P3==3,combined\_df$Closeness\_S2,NA))

combined\_df$Mother\_Conflict\_W1 <- ifelse(combined\_df$Gender\_P1==2 & combined\_df$Relation\_to\_Child\_P1==3, combined\_df$Conflict\_P1,

 ifelse(combined\_df$Gender\_P3==2 & combined\_df$Relation\_to\_Child\_P3==3,combined\_df$Conflict\_S1,NA))

combined\_df$Father\_Conflict\_W1 <- ifelse(combined\_df$Gender\_P1==1 & combined\_df$Relation\_to\_Child\_P1==3, combined\_df$Conflict\_P1,

 ifelse(combined\_df$Gender\_P3==1 & combined\_df$Relation\_to\_Child\_P3==3,combined\_df$Conflict\_S1,NA))

combined\_df$Mother\_Conflict\_W2 <- ifelse(combined\_df$Gender\_P1==2 & combined\_df$Relation\_to\_Child\_P1==3, combined\_df$Conflict\_P2,

 ifelse(combined\_df$Gender\_P3==2 & combined\_df$Relation\_to\_Child\_P3==3,combined\_df$Conflict\_S2,NA))

combined\_df$Father\_Conflict\_W2 <- ifelse(combined\_df$Gender\_P1==1 & combined\_df$Relation\_to\_Child\_P1==3, combined\_df$Conflict\_P2,

 ifelse(combined\_df$Gender\_P3==1 & combined\_df$Relation\_to\_Child\_P3==3,combined\_df$Conflict\_S2,NA))

combined\_df$Mdepression\_W1 <- ifelse(combined\_df$Gender\_P1==2 & combined\_df$Relation\_to\_Child\_P1==3, combined\_df$Depression\_P\_W1,

 ifelse(combined\_df$Gender\_P3==2 & combined\_df$Relation\_to\_Child\_P3==3,combined\_df$Depression\_S\_W1,NA))

combined\_df$Fdepression\_W1 <- ifelse(combined\_df$Gender\_P1==1 & combined\_df$Relation\_to\_Child\_P1==3, combined\_df$Depression\_P\_W1,

 ifelse(combined\_df$Gender\_P3==1 & combined\_df$Relation\_to\_Child\_P3==3,combined\_df$Depression\_S\_W1,NA))

combined\_df$Mdepression\_W2 <- ifelse(combined\_df$Gender\_P1==2 & combined\_df$Relation\_to\_Child\_P1==3, combined\_df$Depression\_P\_W2,

 ifelse(combined\_df$Gender\_P3==2 & combined\_df$Relation\_to\_Child\_P3==3,combined\_df$Depression\_S\_W2,NA))

combined\_df$Fdepression\_W2 <- ifelse(combined\_df$Gender\_P1==1 & combined\_df$Relation\_to\_Child\_P1==3, combined\_df$Depression\_P\_W2,

 ifelse(combined\_df$Gender\_P3==1 & combined\_df$Relation\_to\_Child\_P3==3,combined\_df$Depression\_S\_W2,NA))

combined\_df$Gender <- factor(combined\_df$Gender,

 levels = c(

 '1',

 '2'),

 labels = c(

 'male',

 'female'))

combined\_df$identify\_relation\_p <-factor(combined\_df$identify\_relation\_p,

 levels = c(

 '1',

 '2'),

 labels = c(

 'biological',

 'other'))

combined\_df$identify\_relation\_s <-factor(combined\_df$identify\_relation\_s,

 levels = c(

 '1',

 '2',

 '3'),

 labels = c(

 'biological',

 'step',

 'other'))

combined\_df$identify\_gender\_p <- factor(combined\_df$identify\_gender\_p,

 levels = c(

 '1',

 '2'),

 labels = c(

 'male',

 'female'))

combined\_df$identify\_gender\_s <- factor(combined\_df$identify\_gender\_s,

 levels = c(

 '1',

 '2'),

 labels = c(

 'male',

 'female'))

