Analyses for: Dimensions of adversity through which poverty impacts neural processing of threat-related information in youth

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# Age 3 income (log transformed) and early adolescent mental health

summary(lm(CDI\_TOT ~ SEX + S3AGE + logITN\_age3, data = dtf))

##   
## Call:  
## lm(formula = CDI\_TOT ~ SEX + S3AGE + logITN\_age3, data = dtf)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -7.492 -3.271 -1.512 2.021 18.473   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 14.6085 8.7898 1.662 0.098328 .   
## SEX -1.6376 0.7695 -2.128 0.034733 \*   
## S3AGE -0.6336 0.7504 -0.844 0.399612   
## logITN\_age3 -1.8200 0.4985 -3.651 0.000346 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 5.082 on 173 degrees of freedom  
## Multiple R-squared: 0.0983, Adjusted R-squared: 0.08266   
## F-statistic: 6.286 on 3 and 173 DF, p-value: 0.0004501

summary(lm(SCARED\_TOT ~ SEX + S3AGE + logITN\_age3, data = dtf))

##   
## Call:  
## lm(formula = SCARED\_TOT ~ SEX + S3AGE + logITN\_age3, data = dtf)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -15.627 -7.753 -2.311 5.681 38.523   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)  
## (Intercept) 27.0697 18.2050 1.487 0.139  
## SEX -0.9979 1.5937 -0.626 0.532  
## S3AGE -0.7252 1.5542 -0.467 0.641  
## logITN\_age3 -0.8261 1.0324 -0.800 0.425  
##   
## Residual standard error: 10.53 on 173 degrees of freedom  
## Multiple R-squared: 0.00704, Adjusted R-squared: -0.01018   
## F-statistic: 0.4089 on 3 and 173 DF, p-value: 0.7468

summary(zeroinfl(PTSD\_SEV\_COMBINED ~ SEX + S3AGE + logITN\_age3, data = dtf))

##   
## Call:  
## zeroinfl(formula = PTSD\_SEV\_COMBINED ~ SEX + S3AGE + logITN\_age3, data = dtf)  
##   
## Pearson residuals:  
## Min 1Q Median 3Q Max   
## -1.7010 -0.6934 -0.5463 0.1741 7.3232   
##   
## Count model coefficients (poisson with log link):  
## Estimate Std. Error z value Pr(>|z|)   
## (Intercept) 3.23324 0.87423 3.698 0.000217 \*\*\*  
## SEX -0.07498 0.07316 -1.025 0.305398   
## S3AGE -0.04991 0.07533 -0.663 0.507573   
## logITN\_age3 -0.24233 0.03797 -6.383 1.74e-10 \*\*\*  
##   
## Zero-inflation model coefficients (binomial with logit link):  
## Estimate Std. Error z value Pr(>|z|)   
## (Intercept) -0.65241 3.77890 -0.173 0.862930   
## SEX 0.32012 0.32863 0.974 0.330012   
## S3AGE 0.03312 0.32294 0.103 0.918305   
## logITN\_age3 0.78242 0.22188 3.526 0.000421 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1   
##   
## Number of iterations in BFGS optimization: 1   
## Log-likelihood: -467.5 on 8 Df

# Age 3 income (log transformed) and adolescent adversity

summary(lm(FINAL\_THREAT ~ SEX + S3AGE + logITN\_age3, data = dtf))

##   
## Call:  
## lm(formula = FINAL\_THREAT ~ SEX + S3AGE + logITN\_age3, data = dtf)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -1.1184 -0.3604 -0.1881 0.1615 5.0003   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 1.42209 1.16705 1.219 0.225   
## SEX -0.11089 0.10216 -1.085 0.279   
## S3AGE -0.09805 0.09963 -0.984 0.326   
## logITN\_age3 -0.26648 0.06618 -4.026 8.46e-05 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.6748 on 173 degrees of freedom  
## Multiple R-squared: 0.09605, Adjusted R-squared: 0.08037   
## F-statistic: 6.127 on 3 and 173 DF, p-value: 0.0005526

summary(lm(FINAL\_DEPRIVATION ~ SEX + S3AGE + logITN\_age3, data = dtf))

##   
## Call:  
## lm(formula = FINAL\_DEPRIVATION ~ SEX + S3AGE + logITN\_age3, data = dtf)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -1.2456 -0.4776 -0.1169 0.3849 2.1982   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 1.06728 1.08808 0.981 0.328   
## SEX -0.15319 0.09525 -1.608 0.110   
## S3AGE -0.06020 0.09289 -0.648 0.518   
## logITN\_age3 -0.35202 0.06171 -5.705 4.95e-08 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.6291 on 173 degrees of freedom  
## Multiple R-squared: 0.1727, Adjusted R-squared: 0.1583   
## F-statistic: 12.03 on 3 and 173 DF, p-value: 3.41e-07

# Deprivation and Threat and early adolescent mental health

summary(lm(CDI\_TOT ~ FINAL\_THREAT + FINAL\_DEPRIVATION + SEX + S3AGE + logITN\_age3,   
 data = dtf))

