Analysis of Stress-Heart Rate Coherence & Well-Being

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Contents

RStudio version 1.1.453
R version 3.5

Directories

Raw data files downloaded from http://www.icpsr.umich.edu/icpsrweb/ICPSR/studies
/29282 (biomarker/project 4) and /04652 (survey/project 1)
And from http://midus.colectica.org/ for MIDUS 2 Milwaukee subsample

Then processed through Prep_Coherence_MIDUSII.R script. Find at:
github.com/sashasomms/coherence_behavioral/

```
dir = '~/Desktop/UWMadison/MIDUS'
# Data directory
ddir = paste(dir, '/data', sep='')
# Analysis directory (to output plots)
adir = paste(dir, '/analysis', sep='')

setwd(ddir)
```

Packages

```
library(data.table)
library(plyr)
library(stats)
library(car)
library(ggplot2)
library(multilevel)
library(lme4)
library(lmSupport)
library(AICcmodavg)
library(pbkrtest)
library(boot)
library(rmarkdown)
library(broom)
```

```
library(pander)
library(broom.mixed)
```

```
## Warning in checkMatrixPackageVersion(): Package version inconsistency detected.
## TMB was built with Matrix version 1.2.15
## Current Matrix version is 1.2.14
## Please re-install 'TMB' from source using install.packages('TMB', type = 'source') or ask CRAN for a binary version of 'TMB' matching C
```

Read in processed data files

Files generated in Prep_Coherence_MIDUSII.R script

```
today='20181124'

# Wide format
fnameW = paste("coh_",today,".csv",sep='')
fpathW = paste(ddir,"/",fnameW, sep='')

# Long format
fnameL = paste("cohLong_",today,".csv",sep='')
fpathL = paste(ddir,"/",fnameL, sep='')

# Read in processed data
df = read.csv(fpathW)
dfL = read.csv(fpathL)
```

PREP

Subset dataframe

A condensed/subsetted dataframe for analysis - excluding the many survey/P1 people without biomarker/P4/coherence data

```
dfLs = dfL[!is.na(dfL$coherence_slope),]
length(unique(dfLs$M2ID)) # 1065
```

```
# [1] 1065
```

```r
# Transform that subsetted version to wide format

dfLsW = reshape(dfLs, idvar = "M2ID", v.names=c('hr', 'stress', 'stress_CMC', 'ecgQ'), drop=c('X', 'stressMC'), timevar = "timepoint", dir
names(dfLsW)
```

```
#  [1] "M2ID"               "birth_year"         "P1_sex"
#  [4] "P1_race"            "P1_ethnicity"       "pwb2"
#  [7] "autonomy2"          "envMast2"           "persGrow2"
# [10] "posRela2"           "purpLife2"          "selfAcce2"
# [13] "COPEem"             "COPEprob"           "COPE_denial"
# [16] "COPE_vent"          "COPE_disengage"     "COPE_posReGrow"
# [19] "COPE_active"        "COPE_plan"          "ZYGCAT"
# [22] "TOT_SIBS"           "M2FAMNUM"           "SAMPLMAJ"
# [25] "B4VTASK1str"        "gender"             "P1_PIage"
# [28] "P4_age"             "months_P1PI_to_P4"  "months_P1SAQ_to_P4"
# [31] "months_P1cog_to_P4" "P4_STAItrait"       "P4_CESD"
# [34] "P4_diabetes"        "P4_BMI"             "IL6"
# [37] "CRP"                "coherence_as_r"     "coherence_as_r5"
# [40] "stressNotNA"        "hrNotNA"            "complete"
# [43] "coherence_slope"    "hr.3"               "stress.3"
# [46] "stress_CMC.3"       "ecgQ.3"             "hr.4"
# [49] "stress.4"           "stress_CMC.4"       "ecgQ.4"
# [52] "hr.1"               "stress.1"           "stress_CMC.1"
# [55] "ecgQ.1"             "hr.2"               "stress.2"
# [58] "stress_CMC.2"       "ecgQ.2"             "hr.5"
# [61] "stress.5"           "stress_CMC.5"       "ecgQ.5"
```

```r
length(dfLsW$M2ID)
```

```
# [1] 1065
```

Summary statistics and demographics

```r
summary(dfLsW$gender)
```

```
#   (1) MALE (2) FEMALE
#        455        610
```

```
varDescribe(dfLsW$months_P1SAQ_to_P4)
```

```
#    vars    n  mean    sd median min max skew kurtosis
# X1    1 1065 25.89 14.19     24   0  62 0.39    -0.71
```

```
varDescribe(dfLsW$P4_age)
```

```
#    vars    n mean    sd median min max skew kurtosis
# X1    1 1065 56.4 11.21     56  35  86 0.41    -0.47
```

```
varDescribe(dfLsW$P1_PIage)
```

```
#    vars    n  mean   sd median min max skew kurtosis
# X1    1 1065 53.55 11.4     53  34  83 0.42     -0.5
```

```
varDescribe(dfLsW$months_P1SAQ_to_P4)
```

```
#    vars    n  mean    sd median min max skew kurtosis
# X1    1 1065 25.89 14.19     24   0  62 0.39    -0.71
```

```
varDescribe(dfLsW$months_P1PI_to_P4)
```

```
#    vars    n mean    sd median min max skew kurtosis
# X1    1 1065 28.4 13.93     27   5  63 0.37    -0.82
```

```
varDescribe(dfLsW$months_P1cog_to_P4)
```

```
#    vars   n  mean    sd median min max skew kurtosis
# X1    1 973 23.62 13.64     21   1  61 0.53    -0.65
```

```
varDescribe(dfLsW$pwb2)
```

```
#    vars    n   mean    sd median min max skew kurtosis
# X1    1 1061 232.81 35.25    238  97 294 -0.7     0.14
```

```
varDescribe(dfLsW$P4_CESD)
```

```
#    vars    n mean  sd median min max skew kurtosis
# X1    1 1057 8.61 8.1      6   0  54  1.6     3.16
```

```
varDescribe(dfLsW$P4_STAItrait)
```

```
#    vars    n mean   sd median min max skew kurtosis
# X1    1 1057 34.2 8.98     33  20  71 0.84     0.39
```

```r
varDescribe(dfLsW$IL6)
```

```
#    vars    n mean   sd median  min   max skew kurtosis
# X1    1 1058 2.96 2.89    2.1 0.26 21.82 3.36    14.45
```

```r
varDescribe(dfLsW$CRP)
```

```
#    vars    n mean   sd median  min  max skew kurtosis
# X1    1 1052 2.85 4.26   1.38 0.14 59.3 5.09    42.36
```

```r
varDescribe(dfLsW$COPE_denial)
```

```
#    vars    n mean   sd median min max skew kurtosis
# X1    1 1060 6.09 2.22      5   4  16 1.16     1.09
```

```r
summary(dfLsW$P1_race) # Asian = 3, black = 193, Native american or alaska native aleutian islander/eskimo = 14, other = 27, white = 825,
```

```
#                                                    1
#                                                  819
#                                                    2
#                                                   23
#                                                    3
#                                                   11
#                                                    4
#                                                    3
#                                                    5
#                                                    0
#                                                    6
#                                                   25
#                                                    7
#                                                    1
#                                                    8
#                                                    1
#                             BLACK AND/OR AFRICAN AMERICAN
#                                                  170
# NATIVE AMERICAN OR ALASKA NATIVE ALEUTIAN ISLANDER/ESKIMO
#                                                    3
#                                          OTHER (SPECIFY)
#                                                    2
#                                                WHITE
#                                                    6
```

```
#                                                 NA's
#                                                    1
```

```
summary(dfLsW$SAMPLMAJ)
```

```
#        (01) MAIN RDD         (02) SIBLING            (03) TWIN
#                  521                    6                  337
# (04) CITY OVERSAMPLE       (13) MILWAUKEE
#                   19                  182
```