combined\_df$secondary\_interview <-factor(combined\_df$secondary\_interview,

 levels = c(

 '1',

 '2',

 '3'),

 labels = c(

 'Both',

 'No Partner',

 'Partner but no Response'))

combined\_df$Religious <-factor(combined\_df$Religious,

 levels = c(

 '1',

 '2',

 '8',

 '9'),

 labels = c(

 'yes',

 'no',

 'Refusal',

 'Do not Know'))

combined\_df$denomination <-factor(combined\_df$denomination,

 levels = c(

 '1',

 '2',

 '3'),

 labels = c(

 'Roman Catholic',

 'Other Cristian',

 'Other'))

combined\_df$Preterm\_3cat <-factor(combined\_df$Preterm\_3cat,

 levels = c(

 '0',

 '1',

 '2'),

 labels = c(

 'Full Term',

 'Preterm',

 'Very Preterm'))

combined\_df$Neonatal\_3cat <-factor(combined\_df$Neonatal\_3cat,

 levels = c(

 '0',

 '1',

 '2'),

 labels = c(

 'None',

 'less than one week',

 '1+ WeeKs'))

#Create some dummy variables for the analysis

combined\_df$VPT <- 0

combined\_df$VPT[combined\_df$Preterm\_3cat=='Very Preterm'] <- 1

combined\_df$LPT <- 0

combined\_df$LPT[combined\_df$Preterm\_3cat=='Preterm'] <- 1

combined\_df$Less\_1week <- 0

combined\_df$Less\_1week[combined\_df$Neonatal\_3cat=='less than one week'] <- 1

combined\_df$week\_plus <- 0

combined\_df$week\_plus[combined\_df$Neonatal\_3cat=='1+ WeeKs'] <- 1

#scale the variables

data\_wide <- combined\_df[c('PID', 'female', 'Equivalised\_Income', 'Less\_1week', 'week\_plus', 'Mdepression\_W1', 'Mdepression\_W2',

 'Fdepression\_W1', 'Fdepression\_W2', 'LPT', 'VPT', 'Mother\_Close\_W1', 'Mother\_Close\_W2',

 'Father\_Close\_W1', 'Father\_Close\_W2', 'Mother\_Conflict\_W1', 'Mother\_Conflict\_W2',

 'Father\_Conflict\_W1', 'Father\_Conflict\_W2', 'Social\_Difficulties\_W1', 'Social\_Difficulties\_W2',

 'Verbal\_W1', 'Verbal\_W2', 'Numerical\_W1', 'Numerical\_W2')]

data\_wide$Social\_Difficulties\_W1 <- scale(data\_wide$Social\_Difficulties\_W1)

data\_wide$Social\_Difficulties\_W2 <- scale(data\_wide$Social\_Difficulties\_W2)

data\_wide$Verbal\_W1 <- scale(data\_wide$Verbal\_W1)

data\_wide$Verbal\_W2 <- scale(data\_wide$Verbal\_W2)

data\_wide$Numerical\_W1 <- scale(data\_wide$Numerical\_W1)

data\_wide$Numerical\_W2 <- scale(data\_wide$Numerical\_W2)

data\_wide$Mdepression\_W1 <- scale(data\_wide$Mdepression\_W1)

data\_wide$Mdepression\_W2 <- scale(data\_wide$Mdepression\_W2)

data\_wide$Mother\_Close\_W1 <- scale(data\_wide$Mother\_Close\_W1)

data\_wide$Mother\_Close\_W2 <- scale(data\_wide$Mother\_Close\_W2)

data\_wide$Mother\_Conflict\_W1 <- scale(data\_wide$Mother\_Conflict\_W1)

data\_wide$Mother\_Conflict\_W2 <- scale(data\_wide$Mother\_Conflict\_W2)

data\_wide$Fdepression\_W1 <- scale(data\_wide$Fdepression\_W1)

data\_wide$Fdepression\_W2 <- scale(data\_wide$Fdepression\_W2)

data\_wide$Father\_Close\_W1 <- scale(data\_wide$Father\_Close\_W1)

data\_wide$Father\_Close\_W2 <- scale(data\_wide$Father\_Close\_W2)

data\_wide$Father\_Conflict\_W1 <- scale(data\_wide$Father\_Conflict\_W1)

data\_wide$Father\_Conflict\_W2 <- scale(data\_wide$Father\_Conflict\_W2)

data\_wide$Equivalised\_Income <- scale(data\_wide$Equivalised\_Income)