##   
## Call:  
## lm(formula = CDI\_TOT ~ FINAL\_THREAT + FINAL\_DEPRIVATION + SEX +   
## S3AGE + logITN\_age3, data = dtf)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -10.3733 -2.5975 -0.9102 1.8151 15.3625   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 9.4724 8.0080 1.183 0.23850   
## FINAL\_THREAT 1.6900 0.5382 3.140 0.00199 \*\*   
## FINAL\_DEPRIVATION 2.5604 0.5773 4.435 1.64e-05 \*\*\*  
## SEX -1.0580 0.7032 -1.504 0.13431   
## S3AGE -0.3138 0.6821 -0.460 0.64603   
## logITN\_age3 -0.4683 0.5003 -0.936 0.35054   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 4.604 on 171 degrees of freedom  
## Multiple R-squared: 0.2685, Adjusted R-squared: 0.2471   
## F-statistic: 12.55 on 5 and 171 DF, p-value: 2.188e-10

summary(lm(SCARED\_TOT ~ FINAL\_THREAT + FINAL\_DEPRIVATION + SEX + S3AGE + logITN\_age3,   
 data = dtf))

##   
## Call:  
## lm(formula = SCARED\_TOT ~ FINAL\_THREAT + FINAL\_DEPRIVATION +   
## SEX + S3AGE + logITN\_age3, data = dtf)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -18.748 -6.977 -2.185 5.880 38.521   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 21.9698 18.0376 1.218 0.2249   
## FINAL\_THREAT 2.1541 1.2123 1.777 0.0774 .  
## FINAL\_DEPRIVATION 1.9083 1.3003 1.468 0.1441   
## SEX -0.4667 1.5840 -0.295 0.7686   
## S3AGE -0.3991 1.5363 -0.260 0.7953   
## logITN\_age3 0.4196 1.1269 0.372 0.7101   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 10.37 on 171 degrees of freedom  
## Multiple R-squared: 0.04723, Adjusted R-squared: 0.01937   
## F-statistic: 1.695 on 5 and 171 DF, p-value: 0.1382

summary(zeroinfl(PTSD\_SEV\_COMBINED ~ FINAL\_THREAT + FINAL\_DEPRIVATION + SEX + S3AGE +   
 logITN\_age3, data = dtf))

##   
## Call:  
## zeroinfl(formula = PTSD\_SEV\_COMBINED ~ FINAL\_THREAT + FINAL\_DEPRIVATION +   
## SEX + S3AGE + logITN\_age3, data = dtf)  
##   
## Pearson residuals:  
## Min 1Q Median 3Q Max   
## -1.7150 -0.6543 -0.5100 0.2441 6.2177   
##   
## Count model coefficients (poisson with log link):  
## Estimate Std. Error z value Pr(>|z|)   
## (Intercept) 1.71721 0.90759 1.892 0.0585 .   
## FINAL\_THREAT 0.28249 0.03295 8.573 < 2e-16 \*\*\*  
## FINAL\_DEPRIVATION -0.10012 0.05960 -1.680 0.0930 .   
## SEX -0.19219 0.07721 -2.489 0.0128 \*   
## S3AGE 0.07199 0.07736 0.931 0.3520   
## logITN\_age3 -0.16399 0.04142 -3.960 7.51e-05 \*\*\*  
##   
## Zero-inflation model coefficients (binomial with logit link):  
## Estimate Std. Error z value Pr(>|z|)   
## (Intercept) 0.60814 3.91450 0.155 0.87654   
## FINAL\_THREAT -0.98425 0.34170 -2.880 0.00397 \*\*  
## FINAL\_DEPRIVATION -0.13934 0.27745 -0.502 0.61551   
## SEX 0.17383 0.34636 0.502 0.61576   
## S3AGE -0.05284 0.33409 -0.158 0.87433   
## logITN\_age3 0.54303 0.24908 2.180 0.02925 \*   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1   
##   
## Number of iterations in BFGS optimization: 3   
## Log-likelihood: -428.4 on 12 Df

# multicollinearity check

imcdiag(lm(CDI\_TOT ~ FINAL\_THREAT + FINAL\_DEPRIVATION + SEX + S3AGE + logITN\_age3,   
 data = dtf))

##   
## Call:  
## imcdiag(mod = lm(CDI\_TOT ~ FINAL\_THREAT + FINAL\_DEPRIVATION +   
## SEX + S3AGE + logITN\_age3, data = dtf))  
##   
##   
## All Individual Multicollinearity Diagnostics Result  
##   
## VIF TOL Wi Fi Leamer CVIF Klein IND1  
## FINAL\_THREAT 1.1908 0.8398 8.2032 11.0012 0.9164 1.5630 0 0.0195  
## FINAL\_DEPRIVATION 1.3010 0.7686 12.9443 17.3594 0.8767 1.7077 0 0.0179  
## SEX 1.0282 0.9725 1.2143 1.6285 0.9862 1.3496 0 0.0226  
## S3AGE 1.0159 0.9844 0.6825 0.9153 0.9922 1.3334 0 0.0229  
## logITN\_age3 1.2308 0.8125 9.9253 13.3106 0.9014 1.6156 0 0.0189  
## IND2  
## FINAL\_THREAT 1.2874  
## FINAL\_DEPRIVATION 1.8593  
## SEX 0.2207  
## S3AGE 0.1256  
## logITN\_age3 1.5070  
##   
## 1 --> COLLINEARITY is detected by the test   
## 0 --> COLLINEARITY is not detected by the test  
##   
## SEX , S3AGE , logITN\_age3 , coefficient(s) are non-significant may be due to multicollinearity  
##   
## R-square of y on all x: 0.2685   
##   
## \* use method argument to check which regressors may be the reason of collinearity  
## ===================================

imcdiag(lm(SCARED\_TOT ~ FINAL\_THREAT + FINAL\_DEPRIVATION + SEX + S3AGE + logITN\_age3,   
 data = dtf))