Siblings

Prep variables in long format df

- Have age for everyone (so don't need to recenter well-being variable based on who has age)
- Stress is centered within cluster (centered around each subject's mean)
- Thus: for each analysis, just need to re-center age based on who has that well-being variable (this is probably overkill, the mean changes very little, but it's done)

Cluster mean center

```
dfLs$stress_CMC = dfLs$stress - ave(dfLs$stress, dfLs$M2ID, na.rm=T)
dfLs$hr_CMC = dfLs$hr - ave(dfLs$hr, dfLs$M2ID, na.rm=T)
```

Mean Center

```
dfLs$P4_age_C = dfLs$P4_age - mean(dfLs$P4_age, na.rm=T)
# Self reports
dfLs$pwb2_C = dfLs$pwb2 - mean(dfLs$pwb2, na.rm=T)
dfLs$P4_CESD_C = dfLs$P4_CESD- mean(dfLs$P4_CESD, na.rm=T)
dfLs$P4_STAItrait_C = dfLs$P4_STAItrait - mean(dfLs$P4_STAItrait, na.rm=T)
dfLs$COPE_denial_C = dfLs$COPE_denial - mean(dfLs$COPE_denial, na.rm=T)
# Divide pwb, cesd, stai by 10 so SEs larger, interpretable
dfLs$pwb2_C_d10 = dfLs$pwb2_C/10.000000
dfLs$P4_CESD_C_d10 = dfLs$P4_CESD_C/10.000000
dfLs$P4_STAItrait_C_d10 = dfLs$P4_STAItrait_C/10.000000
```

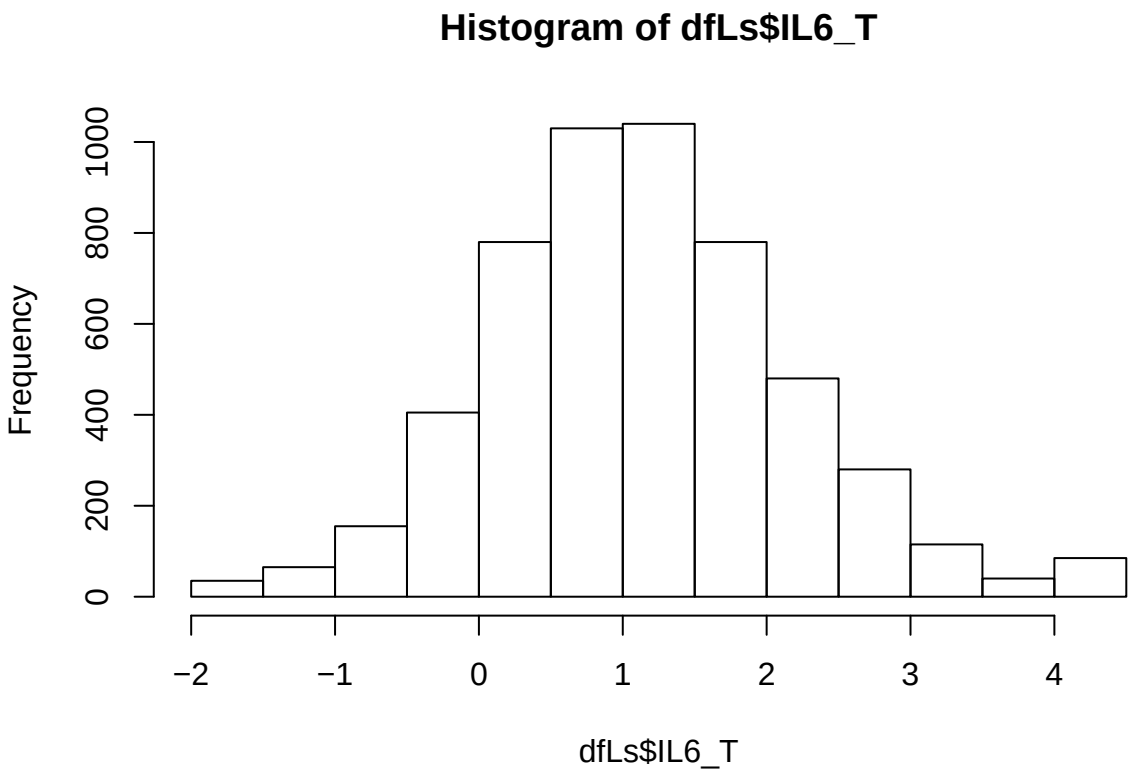
```r
# PWB subscales
dfLs$autonomy2_C = dfLs$autonomy2 - mean(dfLs$autonomy2, na.rm=T)
dfLs$envMast2_C = dfLs$envMast2 - mean(dfLs$envMast2, na.rm=T)
dfLs$persGrow2_C = dfLs$persGrow2 - mean(dfLs$persGrow2, na.rm=T)
dfLs$posRela2_C = dfLs$posRela2 - mean(dfLs$posRela2, na.rm=T)
dfLs$purpLife2_C = dfLs$purpLife2 - mean(dfLs$purpLife2, na.rm=T)
dfLs$selfAcce2_C = dfLs$selfAcce2 - mean(dfLs$selfAcce2, na.rm=T)

# Inflammatory
dfLs$IL6_C = dfLs$IL6 - mean(dfLs$IL6, na.rm=T)
dfLs$CRP_C = dfLs$CRP - mean(dfLs$CRP, na.rm=T)



# Wide data frame
dfLsW$P4_age_C = dfLsW$P4_age - mean(dfLsW$P4_age, na.rm=T)
# Self reports
dfLsW$pwb2_C = dfLsW$pwb2 - mean(dfLsW$pwb2, na.rm=T)
dfLsW$P4_CESD_C = dfLsW$P4_CESD- mean(dfLsW$P4_CESD, na.rm=T)
dfLsW$P4_STAItrait_C = dfLsW$P4_STAItrait - mean(dfLsW$P4_STAItrait, na.rm=T)
dfLsW$COPE_denial_C = dfLsW$COPE_denial - mean(dfLsW$COPE_denial, na.rm=T)
# Inflammatory
dfLsW$IL6_C = dfLsW$IL6 - mean(dfLsW$IL6, na.rm=T)
dfLsW$CRP_C = dfLsW$CRP - mean(dfLsW$CRP, na.rm=T)
# PWB subscales
dfLsW$autonomy2_C = dfLsW$autonomy2 - mean(dfLsW$autonomy2, na.rm=T)
dfLsW$envMast2_C = dfLsW$envMast2 - mean(dfLsW$envMast2, na.rm=T)
dfLsW$persGrow2_C = dfLsW$persGrow2 - mean(dfLsW$persGrow2, na.rm=T)
dfLsW$posRela2_C = dfLsW$posRela2 - mean(dfLsW$posRela2, na.rm=T)
dfLsW$purpLife2_C = dfLsW$purpLife2 - mean(dfLsW$purpLife2, na.rm=T)
dfLsW$selfAcce2_C = dfLsW$selfAcce2 - mean(dfLsW$selfAcce2, na.rm=T)
```