#Create Long Dataset (this uses the panelr package)

data\_long <- long\_panel(data\_wide, prefix = "\_W", begin = 1, end = 2, label\_location = "end")

data\_long$wave <- data\_long$wave - 1

#Control Analysis

social\_difficulties\_Control <- lmer(Social\_Difficulties ~ (1|PID) + (0+wave|PID) + female + Equivalised\_Income +

 Less\_1week + week\_plus + wave + VPT + LPT + Mdepression + Fdepression +

 wave\*VPT + wave\*LPT, data = data\_long)

summary(social\_difficulties\_Control)

Verbal\_Control <- lmer(Verbal ~ (1|PID) + (0+wave|PID) + female + Equivalised\_Income +

 Less\_1week + week\_plus + wave + VPT + LPT + Mdepression + Fdepression +

 wave\*VPT + wave\*LPT, data = data\_long)

summary(Verbal\_Control)

Numerical\_Control <- lmer(Numerical ~ (1|PID) + (0+wave|PID) + female + Equivalised\_Income +

 Less\_1week + week\_plus + wave + VPT + LPT + Mdepression + Fdepression +

 wave\*VPT + wave\*LPT, data = data\_long)

summary(Numerical\_Control)

#Full Analyses

social\_difficulties\_Mother\_Close <- lmer(Social\_Difficulties ~ (1|PID) + (0+wave|PID) + female + Equivalised\_Income +

 Less\_1week + week\_plus + wave + VPT + LPT + Mdepression + Mother\_Close +

 wave\*VPT + wave\*LPT + wave\*Mother\_Close + VPT\*Mother\_Close + LPT\*Mother\_Close +

 wave\*VPT\*Mother\_Close + wave\*LPT\*Mother\_Close, data = data\_long)

summary(social\_difficulties\_Mother\_Close)

social\_difficulties\_Father\_Close <- lmer(Social\_Difficulties ~ (1|PID) + (0+wave|PID) + female + Equivalised\_Income +

 Less\_1week + week\_plus + wave + VPT + LPT + Fdepression + Father\_Close +

 wave\*VPT + wave\*LPT + wave\*Father\_Close + VPT\*Father\_Close + LPT\*Father\_Close +

 wave\*VPT\*Father\_Close + wave\*LPT\*Father\_Close, data = data\_long)

summary(social\_difficulties\_Father\_Close)

social\_difficulties\_Mother\_Conflict <- lmer(Social\_Difficulties ~ (1|PID) + (0+wave|PID) + female + Equivalised\_Income +

 Less\_1week + week\_plus + wave + VPT + LPT + Mdepression + Mother\_Conflict +

 wave\*VPT + wave\*LPT + wave\*Mother\_Conflict + VPT\*Mother\_Conflict + LPT\*Mother\_Conflict +

 wave\*VPT\*Mother\_Conflict + wave\*LPT\*Mother\_Conflict, data = data\_long)

summary(social\_difficulties\_Mother\_Conflict)

vcov(social\_difficulties\_Mother\_Conflict)

social\_difficulties\_Father\_Conflict <- lmer(Social\_Difficulties ~ (1|PID) + (0+wave|PID) + female + Equivalised\_Income +

 Less\_1week + week\_plus + wave + VPT + LPT + Fdepression + Father\_Conflict +

 wave\*VPT + wave\*LPT + wave\*Father\_Conflict + VPT\*Father\_Conflict + LPT\*Father\_Conflict +

 wave\*VPT\*Father\_Conflict + wave\*LPT\*Father\_Conflict, data = data\_long)

summary(social\_difficulties\_Father\_Conflict)

verbal\_Mother\_Close <- lmer(Verbal ~ (1|PID) + (0+wave|PID) + female + Equivalised\_Income +