##   
## Call:  
## imcdiag(mod = lm(SCARED\_TOT ~ FINAL\_THREAT + FINAL\_DEPRIVATION +   
## SEX + S3AGE + logITN\_age3, data = dtf))  
##   
##   
## All Individual Multicollinearity Diagnostics Result  
##   
## VIF TOL Wi Fi Leamer CVIF Klein IND1  
## FINAL\_THREAT 1.1908 0.8398 8.2032 11.0012 0.9164 1.2182 1 0.0195  
## FINAL\_DEPRIVATION 1.3010 0.7686 12.9443 17.3594 0.8767 1.3310 1 0.0179  
## SEX 1.0282 0.9725 1.2143 1.6285 0.9862 1.0519 0 0.0226  
## S3AGE 1.0159 0.9844 0.6825 0.9153 0.9922 1.0393 0 0.0229  
## logITN\_age3 1.2308 0.8125 9.9253 13.3106 0.9014 1.2592 1 0.0189  
## IND2  
## FINAL\_THREAT 1.2874  
## FINAL\_DEPRIVATION 1.8593  
## SEX 0.2207  
## S3AGE 0.1256  
## logITN\_age3 1.5070  
##   
## 1 --> COLLINEARITY is detected by the test   
## 0 --> COLLINEARITY is not detected by the test  
##   
## FINAL\_THREAT , FINAL\_DEPRIVATION , SEX , S3AGE , logITN\_age3 , coefficient(s) are non-significant may be due to multicollinearity  
##   
## R-square of y on all x: 0.0472   
##   
## \* use method argument to check which regressors may be the reason of collinearity  
## ===================================

imcdiag(zeroinfl(PTSD\_SEV\_COMBINED ~ FINAL\_THREAT + FINAL\_DEPRIVATION + SEX + S3AGE +   
 logITN\_age3, data = dtf))

##   
## Call:  
## imcdiag(mod = zeroinfl(PTSD\_SEV\_COMBINED ~ FINAL\_THREAT + FINAL\_DEPRIVATION +   
## SEX + S3AGE + logITN\_age3, data = dtf))  
##   
##   
## All Individual Multicollinearity Diagnostics Result  
##   
## VIF TOL Wi Fi Leamer CVIF Klein IND1  
## FINAL\_THREAT 1.1908 0.8398 8.2032 11.0012 0.9164 1.4116 0 0.0195  
## FINAL\_DEPRIVATION 1.3010 0.7686 12.9443 17.3594 0.8767 1.5423 0 0.0179  
## SEX 1.0282 0.9725 1.2143 1.6285 0.9862 1.2189 0 0.0226  
## S3AGE 1.0159 0.9844 0.6825 0.9153 0.9922 1.2042 0 0.0229  
## logITN\_age3 1.2308 0.8125 9.9253 13.3106 0.9014 1.4590 0 0.0189  
## IND2  
## FINAL\_THREAT 1.2874  
## FINAL\_DEPRIVATION 1.8593  
## SEX 0.2207  
## S3AGE 0.1256  
## logITN\_age3 1.5070  
##   
## 1 --> COLLINEARITY is detected by the test   
## 0 --> COLLINEARITY is not detected by the test  
##   
## FINAL\_DEPRIVATION , SEX , S3AGE , coefficient(s) are non-significant may be due to multicollinearity  
##   
## R-square of y on all x: 0.2703   
##   
## \* use method argument to check which regressors may be the reason of collinearity  
## ===================================

# Mediation of the association between age 3 family income (log transformed) and Depression by Deprivation and Threat

DepMed <- function(x, id) {  
 data <- x[id, ]  
 OutcomeModel <- coef(lm(CDI\_TOT ~ FINAL\_THREAT + FINAL\_DEPRIVATION + SEX + S3AGE +   
 logITN\_age3, data = data))  
 OutcomeModelAlone <- coef(lm(CDI\_TOT ~ logITN\_age3, data = data))  
 MedModel1 <- coef(lm(FINAL\_THREAT ~ logITN\_age3, data = data))  
 MedModel2 <- coef(lm(FINAL\_DEPRIVATION ~ logITN\_age3, data = data))  
 type1 <- unname(OutcomeModel["FINAL\_THREAT"] \* MedModel1["logITN\_age3"])  
 type2 <- unname(OutcomeModel["FINAL\_DEPRIVATION"] \* MedModel2["logITN\_age3"])  
 return(c(type1 = type1, type2 = type2))  
}  
set.seed(123)  
boot.DepMed <- boot(dtf, statistic = DepMed, R = 10000)  
boot.DepMed

##   
## ORDINARY NONPARAMETRIC BOOTSTRAP  
##   
##   
## Call:  
## boot(data = dtf, statistic = DepMed, R = 10000)  
##   
##   
## Bootstrap Statistics :  
## original bias std. error  
## t1\* -0.4524647 0.031685833 0.2245245  
## t2\* -0.9098446 0.002575373 0.2916619

boot.ci(boot.DepMed, type = "bca", index = 1)