Recode dichotomous

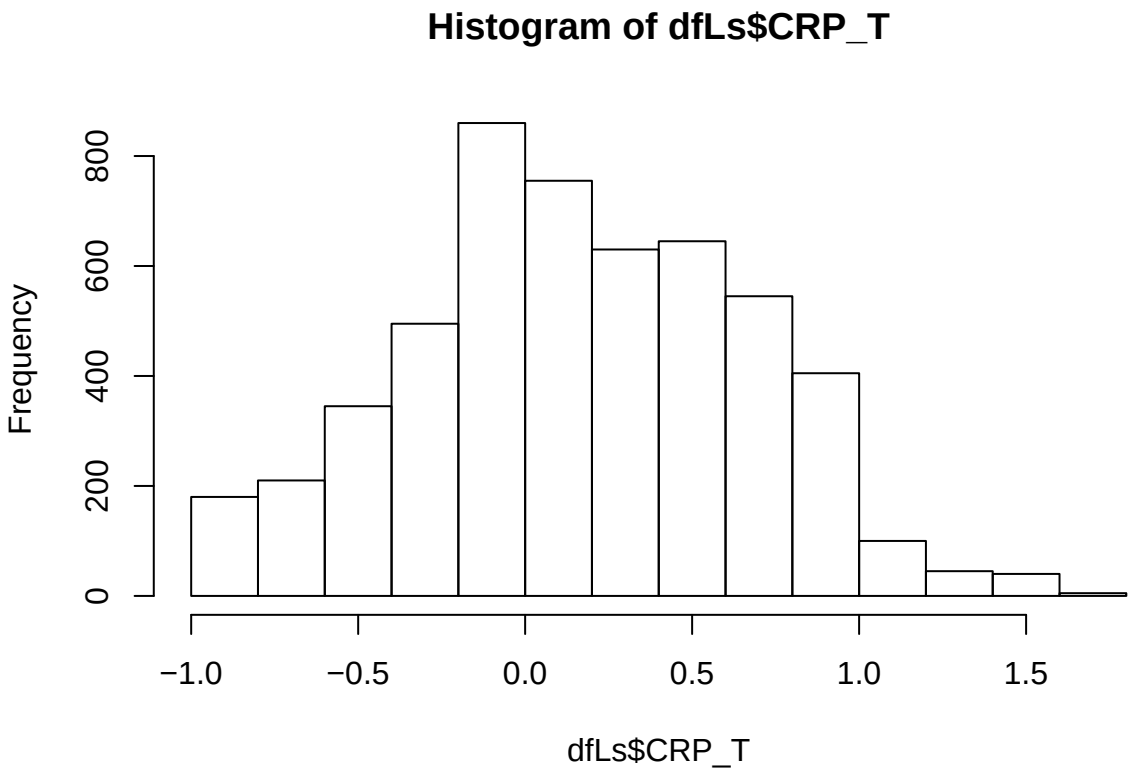
```r
dfLs$gender_C = varRecode(dfLs$gender, c('(1) MALE', '(2) FEMALE'), c(-.5,.5))
```

Log transform inflammatory markers for normal distribution

```
dfLs$IL6_T = log2(dfLs$IL6)
dfLsW$IL6_T = log2(dfLsW$IL6)
hist(dfLs$IL6_T)
```




```
dfLs$CRP_T = log(dfLs$CRP, base=10)
dfLsW$CRP_T = log(dfLsW$CRP, base=10)
hist(dfLs$CRP_T)
```




```
dfLs$IL6_T_C = dfLs$IL6_T - mean(dfLs$IL6_T, na.rm=T)
dfLs$CRP_T_C = dfLs$CRP_T - mean(dfLs$CRP_T, na.rm=T)
```