 Less\_1week + week\_plus + wave + VPT + LPT + Mdepression + Mother\_Close +

 wave\*VPT + wave\*LPT + wave\*Mother\_Close + VPT\*Mother\_Close + LPT\*Mother\_Close +

 wave\*VPT\*Mother\_Close + wave\*LPT\*Mother\_Close, data = data\_long)

summary(verbal\_Mother\_Close)

verbal\_Father\_Close <- lmer(Verbal ~ (1|PID) + (0+wave|PID) + female + Equivalised\_Income +

 Less\_1week + week\_plus + wave + VPT + LPT + Fdepression + Father\_Close +

 wave\*VPT + wave\*LPT + wave\*Father\_Close + VPT\*Father\_Close + LPT\*Father\_Close +

 wave\*VPT\*Father\_Close + wave\*LPT\*Father\_Close, data = data\_long)

summary(verbal\_Father\_Close)

verbal\_Mother\_Conflict <- lmer(Verbal ~ (1|PID) + (0+wave|PID) + female + Equivalised\_Income +

 Less\_1week + week\_plus + wave + VPT + LPT + Mdepression + Mother\_Conflict +

 wave\*VPT + wave\*LPT + wave\*Mother\_Conflict + VPT\*Mother\_Conflict + LPT\*Mother\_Conflict +

 wave\*VPT\*Mother\_Conflict + wave\*LPT\*Mother\_Conflict, data = data\_long)

summary(verbal\_Mother\_Conflict)

verbal\_Father\_Conflict <- lmer(Verbal ~ (1|PID) + (0+wave|PID) + female + Equivalised\_Income +

 Less\_1week + week\_plus + wave + VPT + LPT + Fdepression + Father\_Conflict +

 wave\*VPT + wave\*LPT + wave\*Father\_Conflict + VPT\*Father\_Conflict + LPT\*Father\_Conflict +

 wave\*VPT\*Father\_Conflict + wave\*LPT\*Father\_Conflict, data = data\_long)

summary(verbal\_Father\_Conflict)

numerical\_Mother\_Close <- lmer(Numerical ~ (1|PID) + (0+wave|PID) + female + Equivalised\_Income +

 Less\_1week + week\_plus + wave + VPT + LPT + Mdepression + Mother\_Close +

 wave\*VPT + wave\*LPT + wave\*Mother\_Close + VPT\*Mother\_Close + LPT\*Mother\_Close +

 wave\*VPT\*Mother\_Close + wave\*LPT\*Mother\_Close, data = data\_long)

summary(numerical\_Mother\_Close)

numerical\_Father\_Close <- lmer(Numerical ~ (1|PID) + (0+wave|PID) + female + Equivalised\_Income +

 Less\_1week + week\_plus + wave + VPT + LPT + Fdepression + Father\_Close +

 wave\*VPT + wave\*LPT + wave\*Father\_Close + VPT\*Father\_Close + LPT\*Father\_Close +

 wave\*VPT\*Father\_Close + wave\*LPT\*Father\_Close, data = data\_long)

summary(numerical\_Father\_Close)

numerical\_Mother\_Conflict <- lmer(Numerical ~ (1|PID) + (0+wave|PID) + female + Equivalised\_Income +

 Less\_1week + week\_plus + wave + VPT + LPT + Mdepression + Mother\_Conflict +

 wave\*VPT + wave\*LPT + wave\*Mother\_Conflict + VPT\*Mother\_Conflict + LPT\*Mother\_Conflict +

 wave\*VPT\*Mother\_Conflict + wave\*LPT\*Mother\_Conflict, data = data\_long)

summary(numerical\_Mother\_Conflict)

numerical\_Father\_Conflict <- lmer(Numerical ~ (1|PID) + (0+wave|PID) + female + Equivalised\_Income +

 Less\_1week + week\_plus + wave + VPT + LPT + Fdepression + Father\_Conflict +

 wave\*VPT + wave\*LPT + wave\*Father\_Conflict + VPT\*Father\_Conflict + LPT\*Father\_Conflict +

 wave\*VPT\*Father\_Conflict + wave\*LPT\*Father\_Conflict, data = data\_long)

summary(numerical\_Father\_Conflict)