## BOOTSTRAP CONFIDENCE INTERVAL CALCULATIONS  
## Based on 10000 bootstrap replicates  
##   
## CALL :   
## boot.ci(boot.out = boot.DepMed, type = "bca", index = 1)  
##   
## Intervals :   
## Level BCa   
## 95% (-0.9617, -0.0670 )   
## Calculations and Intervals on Original Scale

boot.ci(boot.DepMed, type = "bca", index = 2)

## BOOTSTRAP CONFIDENCE INTERVAL CALCULATIONS  
## Based on 10000 bootstrap replicates  
##   
## CALL :   
## boot.ci(boot.out = boot.DepMed, type = "bca", index = 2)  
##   
## Intervals :   
## Level BCa   
## 95% (-1.6551, -0.4634 )   
## Calculations and Intervals on Original Scale

# Mediation of the association between age 3 family income (log transformed) and PTSD (zero and count) by Threat

PTMed <- function(x, id) {  
 data <- x[id, ]  
 OutcomeModel <- coef(zeroinfl(PTSD\_SEV\_COMBINED ~ FINAL\_THREAT + FINAL\_DEPRIVATION +   
 SEX + S3AGE + logITN\_age3, data = data))  
 OutcomeModelAlone <- coef(zeroinfl(PTSD\_SEV\_COMBINED ~ logITN\_age3, data = data))  
 MedModel <- coef(lm(FINAL\_THREAT ~ logITN\_age3, data = data))  
 type1 <- unname(OutcomeModel["count\_FINAL\_THREAT"] \* MedModel["logITN\_age3"])  
 type2 <- unname(OutcomeModel["zero\_FINAL\_THREAT"] \* MedModel["logITN\_age3"])  
 return(c(type1 = type1, type2 = type2))  
}  
set.seed(123)  
boot.PTMed <- boot(dtf, statistic = PTMed, R = 10000)  
boot.PTMed

##   
## ORDINARY NONPARAMETRIC BOOTSTRAP  
##   
##   
## Call:  
## boot(data = dtf, statistic = PTMed, R = 10000)  
##   
##   
## Bootstrap Statistics :  
## original bias std. error  
## t1\* -0.07563164 0.01178395 0.03479617  
## t2\* 0.26351297 0.02101883 0.13112066

boot.ci(boot.PTMed, type = "bca", index = 1)

## BOOTSTRAP CONFIDENCE INTERVAL CALCULATIONS  
## Based on 10000 bootstrap replicates  
##   
## CALL :   
## boot.ci(boot.out = boot.PTMed, type = "bca", index = 1)  
##   
## Intervals :   
## Level BCa   
## 95% (-0.1591, -0.0186 )   
## Calculations and Intervals on Original Scale

boot.ci(boot.PTMed, type = "bca", index = 2)

## BOOTSTRAP CONFIDENCE INTERVAL CALCULATIONS  
## Based on 10000 bootstrap replicates  
##   
## CALL :   
## boot.ci(boot.out = boot.PTMed, type = "bca", index = 2)  
##   
## Intervals :   
## Level BCa   
## 95% ( 0.0784, 0.5812 )   
## Calculations and Intervals on Original Scale

# Association between income, Deprivation, threat, and Amygdala ROIs (Fear vs. Calm)

summary(lm(lamyg.Fear\_GT\_Calm ~ SEX + S3AGE + logITN\_age3, data = dtf))

##   
## Call:  
## lm(formula = lamyg.Fear\_GT\_Calm ~ SEX + S3AGE + logITN\_age3,   
## data = dtf)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -2.92847 -0.68373 0.08027 0.63309 2.43670   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 2.6153 1.6099 1.624 0.1061   
## SEX -0.1168 0.1409 -0.829 0.4082   
## S3AGE -0.1929 0.1374 -1.404 0.1622   
## logITN\_age3 -0.1693 0.0913 -1.854 0.0655 .  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.9308 on 173 degrees of freedom  
## Multiple R-squared: 0.03292, Adjusted R-squared: 0.01615   
## F-statistic: 1.963 on 3 and 173 DF, p-value: 0.1213

summary(lm(lamyg.Fear\_GT\_Calm ~ FINAL\_THREAT + FINAL\_DEPRIVATION + SEX + S3AGE +   
 logITN\_age3, data = dtf))

##   
## Call:  
## lm(formula = lamyg.Fear\_GT\_Calm ~ FINAL\_THREAT + FINAL\_DEPRIVATION +   
## SEX + S3AGE + logITN\_age3, data = dtf)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -2.90342 -0.65015 0.04771 0.64202 2.44742   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 2.78600 1.61962 1.720 0.0872 .  
## FINAL\_THREAT -0.14812 0.10886 -1.361 0.1754   
## FINAL\_DEPRIVATION 0.03739 0.11676 0.320 0.7492   
## SEX -0.12754 0.14223 -0.897 0.3711   
## S3AGE -0.20520 0.13795 -1.488 0.1387   
## logITN\_age3 -0.19556 0.10118 -1.933 0.0549 .  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.9312 on 171 degrees of freedom  
## Multiple R-squared: 0.04329, Adjusted R-squared: 0.01532   
## F-statistic: 1.548 on 5 and 171 DF, p-value: 0.1776

summary(lm(ramyg.Fear\_GT\_Calm ~ SEX + S3AGE + logITN\_age3, data = dtf))