TESTS

Stress-heart rate coherence associations

Age

```
lmerM = lmer(hr ~ stress_CMC * P4_age_C + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * P4_age_C + (1 + stress_CMC |
##     M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5174; Groups: M2ID, 1065
##
##  Observations: 5174; Groups: M2FAMNUM, 940
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                       Estimate        SE         F error df   Pr(>F)
## (Intercept)         74.606886  0.336632 49053.169    910.3  < 2e-16 ***
## stress_CMC           0.879697  0.033773   677.676    834.0  < 2e-16 ***
## P4_age_C            -0.147480  0.029872    24.348    951.5 9.49e-07 ***
## stress_CMC:P4_age_C -0.008380  0.003008     7.754    843.0  0.00548 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.12648
##           stress_CMC  0.72944  0.184
##  M2FAMNUM (Intercept) 5.49528
##  Residual             2.36420

## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit

##
## AIC: 29206.2; BIC: 29265.2; logLik: -14594.1; Deviance: 29188.2
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 1: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.337

effect	group	term	estimate	std.error
fixed	NA	stress_CMC	0.88	0.0338
fixed	NA	P4_age_C	-0.147	0.0299
fixed	NA	stress_CMC:P4_age_C	-0.00838	0.00301
ran_pars	M2ID	sd___(Intercept)	9.13	NA
ran_pars	M2ID	sd___stress_CMC	0.729	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.184	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.5	NA
ran_pars	Residual	sd___Observation	2.36	NA

statistic	conf.low	conf.high
222	73.9	75.3
26	0.814	0.946
-4.94	-0.206	-0.0889
-2.79	-0.0143	-0.00248
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14594	29206	29265	29188	5165

Gender

```
lmerM = lmer(hr ~ stress_CMC * gender_C + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * gender_C + (1 + stress_CMC |
```

```
##     M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5174; Groups: M2ID, 1065
##
##  Observations: 5174; Groups: M2FAMNUM, 940
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                         Estimate       SE         F error df   Pr(>F)
## (Intercept)            72.60364  0.50890 2.031e+04    997.9  < 2e-16 ***
## stress_CMC              0.84851  0.05270 2.590e+02    890.3  < 2e-16 ***
## gender_C0.5             3.48633  0.66938 2.705e+01   1034.1 2.39e-07 ***
## stress_CMC:gender_C0.5  0.05149  0.06881 5.594e-01    850.0    0.455
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.1403
##           stress_CMC  0.7346   0.198
##  M2FAMNUM (Intercept) 5.4436
##  Residual             2.3643

## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit

##
## AIC: 29196.1; BIC: 29255.1; logLik: -14589.1; Deviance: 29178.1
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 4: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	72.6	0.509
fixed	NA	stress_CMC	0.849	0.0527

effect	group	term	estimate	std.error
fixed	NA	gender_C0.5	3.49	0.669
fixed	NA	stress_CMC:gender_C0.5	0.0515	0.0688
ran_pars	M2ID	sd__(Intercept)	9.14	NA
ran_pars	M2ID	sd__stress_CMC	0.735	NA
ran_pars	M2ID	cor__(Intercept).stress_CMC	0.198	NA
ran_pars	M2FAMNUM	sd__(Intercept)	5.44	NA
ran_pars	Residual	sd__Observation	2.36	NA

statistic	conf.low	conf.high
143	71.6	73.6
16.1	0.745	0.952
5.21	2.17	4.8
0.748	-0.0834	0.186
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14589	29196	29255	29178	5165

PWB

```
# Center age for subjects in this analysis
varDescribe(dfLs$pwb2_C)
```

```
##    vars    n mean    sd median     min   max skew kurtosis
## X1    1 5305    0 35.23   5.19 -135.81 61.19 -0.7     0.14
```

```r
length(dfLs$P4_age[!is.na(dfLs$pwb2_C)])
```

```
## [1] 5305
```

```r
dfLs$P4_age_C = dfLs$P4_age - mean(dfLs$P4_age[!is.na(dfLs$pwb2_C)], na.rm=T)


# Run the test
lmerM = lmer(hr ~ stress_CMC * pwb2_C_d10 + P4_age_C*stress_CMC + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * pwb2_C_d10 + P4_age_C * stress_CMC +
##     (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5154; Groups: M2ID, 1061
##
##  Observations: 5154; Groups: M2FAMNUM, 936
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                          Estimate        SE         F error df   Pr(>F)
## (Intercept)            74.576312  0.336510 4.905e+04    904.9  < 2e-16 ***
## stress_CMC              0.883415  0.033557 6.922e+02    827.8  < 2e-16 ***
## pwb2_C_d10              0.007326  0.094901 5.939e-03   1058.3 0.938584
## P4_age_C               -0.149293  0.030494 2.394e+01    951.0 1.17e-06 ***
## stress_CMC:pwb2_C_d10   0.050252  0.009720 2.670e+01    822.8 2.99e-07 ***
## stress_CMC:P4_age_C    -0.011877  0.003075 1.490e+01    846.0 0.000122 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.1097
##           stress_CMC  0.7184   0.182
##  M2FAMNUM (Intercept) 5.4752
##  Residual             2.3642
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
```

```
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit

##
## AIC: 29088.1; BIC: 29160.1; logLik: -14533.0; Deviance: 29066.1
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 7: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.337
fixed	NA	stress_CMC	0.883	0.0336
fixed	NA	pwb2_C_d10	0.00733	0.0949
fixed	NA	P4_age_C	-0.149	0.0305
fixed	NA	stress_CMC:pwb2_C_d10	0.0503	0.00972
fixed	NA	stress_CMC:P4_age_C	-0.0119	0.00307
ran_pars	M2ID	sd___(Intercept)	9.11	NA
ran_pars	M2ID	sd___stress_CMC	0.718	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.182	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.48	NA
ran_pars	Residual	sd___Observation	2.36	NA

statistic	conf.low	conf.high
222	73.9	75.2
26.3	0.818	0.949
0.0772	-0.179	0.193
-4.9	-0.209	-0.0895
5.17	0.0312	0.0693
-3.86	-0.0179	-0.00585
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14533	29088	29160	29066	5143

Depression

```
# Center age for subjects in this analysis
varDescribe(dfLs$P4_CESD_C)
```

```
##    vars    n mean  sd median   min   max skew kurtosis
## X1    1 5285    0 8.1  -2.61 -8.61 45.39 1.61     3.17
```

```
length(dfLs$P4_age[!is.na(dfLs$P4_CESD_C)])
```

```
## [1] 5285
```

```
dfLs$P4_age_C = dfLs$P4_age - mean(dfLs$P4_age[!is.na(dfLs$P4_CESD_C)], na.rm=T)