#Rquared Equivalents

r.squaredGLMM(social\_difficulties\_Mother\_Close)

r.squaredGLMM(verbal\_Mother\_Close)

r.squaredGLMM(numerical\_Mother\_Close)

r.squaredGLMM(social\_difficulties\_Mother\_Conflict)

r.squaredGLMM(verbal\_Mother\_Conflict)

r.squaredGLMM(numerical\_Mother\_Conflict)

r.squaredGLMM(social\_difficulties\_Father\_Close)

r.squaredGLMM(verbal\_Father\_Close)

r.squaredGLMM(numerical\_Father\_Close)

r.squaredGLMM(social\_difficulties\_Father\_Conflict)

r.squaredGLMM(verbal\_Father\_Conflict)

r.squaredGLMM(numerical\_Father\_Conflict)

#Descriptive Statistics

#Frequences

table(combined\_df$Gender)

table(combined\_df$took\_part\_wave\_2)

table(combined\_df$identify\_relation\_p)

table(combined\_df$identify\_relation\_s)

table(combined\_df$identify\_gender\_p)

table(combined\_df$identify\_gender\_s)

table(combined\_df$partner)

table(combined\_df$secondary\_interview)

table(combined\_df$Religious)

table(combined\_df$denomination)

table(combined\_df$Neonatal\_3cat)

table(combined\_df$Preterm\_3cat)

table(combined\_df$identify\_relation\_p, combined\_df$identify\_gender\_p)

table(combined\_df$identify\_relation\_s, combined\_df$identify\_gender\_s)

table(combined\_df$Preterm\_3cat, combined\_df$Gender)

chisq.test(combined\_df$Preterm\_3cat, combined\_df$Gender, correct=FALSE)

table(combined\_df$Preterm\_3cat, combined\_df$Neonatal\_3cat)

chisq.test(combined\_df$Preterm\_3cat, combined\_df$Neonatal\_3cat, correct=FALSE)

#Means

mean(combined\_df$age\_W1, na.rm=TRUE); sd(combined\_df$age\_W1, na.rm=TRUE)

mean(combined\_df$age\_W2, na.rm=TRUE); sd(combined\_df$age\_W2, na.rm=TRUE)

aggregate(combined\_df$Social\_Difficulties\_W1, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Social\_Difficulties\_W1, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Social\_Difficulties\_W2, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Social\_Difficulties\_W2, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Verbal\_W1, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Verbal\_W1, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Verbal\_W2, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Verbal\_W2, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Numerical\_W1, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Numerical\_W1, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Numerical\_W2, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Numerical\_W2, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Mdepression\_W1, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Mdepression\_W1, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Mdepression\_W2, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Mdepression\_W2, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Mother\_Close\_W1, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Mother\_Close\_W1, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Mother\_Close\_W2, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Mother\_Close\_W2, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Mother\_Conflict\_W1, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Mother\_Conflict\_W1, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Mother\_Conflict\_W2, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Mother\_Conflict\_W2, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Fdepression\_W1, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Fdepression\_W1, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Fdepression\_W2, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Fdepression\_W2, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Father\_Close\_W1, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Father\_Close\_W1, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Father\_Close\_W2, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Father\_Close\_W2, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Father\_Conflict\_W1, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Father\_Conflict\_W1, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Father\_Conflict\_W2, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Father\_Conflict\_W2, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

aggregate(combined\_df$Equivalised\_Income, list(combined\_df$Preterm\_3cat), FUN=mean, na.rm=TRUE)

aggregate(combined\_df$Equivalised\_Income, list(combined\_df$Preterm\_3cat), FUN=sd, na.rm=TRUE)

mean(combined\_df$Equivalised\_Income, na.rm=TRUE)

income\_anova <- aov(Equivalised\_Income ~ Preterm\_3cat, data = combined\_df)

summary(income\_anova)

pairwise.t.test(combined\_df$Equivalised\_Income, combined\_df$Preterm\_3cat, p.adj = "bonf")