##   
## Call:  
## lm(formula = ramyg.Fear\_GT\_Calm ~ SEX + S3AGE + logITN\_age3,   
## data = dtf)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -2.53990 -0.48181 0.06547 0.49473 2.41886   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)  
## (Intercept) 1.05740 1.53669 0.688 0.492  
## SEX -0.08116 0.13452 -0.603 0.547  
## S3AGE -0.07016 0.13119 -0.535 0.594  
## logITN\_age3 -0.10404 0.08715 -1.194 0.234  
##   
## Residual standard error: 0.8885 on 173 degrees of freedom  
## Multiple R-squared: 0.01172, Adjusted R-squared: -0.005414   
## F-statistic: 0.6841 on 3 and 173 DF, p-value: 0.5629

summary(lm(ramyg.Fear\_GT\_Calm ~ FINAL\_THREAT + FINAL\_DEPRIVATION + SEX + S3AGE +   
 logITN\_age3, data = dtf))

##   
## Call:  
## lm(formula = ramyg.Fear\_GT\_Calm ~ FINAL\_THREAT + FINAL\_DEPRIVATION +   
## SEX + S3AGE + logITN\_age3, data = dtf)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -2.56361 -0.44507 0.05139 0.48081 2.61751   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 1.31674 1.53681 0.857 0.3928   
## FINAL\_THREAT -0.03273 0.10329 -0.317 0.7517   
## FINAL\_DEPRIVATION -0.19938 0.11079 -1.800 0.0737 .  
## SEX -0.11533 0.13496 -0.855 0.3940   
## S3AGE -0.08537 0.13089 -0.652 0.5152   
## logITN\_age3 -0.18295 0.09601 -1.906 0.0584 .  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.8836 on 171 degrees of freedom  
## Multiple R-squared: 0.03388, Adjusted R-squared: 0.00563   
## F-statistic: 1.199 on 5 and 171 DF, p-value: 0.3116

# ROIs from whole brain analysis and Depression

summary(lm(CDI\_TOT ~ Fear\_GT\_Calm.pcc + FINAL\_THREAT + FINAL\_DEPRIVATION + SEX +   
 S3AGE + logITN\_age3, data = dtf))

##   
## Call:  
## lm(formula = CDI\_TOT ~ Fear\_GT\_Calm.pcc + FINAL\_THREAT + FINAL\_DEPRIVATION +   
## SEX + S3AGE + logITN\_age3, data = dtf)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -10.3873 -2.5859 -0.9226 1.8811 15.5663   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 9.2808 8.0233 1.157 0.24901   
## Fear\_GT\_Calm.pcc -0.2451 0.3357 -0.730 0.46639   
## FINAL\_THREAT 1.8003 0.5597 3.216 0.00155 \*\*   
## FINAL\_DEPRIVATION 2.5688 0.5782 4.443 1.6e-05 \*\*\*  
## SEX -1.0577 0.7042 -1.502 0.13497   
## S3AGE -0.2937 0.6836 -0.430 0.66795   
## logITN\_age3 -0.4880 0.5017 -0.973 0.33205   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 4.611 on 170 degrees of freedom  
## Multiple R-squared: 0.2707, Adjusted R-squared: 0.245   
## F-statistic: 10.52 on 6 and 170 DF, p-value: 6.461e-10

summary(lm(CDI\_TOT ~ Fear\_GT\_Calm.mpfc + FINAL\_THREAT + FINAL\_DEPRIVATION + SEX +   
 S3AGE + logITN\_age3, data = dtf))

##   
## Call:  
## lm(formula = CDI\_TOT ~ Fear\_GT\_Calm.mpfc + FINAL\_THREAT + FINAL\_DEPRIVATION +   
## SEX + S3AGE + logITN\_age3, data = dtf)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -10.481 -2.818 -1.044 1.524 16.347   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 8.8868 7.9898 1.112 0.2676   
## Fear\_GT\_Calm.mpfc 0.4943 0.3332 1.483 0.1398   
## FINAL\_THREAT 1.4645 0.5575 2.627 0.0094 \*\*   
## FINAL\_DEPRIVATION 2.6359 0.5775 4.564 9.58e-06 \*\*\*  
## SEX -0.9253 0.7065 -1.310 0.1920   
## S3AGE -0.2803 0.6801 -0.412 0.6807   
## logITN\_age3 -0.4591 0.4986 -0.921 0.3585   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 4.588 on 170 degrees of freedom  
## Multiple R-squared: 0.2778, Adjusted R-squared: 0.2523   
## F-statistic: 10.9 on 6 and 170 DF, p-value: 2.968e-10

# multicollinearity check

imcdiag(lm(CDI\_TOT ~ Fear\_GT\_Calm.pcc + FINAL\_THREAT + FINAL\_DEPRIVATION + SEX +   
 S3AGE + logITN\_age3, data = dtf))