# Run the test
lmerM = lmer(hr ~ stress_CMC * P4_CESD_C_d10 + P4_age_C*stress_CMC + (1 + stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * P4_CESD_C_d10 + P4_age_C * stress_CMC +
##     (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5136; Groups: M2ID, 1057
##
##  Observations: 5136; Groups: M2FAMNUM, 933
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                           Estimate        SE         F error df   Pr(>F)
## (Intercept)              74.604070  0.337934 4.868e+04    903.9  < 2e-16
## stress_CMC                0.885757  0.033254 7.086e+02    821.7  < 2e-16
## P4_CESD_C_d10             0.390758  0.413199 8.915e-01   1053.8    0.345
## P4_age_C                 -0.141844  0.030469 2.165e+01    943.6 3.75e-06
```

```
## stress_CMC:P4_CESD_C_d10 -0.249253  0.041077 3.677e+01    783.7 2.06e-09
## stress_CMC:P4_age_C      -0.011962  0.003018 1.569e+01    833.9 8.09e-05
##
## (Intercept)              ***
## stress_CMC               ***
## P4_CESD_C_d10
## P4_age_C                 ***
## stress_CMC:P4_CESD_C_d10 ***
## stress_CMC:P4_age_C      ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.03983
##           stress_CMC  0.70346  0.204
##  M2FAMNUM (Intercept) 5.61826
##  Residual             2.36536
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28963.4; BIC: 29035.4; logLik: -14470.7; Deviance: 28941.4
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 10: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.338
fixed	NA	stress_CMC	0.886	0.0333
fixed	NA	P4_CESD_C_d10	0.391	0.413
fixed	NA	P4_age_C	-0.142	0.0305
fixed	NA	stress_CMC:P4_CESD_C_d10	-0.249	0.0411
fixed	NA	stress_CMC:P4_age_C	-0.012	0.00302

effect	group	term	estimate	std.error
ran_pars	M2ID	sd___(Intercept)	9.04	NA
ran_pars	M2ID	sd___stress_CMC	0.703	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.204	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.62	NA
ran_pars	Residual	sd___Observation	2.37	NA

statistic	conf.low	conf.high
221	73.9	75.3
26.6	0.821	0.951
0.946	-0.419	1.2
-4.66	-0.202	-0.0821
-6.07	-0.33	-0.169
-3.96	-0.0179	-0.00605
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14471	28963	29035	28941	5125

Anxiety

```
# Center age for subjects in this analysis
varDescribe(dfLs$P4_STAItrait_C)
```

```
##    vars    n mean   sd median   min  max skew kurtosis
## X1    1 5285    0 8.98   -1.2 -14.2 36.8 0.84      0.4
```

```r
length(dfLs$P4_age[!is.na(dfLs$P4_STAItrait_C)])
```

```
## [1] 5285
```

```r
dfLs$P4_age_C = dfLs$P4_age - mean(dfLs$P4_age[!is.na(dfLs$P4_STAItrait_C)], na.rm=T)

# Run the test
lmerM = lmer(hr ~ stress_CMC * P4_STAItrait_C_d10 + P4_age_C*stress_CMC + (1 + stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * P4_STAItrait_C_d10 + P4_age_C *
##     stress_CMC + (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5134; Groups: M2ID, 1057
##
##  Observations: 5134; Groups: M2FAMNUM, 932
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                                Estimate       SE         F error df
## (Intercept)                    74.59287  0.33743 4.880e+04    901.7
## stress_CMC                      0.88498  0.03346 6.987e+02    824.9
## P4_STAItrait_C_d10              0.30179  0.37381 6.496e-01   1051.0
## P4_age_C                       -0.14510  0.03050 2.260e+01    946.2
## stress_CMC:P4_STAItrait_C_d10 -0.21105  0.03700 3.249e+01    769.4
## stress_CMC:P4_age_C            -0.01157  0.00304 1.446e+01    834.4
##                                  Pr(>F)
## (Intercept)                     < 2e-16 ***
## stress_CMC                      < 2e-16 ***
## P4_STAItrait_C_d10             0.420442
## P4_age_C                       2.31e-06 ***
## stress_CMC:P4_STAItrait_C_d10 1.70e-08 ***
## stress_CMC:P4_age_C            0.000154 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
```

```
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.09841
##           stress_CMC  0.71234  0.201
##  M2FAMNUM (Intercept) 5.50493
##  Residual             2.36224
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28955.7; BIC: 29027.7; logLik: -14466.9; Deviance: 28933.7
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 13: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.337
fixed	NA	stress_CMC	0.885	0.0335
fixed	NA	P4_STAItrait_C_d10	0.302	0.374
fixed	NA	P4_age_C	-0.145	0.0305
fixed	NA	stress_CMC:P4_STAItrait_C_d10	-0.211	0.037
fixed	NA	stress_CMC:P4_age_C	-0.0116	0.00304
ran_pars	M2ID	sd___(Intercept)	9.1	NA
ran_pars	M2ID	sd___stress_CMC	0.712	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.201	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.5	NA
ran_pars	Residual	sd___Observation	2.36	NA

statistic	conf.low	conf.high
221	73.9	75.3
26.4	0.819	0.951
0.807	-0.431	1.03
-4.76	-0.205	-0.0853
-5.7	-0.284	-0.139
-3.8	-0.0175	-0.00561

statistic	conf.low	conf.high
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14467	28956	29028	28934	5123

IL6

```
# Center age for subjects in this analysis
varDescribe(dfLs$IL6_T_C)
```

```
##    vars    n mean   sd median   min max skew kurtosis
## X1    1 5290    0 1.06  -0.07 -3.09 3.3 0.31     0.46
```

```
length(dfLs$P4_age[!is.na(dfLs$IL6_T_C)])
```

```
## [1] 5290
```

```
dfLs$P4_age_C = dfLs$P4_age - mean(dfLs$P4_age[!is.na(dfLs$IL6_T_C)], na.rm=T)

# Run the test
lmerM = lmer(hr ~ stress_CMC * IL6_T_C + P4_age_C*stress_CMC + (1 + stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * IL6_T_C + P4_age_C * stress_CMC +
##     (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5147; Groups: M2ID, 1058
##
##  Observations: 5147; Groups: M2FAMNUM, 933
##
```