#Correlations -this needs to be completed

cor(combined\_df[,c('Social\_Difficulties\_W1','Social\_Difficulties\_W2',

 'Verbal\_W1','Verbal\_W2',

 'Numerical\_W1','Numerical\_W2',

 'Mdepression\_W1','Mdepression\_W2',

 'Mother\_Close\_W1','Mother\_Close\_W2',

 'Mother\_Conflict\_W1','Mother\_Conflict\_W2',

 'Fdepression\_W1','Fdepression\_W2',

 'Father\_Close\_W1','Father\_Close\_W2',

 'Father\_Conflict\_W1','Father\_Conflict\_W2', 'Equivalised\_Income')],method = 'pearson', use="pairwise.complete.obs")

cor(combined\_df[,c('Verbal\_W1','Verbal\_W2')],method = 'pearson', use="pairwise.complete.obs")

cor(combined\_df[,c('Numerical\_W1','Numerical\_W2')],method = 'pearson', use="pairwise.complete.obs")

Correlations Between all Continuous Variables in Subsequent Multilevel Models

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Social Difficulties Wave 1 | Social Difficulties Wave 2 | Verbal Wave 1 | Verbal Wave 2 | Numerical Wave 1 | Numerical Wave2 | Maternal depression Wave 1 | Maternal depression Wave 2 | Maternal Closeness Wave 1 |
| Social Difficulties Wave 1 | 1 |  |  |  |  |  |  |  |  |
| Social Difficulties Wave 2 | .63\*\*\* | 1 |  |  |  |  |  |  |  |
| Verbal Wave 1 | -.26\*\*\* | -.25\*\*\* | 1 |  |  |  |  |  |  |
| Verbal Wave 2 | -.23\*\*\* | -.23\*\*\* | .64\*\*\* | 1 |  |  |  |  |  |
| Numerical Wave 1 | -.28\*\*\* | -.27\*\*\* | .62\*\*\* | .48\*\*\* | 1 |  |  |  |  |
| Numerical Wave2 | -.26\*\*\* | -.28\*\*\* | .48\*\*\* | .55\*\*\* | .58\*\*\* | 1 |  |  |  |
| Maternal depression Wave 1 | .25\*\*\* | .21\*\*\* | -.08\*\*\* | -.06\*\*\* | -.09\*\*\* | -.09\*\*\* | 1 |  |  |
| Maternal depression Wave 2 | .23\*\*\* | .28\*\*\* | -.06\*\*\* | -.06\*\*\* | -.07\*\*\* | -.08\*\*\* | .4\*\*\* | 1 |  |
| Maternal Closeness Wave 1 | -.24\*\*\* | -.16\*\*\* | .03\*\* | .01 | .01 | -.01 | -.05\*\*\* | -.04\*\* | 1 |
| Maternal Closeness Wave 2 | -.17\*\*\* | -.29\*\*\* | -.02 | -.01 | -.03\*\* | -.01 | -.08\*\*\* | -.11\*\*\* | .34\*\*\* |
| Maternal Conflict Wave 1 | .57\*\*\* | .45\*\*\* | -.11\*\*\* | -.1\*\*\* | -.13\*\*\* | -.12\*\*\* | .22\*\*\* | .19\*\*\* | -.26\*\*\* |
| Maternal Conflict Wave 2 | .38\*\*\* | .58\*\*\* | -.07\*\*\* | -.09\*\*\* | -.1\*\*\* | -.12\*\*\* | .15\*\*\* | .23\*\*\* | -.17\*\*\* |
| Paternal depression Wave 1 | .08\*\*\* | .08\*\*\* | -.03\*\* | -.01 | -.04\*\* | -.01 | .15\*\*\* | .12\*\*\* | -.02 |
| Paternal depression Wave 2 | .08\*\*\* | .11\*\*\* | -.01 | .01 | -.01 | -.02 | .09\*\*\* | .15\*\*\* | -.03\*\* |
| Paternal Closeness Wave 1 | -.16\*\*\* | -.09\*\*\* | -.01 | .01 | -.01 | -.01 | -.02 | -.01 | .26\*\*\* |
| Paternal Closeness Wave 2 | -.14\*\*\* | -.21\*\*\* | -.01 | -.01 | -.01 | .01 | -.05\*\*\* | -.06\*\*\* | .14\*\*\* |
| Paternal Conflict Wave 1 | .37\*\*\* | .3\*\*\* | -.07\*\*\* | -.07\*\*\* | -.08\*\*\* | -.1\*\*\* | .09\*\*\* | .1\*\*\* | -.16\*\*\* |
| Paternal Conflict Wave 2 | .26\*\*\* | .37\*\*\* | -.07\*\*\* | -.06\*\*\* | -.07\*\*\* | -.1\*\*\* | .08\*\*\* | .1\*\*\* | -.11\*\*\* |
| Equivalised Income | -.14\*\*\* | -.14\*\*\* | .22\*\*\* | .24\*\*\* | .19\*\*\* | .21\*\*\* | -.1\*\*\* | -.12\*\*\* | -.01 |