##   
## Call:  
## imcdiag(mod = lm(CDI\_TOT ~ Fear\_GT\_Calm.pcc + FINAL\_THREAT +   
## FINAL\_DEPRIVATION + SEX + S3AGE + logITN\_age3, data = dtf))  
##   
##   
## All Individual Multicollinearity Diagnostics Result  
##   
## VIF TOL Wi Fi Leamer CVIF Klein IND1  
## Fear\_GT\_Calm.pcc 1.1148 0.8971 3.9245 4.9344 0.9471 1.4783 0 0.0262  
## FINAL\_THREAT 1.2843 0.7786 9.7243 12.2265 0.8824 1.7031 0 0.0228  
## FINAL\_DEPRIVATION 1.3015 0.7683 10.3127 12.9663 0.8765 1.7260 0 0.0225  
## SEX 1.0282 0.9725 0.9658 1.2143 0.9862 1.3635 0 0.0284  
## S3AGE 1.0175 0.9828 0.5992 0.7534 0.9914 1.3493 0 0.0287  
## logITN\_age3 1.2344 0.8101 8.0164 10.0791 0.9001 1.6369 0 0.0237  
## IND2  
## Fear\_GT\_Calm.pcc 0.7813  
## FINAL\_THREAT 1.6802  
## FINAL\_DEPRIVATION 1.7583  
## SEX 0.2084  
## S3AGE 0.1307  
## logITN\_age3 1.4411  
##   
## 1 --> COLLINEARITY is detected by the test   
## 0 --> COLLINEARITY is not detected by the test  
##   
## Fear\_GT\_Calm.pcc , SEX , S3AGE , logITN\_age3 , coefficient(s) are non-significant may be due to multicollinearity  
##   
## R-square of y on all x: 0.2707   
##   
## \* use method argument to check which regressors may be the reason of collinearity  
## ===================================

imcdiag(lm(CDI\_TOT ~ Fear\_GT\_Calm.mpfc + FINAL\_THREAT + FINAL\_DEPRIVATION + SEX +   
 S3AGE + logITN\_age3, data = dtf))

##   
## Call:  
## imcdiag(mod = lm(CDI\_TOT ~ Fear\_GT\_Calm.mpfc + FINAL\_THREAT +   
## FINAL\_DEPRIVATION + SEX + S3AGE + logITN\_age3, data = dtf))  
##   
##   
## All Individual Multicollinearity Diagnostics Result  
##   
## VIF TOL Wi Fi Leamer CVIF Klein IND1  
## Fear\_GT\_Calm.mpfc 1.1069 0.9035 3.6545 4.5948 0.9505 1.5258 0 0.0264  
## FINAL\_THREAT 1.2864 0.7773 9.7964 12.3170 0.8817 1.7733 0 0.0227  
## FINAL\_DEPRIVATION 1.3112 0.7627 10.6428 13.3814 0.8733 1.8074 0 0.0223  
## SEX 1.0450 0.9570 1.5381 1.9339 0.9782 1.4405 0 0.0280  
## S3AGE 1.0170 0.9833 0.5812 0.7308 0.9916 1.4019 0 0.0288  
## logITN\_age3 1.2310 0.8123 7.9006 9.9336 0.9013 1.6969 0 0.0238  
## IND2  
## Fear\_GT\_Calm.mpfc 0.7205  
## FINAL\_THREAT 1.6618  
## FINAL\_DEPRIVATION 1.7713  
## SEX 0.3212  
## S3AGE 0.1247  
## logITN\_age3 1.4005  
##   
## 1 --> COLLINEARITY is detected by the test   
## 0 --> COLLINEARITY is not detected by the test  
##   
## Fear\_GT\_Calm.mpfc , SEX , S3AGE , logITN\_age3 , coefficient(s) are non-significant may be due to multicollinearity  
##   
## R-square of y on all x: 0.2778   
##   
## \* use method argument to check which regressors may be the reason of collinearity  
## ===================================

# ROIs from whole brain analysis and PTSD

summary(zeroinfl(PTSD\_SEV\_COMBINED ~ SEX + S3AGE + logITN\_age3 + FINAL\_THREAT + FINAL\_DEPRIVATION +   
 Fear\_GT\_Calm.pcc, data = dtf))

##   
## Call:  
## zeroinfl(formula = PTSD\_SEV\_COMBINED ~ SEX + S3AGE + logITN\_age3 + FINAL\_THREAT +   
## FINAL\_DEPRIVATION + Fear\_GT\_Calm.pcc, data = dtf)  
##   
## Pearson residuals:  
## Min 1Q Median 3Q Max   
## -1.9351 -0.6658 -0.4888 0.1868 6.6083   
##   
## Count model coefficients (poisson with log link):  
## Estimate Std. Error z value Pr(>|z|)   
## (Intercept) 2.37453 0.92034 2.580 0.00988 \*\*   
## SEX -0.21102 0.07704 -2.739 0.00616 \*\*   
## S3AGE 0.01275 0.07856 0.162 0.87110   
## logITN\_age3 -0.20268 0.04209 -4.816 1.47e-06 \*\*\*  
## FINAL\_THREAT 0.19725 0.03719 5.304 1.13e-07 \*\*\*  
## FINAL\_DEPRIVATION -0.16294 0.06157 -2.647 0.00813 \*\*   
## Fear\_GT\_Calm.pcc 0.20079 0.04033 4.978 6.41e-07 \*\*\*  
##   
## Zero-inflation model coefficients (binomial with logit link):  
## Estimate Std. Error z value Pr(>|z|)   
## (Intercept) 0.36291 3.97402 0.091 0.9272   
## SEX 0.17344 0.34830 0.498 0.6185   
## S3AGE -0.02733 0.33951 -0.080 0.9358   
## logITN\_age3 0.51953 0.25155 2.065 0.0389 \*  
## FINAL\_THREAT -0.88896 0.35074 -2.535 0.0113 \*  
## FINAL\_DEPRIVATION -0.13788 0.27987 -0.493 0.6223   
## Fear\_GT\_Calm.pcc -0.25023 0.17042 -1.468 0.1420   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1   
##   
## Number of iterations in BFGS optimization: 16   
## Log-likelihood: -414.4 on 14 Df

summary(zeroinfl(PTSD\_SEV\_COMBINED ~ Fear\_GT\_Calm.mpfc + FINAL\_THREAT + FINAL\_DEPRIVATION +   
 SEX + S3AGE + logITN\_age3, data = dtf))