```
## Linear mixed model fit by REML
##
## Fixed Effects:
##                       Estimate        SE         F error df   Pr(>F)
## (Intercept)         74.566859  0.335299 49387.324    902.5  < 2e-16 ***
## stress_CMC           0.876484  0.033062   701.932    820.8  < 2e-16 ***
## IL6_T_C              1.202373  0.314616    14.549   1055.4 0.000144 ***
## P4_age_C            -0.163316  0.030207    29.196    949.5 8.27e-08 ***
## stress_CMC:IL6_T_C  -0.145483  0.030856    22.204    762.3 2.91e-06 ***
## stress_CMC:P4_age_C -0.006733  0.002969     5.137    818.6 0.023681 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.17117
##           stress_CMC  0.69889  0.230
##  M2FAMNUM (Intercept) 5.29098
##  Residual             2.36294

## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit

##
## AIC: 28996.2; BIC: 29068.2; logLik: -14487.1; Deviance: 28974.2
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 16: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.335
fixed	NA	stress_CMC	0.876	0.0331
fixed	NA	IL6_T_C	1.2	0.315
fixed	NA	P4_age_C	-0.163	0.0302
fixed	NA	stress_CMC:IL6_T_C	-0.145	0.0309

effect	group	term	estimate	std.error
fixed	NA	stress_CMC:P4_age_C	-0.00673	0.00297
ran_pars	M2ID	sd___(Intercept)	9.17	NA
ran_pars	M2ID	sd___stress_CMC	0.699	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.23	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.29	NA
ran_pars	Residual	sd___Observation	2.36	NA

statistic	conf.low	conf.high
222	73.9	75.2
26.5	0.812	0.941
3.82	0.586	1.82
-5.41	-0.223	-0.104
-4.71	-0.206	-0.085
-2.27	-0.0126	-0.000914
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14487	28996	29068	28974	5136

CRP

```
# Center age for subjects in this analysis
varDescribe(dfLs$CRP_T_C)
```

```
##    vars    n mean   sd median   min  max skew kurtosis
## X1    1 5260    0 0.51  -0.03 -1.02 1.61 0.05    -0.44
```

```r
length(dfLs$P4_age[!is.na(dfLs$CRP_T_C)])
```

```
## [1] 5260
```

```r
dfLs$P4_age_C = dfLs$P4_age - mean(dfLs$P4_age[!is.na(dfLs$CRP_T_C)], na.rm=T)

# Run the test
lmerM = lmer(hr ~ stress_CMC * CRP_T_C + P4_age_C*stress_CMC + (1 + stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * CRP_T_C + P4_age_C * stress_CMC +
##     (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5117; Groups: M2ID, 1052
##
##  Observations: 5117; Groups: M2FAMNUM, 928
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                       Estimate        SE         F error df   Pr(>F)
## (Intercept)         74.547465  0.336296 49078.668    902.3  < 2e-16 ***
## stress_CMC           0.872203  0.033412   680.613    819.1  < 2e-16 ***
## CRP_T_C              3.199604  0.650060    24.137   1046.9 1.04e-06 ***
## P4_age_C            -0.143695  0.029908    23.060    939.6 1.83e-06 ***
## stress_CMC:CRP_T_C  -0.175099  0.065423     7.155    827.2  0.00762 **
## stress_CMC:P4_age_C -0.008831  0.002975     8.802    829.9  0.00310 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 8.87569
##           stress_CMC  0.70872  0.221
##  M2FAMNUM (Intercept) 5.71154
##  Residual             2.36569
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
```

```
## calculated at the REML fit
##
## AIC: 28839.8; BIC: 28911.7; logLik: -14408.9; Deviance: 28817.8
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 19: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.5	0.336
fixed	NA	stress_CMC	0.872	0.0334
fixed	NA	CRP_T_C	3.2	0.65
fixed	NA	P4_age_C	-0.144	0.0299
fixed	NA	stress_CMC:CRP_T_C	-0.175	0.0654
fixed	NA	stress_CMC:P4_age_C	-0.00883	0.00297
ran_pars	M2ID	sd__(Intercept)	8.88	NA
ran_pars	M2ID	sd__stress_CMC	0.709	NA
ran_pars	M2ID	cor__(Intercept).stress_CMC	0.221	NA
ran_pars	M2FAMNUM	sd__(Intercept)	5.71	NA
ran_pars	Residual	sd__Observation	2.37	NA

statistic	conf.low	conf.high
222	73.9	75.2
26.1	0.807	0.938
4.92	1.93	4.47
-4.8	-0.202	-0.0851
-2.68	-0.303	-0.0469
-2.97	-0.0147	-0.003
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```r
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14409	28840	28912	28818	5106

Denial

```r
# Center age for subjects in this analysis
length(dfLs$P4_age[!is.na(dfLs$COPE_denial_C)])
```

```
## [1] 5300
```

```r
dfLs$P4_age_C = dfLs$P4_age - mean(dfLs$P4_age[!is.na(dfLs$COPE_denial_C)], na.rm=T)

# Run the test
lmerM = lmer(hr ~ stress_CMC * COPE_denial_C + P4_age_C*stress_CMC + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = F)
```

```
## lmer(formula = hr ~ stress_CMC * COPE_denial_C + P4_age_C * stress_CMC +
##     (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5149; Groups: M2ID, 1060
##
##  Observations: 5149; Groups: M2FAMNUM, 936
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                            Estimate        SE         F error df   Pr(>F)
## (Intercept)              74.603472  0.337499 4.879e+04    903.5  < 2e-16
## stress_CMC                0.871002  0.032961 6.974e+02    821.3  < 2e-16
## COPE_denial_C            -0.037553  0.148277 6.396e-02   1057.6  0.80040
## P4_age_C                 -0.147097  0.029983 2.404e+01    945.6 1.11e-06
## stress_CMC:COPE_denial_C -0.068955  0.015150 2.069e+01    853.3 6.18e-06
## stress_CMC:P4_age_C      -0.007733  0.002942 6.900e+00    830.0  0.00878
##
## (Intercept)              ***
```