*Note*.

a

\**p* < .05. \*\**p* < .01. \*\*\**p* < .001.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Maternal Closeness Wave 2 | Maternal Conflict Wave 1 | Maternal Conflict Wave 2 | Paternal depression Wave 1 | Paternal depression Wave 2 | Paternal Closeness Wave 1 | Paternal Closeness Wave 2 | Paternal Conflict Wave 1 | Paternal Conflict Wave 2 | Equivalised Income |
| Social Difficulties Wave 1 |  |  |  |  |  |  |  |  |  |  |
| Social Difficulties Wave 2 |  |  |  |  |  |  |  |  |  |  |
| Verbal Wave 1 |  |  |  |  |  |  |  |  |  |  |
| Verbal Wave 2 |  |  |  |  |  |  |  |  |  |  |
| Numerical Wave 1 |  |  |  |  |  |  |  |  |  |  |
| Numerical Wave2 |  |  |  |  |  |  |  |  |  |  |
| Maternal depression Wave 1 |  |  |  |  |  |  |  |  |  |  |
| Maternal depression Wave 2 |  |  |  |  |  |  |  |  |  |  |
| Maternal Closeness Wave 1 |  |  |  |  |  |  |  |  |  |  |
| Maternal Closeness Wave 2 | 1 |  |  |  |  |  |  |  |  |  |
| Maternal Conflict Wave 1 | -.27\*\*\* | 1 |  |  |  |  |  |  |  |  |
| Maternal Conflict Wave 2 | -.42\*\*\* | .57\*\*\* | 1 |  |  |  |  |  |  |  |
| Paternal depression Wave 1 | -.02 | .07\*\*\* | .07\*\*\* | 1 |  |  |  |  |  |  |
| Paternal depression Wave 2 | -.05\*\*\* | .09\*\*\* | .09\*\*\* | .41\*\*\* | 1 |  |  |  |  |  |
| Paternal Closeness Wave 1 | .15\*\*\* | -.18\*\*\* | -.11\*\*\* | -.06\*\*\* | -.05\*\*\* | 1 |  |  |  |  |
| Paternal Closeness Wave 2 | .32\*\*\* | -.2\*\*\* | -.25\*\*\* | -.09\*\*\* | -.14\*\*\* | .34\*\*\* | 1 |  |  |  |
| Paternal Conflict Wave 1 | -.15\*\*\* | .47\*\*\* | .33\*\*\* | .19\*\*\* | .16\*\*\* | -.24\*\*\* | -.26\*\*\* | 1 |  |  |
| Paternal Conflict Wave 2 | -.22\*\*\* | .37\*\*\* | .49\*\*\* | .15\*\*\* | .2\*\*\* | -.17\*\*\* | -.41\*\*\* | .51\*\*\* | 1 |  |
| Equivalised Income | -.04\*\* | -.04\*\* | -.03\*\* | -.02 | -.04\*\* | .01 | -.03\*\* | -.01 | -.01 | 1 |

\**p* < .05. \*\**p* < .01. \*\*\**p* < .001.