##   
## Call:  
## zeroinfl(formula = PTSD\_SEV\_COMBINED ~ Fear\_GT\_Calm.mpfc + FINAL\_THREAT +   
## FINAL\_DEPRIVATION + SEX + S3AGE + logITN\_age3, data = dtf)  
##   
## Pearson residuals:  
## Min 1Q Median 3Q Max   
## -1.7048 -0.6341 -0.4819 0.1170 6.5342   
##   
## Count model coefficients (poisson with log link):  
## Estimate Std. Error z value Pr(>|z|)   
## (Intercept) 1.80351 0.90951 1.983 0.0474 \*   
## Fear\_GT\_Calm.mpfc 0.07278 0.03448 2.111 0.0348 \*   
## FINAL\_THREAT 0.25387 0.03552 7.148 8.81e-13 \*\*\*  
## FINAL\_DEPRIVATION -0.09697 0.05990 -1.619 0.1055   
## SEX -0.14869 0.07966 -1.867 0.0620 .   
## S3AGE 0.06103 0.07763 0.786 0.4317   
## logITN\_age3 -0.17419 0.04194 -4.153 3.28e-05 \*\*\*  
##   
## Zero-inflation model coefficients (binomial with logit link):  
## Estimate Std. Error z value Pr(>|z|)   
## (Intercept) 0.74590 3.93166 0.190 0.84953   
## Fear\_GT\_Calm.mpfc -0.12174 0.16140 -0.754 0.45070   
## FINAL\_THREAT -0.92153 0.34923 -2.639 0.00832 \*\*  
## FINAL\_DEPRIVATION -0.16165 0.27904 -0.579 0.56237   
## SEX 0.13607 0.35080 0.388 0.69811   
## S3AGE -0.05969 0.33531 -0.178 0.85871   
## logITN\_age3 0.53696 0.24894 2.157 0.03101 \*   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1   
##   
## Number of iterations in BFGS optimization: 1   
## Log-likelihood: -425.9 on 14 Df

# multicollinearity check

imcdiag(zeroinfl(PTSD\_SEV\_COMBINED ~ SEX + S3AGE + logITN\_age3 + FINAL\_THREAT + FINAL\_DEPRIVATION +   
 Fear\_GT\_Calm.pcc, data = dtf))

##   
## Call:  
## imcdiag(mod = zeroinfl(PTSD\_SEV\_COMBINED ~ SEX + S3AGE + logITN\_age3 +   
## FINAL\_THREAT + FINAL\_DEPRIVATION + Fear\_GT\_Calm.pcc, data = dtf))  
##   
##   
## All Individual Multicollinearity Diagnostics Result  
##   
## VIF TOL Wi Fi Leamer CVIF Klein IND1  
## SEX 1.0282 0.9725 0.9658 1.2143 0.9862 1.3736 0 0.0284  
## S3AGE 1.0175 0.9828 0.5992 0.7534 0.9914 1.3593 0 0.0287  
## logITN\_age3 1.2344 0.8101 8.0164 10.0791 0.9001 1.6490 0 0.0237  
## FINAL\_THREAT 1.2843 0.7786 9.7243 12.2265 0.8824 1.7157 0 0.0228  
## FINAL\_DEPRIVATION 1.3015 0.7683 10.3127 12.9663 0.8765 1.7387 0 0.0225  
## Fear\_GT\_Calm.pcc 1.1148 0.8971 3.9245 4.9344 0.9471 1.4892 0 0.0262  
## IND2  
## SEX 0.2084  
## S3AGE 0.1307  
## logITN\_age3 1.4411  
## FINAL\_THREAT 1.6802  
## FINAL\_DEPRIVATION 1.7583  
## Fear\_GT\_Calm.pcc 0.7813  
##   
## 1 --> COLLINEARITY is detected by the test   
## 0 --> COLLINEARITY is not detected by the test  
##   
## SEX , S3AGE , FINAL\_DEPRIVATION , coefficient(s) are non-significant may be due to multicollinearity  
##   
## R-square of y on all x: 0.288   
##   
## \* use method argument to check which regressors may be the reason of collinearity  
## ===================================

imcdiag(zeroinfl(PTSD\_SEV\_COMBINED ~ Fear\_GT\_Calm.mpfc + FINAL\_THREAT + FINAL\_DEPRIVATION +   
 SEX + S3AGE + logITN\_age3, data = dtf))