```
## stress_CMC               ***
## COPE_denial_C
## P4_age_C                 ***
## stress_CMC:COPE_denial_C ***
## stress_CMC:P4_age_C      **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.19120
##           stress_CMC  0.69705  0.182
##  M2FAMNUM (Intercept) 5.40731
##  Residual             2.35528
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 29010.6; BIC: 29082.6; logLik: -14494.3; Deviance: 28988.6
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)   # Using pander() to view the created table, with 3 sig figs
```

Table 22: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.337
fixed	NA	stress_CMC	0.871	0.033
fixed	NA	COPE_denial_C	-0.0376	0.148
fixed	NA	P4_age_C	-0.147	0.03
fixed	NA	stress_CMC:COPE_denial_C	-0.069	0.0151
fixed	NA	stress_CMC:P4_age_C	-0.00773	0.00294
ran_pars	M2ID	sd___(Intercept)	9.19	NA
ran_pars	M2ID	sd___stress_CMC	0.697	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.182	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.41	NA

effect	group	term	estimate	std.error
ran_pars	Residual	sd___Observation	2.36	NA

statistic	conf.low	conf.high
221	73.9	75.3
26.4	0.806	0.936
-0.253	-0.328	0.253
-4.91	-0.206	-0.0883
-4.55	-0.0986	-0.0393
-2.63	-0.0135	-0.00197
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14494	29011	29083	28989	5138

Multiple Comparisons Correction

Holm-Bonferonni

```
## p value for each test of a well-being marker
p = c(2.99E-07, 2.06E-09, 1.70E-08, 2.91E-06, 0.00762, 6.18E-06)
## Holm-bonferonni
p.adjust(p, method= 'holm')
```

```
## [1] 1.196e-06 1.236e-08 8.500e-08 8.730e-06 7.620e-03 1.236e-05
```

```
#
```

Reactivity and Recovery

Compute reactivity measures

```
# Stress reactivity
dfLsW$stressChange2to1 = dfLsW$stress.2 - dfLsW$stress.1
varDescribe(dfLsW$stressChange2to1)
```

```
##    vars    n mean   sd median min max skew kurtosis
## X1    1 1065 2.35 1.76      2  -7   9 0.14     1.39
```

```
dfLsW$stressChange4to1 = dfLsW$stress.4 - dfLsW$stress.1
varDescribe(dfLsW$stressChange4to1)
```

```
##    vars    n mean   sd median min max skew kurtosis
## X1    1 1065 2.85 2.06      3  -8   9 0.11     0.77
```

```
dfLsW$stressChangeStresstoBase = rowMeans(dfLsW[c('stressChange2to1', 'stressChange4to1')], na.rm=TRUE)
varDescribe(dfLsW$stressChangeStresstoBase) # mean = 2.6, sd = 1.75, min = -7.5, max = 8
```

```
##    vars    n mean   sd median  min max skew kurtosis
## X1    1 1065  2.6 1.75    2.5 -7.5   8    0     1.14
```

```
# Heart rate reactivity
dfLsW$hrChange2to1 = dfLsW$hr.2 - dfLsW$hr.1
varDescribe(dfLsW$hrChange2to1)
```

```
##    vars    n mean   sd median  min max skew kurtosis
## X1    1 1008 3.97 4.25    3.3 -7.3  38 1.71     7.35
```

```
dfLsW$hrChange4to1 = dfLsW$hr.4 - dfLsW$hr.1
varDescribe(dfLsW$hrChange4to1)
```

```
##    vars    n mean   sd median  min  max skew kurtosis
## X1    1 1001 2.88 3.88    2.4 -9.4 26.8 1.21     4.11
```

```
dfLsW$hrChangeStresstoBase = rowMeans(dfLsW[c('hrChange2to1', 'hrChange4to1')], na.rm=TRUE)
varDescribe(dfLsW$hrChangeStresstoBase) # mean = 3.42, sd = 3.81, min = -7.1, max = 30.95
```

```
##    vars    n mean   sd median  min   max skew kurtosis
## X1    1 1035 3.42 3.81    2.9 -7.1 30.95 1.43     5.41
```

```r
# Center reactivity
dfLsW$stressChangeStresstoBase_C = dfLsW$stressChangeStresstoBase - mean(dfLsW$stressChangeStresstoBase, na.rm=T)
dfLsW$hrChangeStresstoBase_C = dfLsW$hrChangeStresstoBase - mean(dfLsW$hrChangeStresstoBase, na.rm=T)
```

```r
# Self-reported stress
dfLsW$stressChange3to2 = dfLsW$stress.3 - dfLsW$stress.2
varDescribe(dfLsW$stressChange3to2)
```

```
##    vars    n  mean   sd median min max  skew kurtosis
## X1    1 1065 -2.17 1.76     -2  -8   6 -0.29     0.86
```

```r
dfLsW$stressChange5to4 = dfLsW$stress.5 - dfLsW$stress.4
varDescribe(dfLsW$stressChange5to4)
```

```
##    vars    n  mean   sd median min max  skew kurtosis
## X1    1 1065 -2.74 2.04     -3  -9   8 -0.06     0.91
```

```r
dfLsW$stressChangeRecovtoStress = rowMeans(dfLsW[c('stressChange3to2', 'stressChange5to4')], na.rm=TRUE)
varDescribe(dfLsW$stressChangeRecovtoStress)
```

```
##    vars    n  mean   sd median  min max  skew kurtosis
## X1    1 1065 -2.46 1.66   -2.5 -7.5   5 -0.14     0.39
```

```r
# center
dfLsW$stressChangeRecovtoStress_C = dfLsW$stressChangeRecovtoStress - mean(dfLsW$stressChangeRecovtoStress, na.rm=T)

# Heart rate
dfLsW$hrChange3to2 = dfLsW$hr.3 - dfLsW$hr.2
varDescribe(dfLsW$hrChange3to2)
```

```
##    vars    n  mean   sd median min max  skew kurtosis
## X1    1 1003 -3.35 3.93   -2.9 -33 7.1 -1.77     8.26
```

```r
dfLsW$hrChange5to4 = dfLsW$hr.5 - dfLsW$hr.4
varDescribe(dfLsW$hrChange5to4)
```

```
##    vars   n mean   sd median   min max  skew kurtosis
## X1    1 994 -2.8 3.38   -2.3 -24.8 8.3 -1.08     3.84
```

```r
dfLsW$hrChangeRecovtoStress = rowMeans(dfLsW[c('hrChange3to2', 'hrChange5to4')], na.rm=TRUE)
varDescribe(dfLsW$hrChangeRecovtoStress)
```