##   
## Call:  
## imcdiag(mod = zeroinfl(PTSD\_SEV\_COMBINED ~ Fear\_GT\_Calm.mpfc +   
## FINAL\_THREAT + FINAL\_DEPRIVATION + SEX + S3AGE + logITN\_age3,   
## data = dtf))  
##   
##   
## All Individual Multicollinearity Diagnostics Result  
##   
## VIF TOL Wi Fi Leamer CVIF Klein IND1  
## Fear\_GT\_Calm.mpfc 1.1069 0.9035 3.6545 4.5948 0.9505 1.3914 0 0.0264  
## FINAL\_THREAT 1.2864 0.7773 9.7964 12.3170 0.8817 1.6171 0 0.0227  
## FINAL\_DEPRIVATION 1.3112 0.7627 10.6428 13.3814 0.8733 1.6482 0 0.0223  
## SEX 1.0450 0.9570 1.5381 1.9339 0.9782 1.3136 0 0.0280  
## S3AGE 1.0170 0.9833 0.5812 0.7308 0.9916 1.2784 0 0.0288  
## logITN\_age3 1.2310 0.8123 7.9006 9.9336 0.9013 1.5474 0 0.0238  
## IND2  
## Fear\_GT\_Calm.mpfc 0.7205  
## FINAL\_THREAT 1.6618  
## FINAL\_DEPRIVATION 1.7713  
## SEX 0.3212  
## S3AGE 0.1247  
## logITN\_age3 1.4005  
##   
## 1 --> COLLINEARITY is detected by the test   
## 0 --> COLLINEARITY is not detected by the test  
##   
## Fear\_GT\_Calm.mpfc , FINAL\_DEPRIVATION , SEX , S3AGE , coefficient(s) are non-significant may be due to multicollinearity  
##   
## R-square of y on all x: 0.2743   
##   
## \* use method argument to check which regressors may be the reason of collinearity  
## ===================================

# Mediation of the association between age 3 family income (log transformed) and PTSD (count) by precuneus

PTpccITNMed <- function(x, id) {  
 data <- x[id, ]  
 OutcomeModel <- coef(zeroinfl(PTSD\_SEV\_COMBINED ~ Fear\_GT\_Calm.pcc + FINAL\_THREAT +   
 FINAL\_DEPRIVATION + SEX + S3AGE + logITN\_age3, data = data))  
 OutcomeModelAlone <- coef(zeroinfl(PTSD\_SEV\_COMBINED ~ logITN\_age3, data = data))  
 MedModel <- coef(lm(Fear\_GT\_Calm.pcc ~ logITN\_age3, data = data))  
 type1 <- unname(OutcomeModel["count\_Fear\_GT\_Calm.pcc"] \* MedModel["logITN\_age3"])  
 return(type1 = type1)  
}  
set.seed(123)  
boot.PTpccITNMed <- boot(dtf, statistic = PTpccITNMed, R = 10000)  
boot.PTpccITNMed

##   
## ORDINARY NONPARAMETRIC BOOTSTRAP  
##   
##   
## Call:  
## boot(data = dtf, statistic = PTpccITNMed, R = 10000)  
##   
##   
## Bootstrap Statistics :  
## original bias std. error  
## t1\* -0.04312114 0.003564468 0.02915297

boot.ci(boot.PTpccITNMed, type = "bca", index = 1)

## BOOTSTRAP CONFIDENCE INTERVAL CALCULATIONS  
## Based on 10000 bootstrap replicates  
##   
## CALL :   
## boot.ci(boot.out = boot.PTpccITNMed, type = "bca", index = 1)  
##   
## Intervals :   
## Level BCa   
## 95% (-0.1333, -0.0047 )   
## Calculations and Intervals on Original Scale

# Mediation of the association between age 3 family income (log transformed) and PTSD (count) by dmPFC

PTmpfcITNMed <- function(x, id) {  
 data <- x[id, ]  
 OutcomeModel <- coef(zeroinfl(PTSD\_SEV\_COMBINED ~ Fear\_GT\_Calm.mpfc + FINAL\_THREAT +   
 FINAL\_DEPRIVATION + SEX + S3AGE + logITN\_age3, data = data))  
 OutcomeModelAlone <- coef(zeroinfl(PTSD\_SEV\_COMBINED ~ logITN\_age3, data = data))  
 MedModel <- coef(lm(Fear\_GT\_Calm.mpfc ~ logITN\_age3, data = data))  
 type1 <- unname(OutcomeModel["count\_Fear\_GT\_Calm.mpfc"] \* MedModel["logITN\_age3"])  
 return(type1 = type1)  
}  
set.seed(123)  
boot.PTmpfcITNMed <- boot(dtf, statistic = PTmpfcITNMed, R = 10000)  
boot.PTmpfcITNMed

##   
## ORDINARY NONPARAMETRIC BOOTSTRAP  
##   
##   
## Call:  
## boot(data = dtf, statistic = PTmpfcITNMed, R = 10000)  
##   
##   
## Bootstrap Statistics :  
## original bias std. error  
## t1\* -0.0067908 -1.729903e-05 0.01475866

boot.ci(boot.PTmpfcITNMed, type = "bca", index = 1)

## BOOTSTRAP CONFIDENCE INTERVAL CALCULATIONS  
## Based on 10000 bootstrap replicates  
##   
## CALL :   
## boot.ci(boot.out = boot.PTmpfcITNMed, type = "bca", index = 1)  
##   
## Intervals :   
## Level BCa   
## 95% (-0.0703, 0.0071 )   
## Calculations and Intervals on Original Scale