```
##    vars    n  mean   sd median    min  max  skew kurtosis
```

```
## X1    1 1030 -3.06 3.33  -2.75 -26.45 6.45 -1.44     5.94
```

```
# center
dfLsW$hrChangeRecovtoStress_C = dfLsW$hrChangeRecovtoStress - mean(dfLsW$hrChangeRecovtoStress, na.rm=T)
```

```
## Merge reactivity and recovery measures into dfLs
varsToMerge = c('M2ID', 'hrChangeStresstoBase', 'hrChangeStresstoBase_C', 'stressChangeStresstoBase', 'stressChangeStresstoBase_C', 'hrCha
#dfLsW[varsToMerge]
# dfLs with Reactivity and Recovery data = dfLsRR
dfLsRR = merge.data.frame(dfLs, dfLsW[varsToMerge],  by='M2ID', all=TRUE)
#varDescribe(dfLsRR)
```

```
# Center age
dfLsRR$P4_age_C = dfLsRR$P4_age - mean(dfLsRR$P4_age, na.rm=T)
```

Is reactivity or recovery associated with coherence?

Heart rate reactivity

```
# hr reactivity
lmerM = lmer(hr ~ stress_CMC * hrChangeStresstoBase_C + P4_age_C * stress_CMC + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLsRR)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * hrChangeStresstoBase_C + P4_age_C *
##     stress_CMC + (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLsRR)
## Observations: 5098; Groups: M2ID, 1035
##
##  Observations: 5098; Groups: M2FAMNUM, 918
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                                    Estimate        SE         F error df
## (Intercept)                       74.611591  0.339084 48347.497    884.7
## stress_CMC                         0.775073  0.020112  1477.918    553.8
## hrChangeStresstoBase_C             0.376262  0.088110    18.144   1018.0
## P4_age_C                          -0.135265  0.030323    19.873    916.9
## stress_CMC:hrChangeStresstoBase_C  0.195908  0.005386  1318.695    752.5
```

```
## stress_CMC:P4_age_C               -0.002527  0.001794     1.973    508.8
##                                     Pr(>F)
## (Intercept)                        < 2e-16 ***
## stress_CMC                         < 2e-16 ***
## hrChangeStresstoBase_C            2.24e-05 ***
## P4_age_C                          9.30e-06 ***
## stress_CMC:hrChangeStresstoBase_C  < 2e-16 ***
## stress_CMC:P4_age_C                  0.161
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.113382
##           stress_CMC  0.031311 1.000
##  M2FAMNUM (Intercept) 5.408501
##  Residual             2.314602
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 27873.6; BIC: 27945.5; logLik: -13925.8; Deviance: 27851.6
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 25: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.339
fixed	NA	stress_CMC	0.775	0.0201
fixed	NA	hrChangeStresstoBase_C	0.376	0.0881
fixed	NA	P4_age_C	-0.135	0.0303
fixed	NA	stress_CMC:hrChangeStresstoBase_C	0.196	0.00539
fixed	NA	stress_CMC:P4_age_C	-0.00253	0.00179
ran_pars	M2ID	sd___(Intercept)	9.11	NA

effect	group	term	estimate	std.error
ran_pars	M2ID	sd___stress_CMC	0.0313	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	1	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.41	NA
ran_pars	Residual	sd___Observation	2.31	NA

statistic	conf.low	conf.high
220	73.9	75.3
38.5	0.736	0.814
4.27	0.204	0.549
-4.46	-0.195	-0.0758
36.4	0.185	0.206
-1.41	-0.00604	0.000989
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.31	-13926	27874	27945	27852	5087

Stress reactivity

```
# stress reactivity
lmerM = lmer(hr ~ stress_CMC * stressChangeStresstoBase_C + P4_age_C * stress_CMC + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLsRR)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * stressChangeStresstoBase_C +
##     P4_age_C * stress_CMC + (1 + stress_CMC | M2ID) + (1 | M2FAMNUM),
```

```
##     data = dfLsRR)
## Observations: 5174; Groups: M2ID, 1065
##
##  Observations: 5174; Groups: M2FAMNUM, 940
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                                      Estimate        SE         F
## (Intercept)                         74.603915  0.336590 4.906e+04
## stress_CMC                           0.919418  0.035971 6.527e+02
## stressChangeStresstoBase_C          -0.149642  0.188708 6.268e-01
## P4_age_C                            -0.146056  0.029945 2.376e+01
## stress_CMC:stressChangeStresstoBase_C -0.061563  0.019123 1.035e+01
## stress_CMC:P4_age_C                 -0.007672  0.003003 6.521e+00
##                                     error df   Pr(>F)
## (Intercept)                            908.4  < 2e-16 ***
## stress_CMC                            1108.8  < 2e-16 ***
## stressChangeStresstoBase_C            1060.0  0.42872
## P4_age_C                               951.9 1.28e-06 ***
## stress_CMC:stressChangeStresstoBase_C   714.5  0.00135 **
## stress_CMC:P4_age_C                     840.9  0.01084 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.14173
##           stress_CMC  0.72395  0.173
##  M2FAMNUM (Intercept) 5.47090
##  Residual             2.36312
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
##
## AIC: 29207.3; BIC: 29279.3; logLik: -14592.6; Deviance: 29185.3
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 28: Table continues below

effect	group	term	estimate
fixed	NA	(Intercept)	74.6
fixed	NA	stress_CMC	0.919
fixed	NA	stressChangeStresstoBase_C	-0.15
fixed	NA	P4_age_C	-0.146
fixed	NA	stress_CMC:stressChangeStresstoBase_C	-0.0616
fixed	NA	stress_CMC:P4_age_C	-0.00767
ran_pars	M2ID	sd___(Intercept)	9.14
ran_pars	M2ID	sd___stress_CMC	0.724
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.173
ran_pars	M2FAMNUM	sd___(Intercept)	5.47
ran_pars	Residual	sd___Observation	2.36

std.error	statistic	conf.low	conf.high
0.337	222	73.9	75.3
0.036	25.6	0.849	0.99
0.189	-0.793	-0.52	0.22
0.0299	-4.88	-0.205	-0.0874
0.0191	-3.22	-0.099	-0.0241
0.003	-2.56	-0.0136	-0.00179
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14593	29207	29279	29185	5163

Heart rate recovery

```
# hr recovery
lmerM = lmer(hr ~ stress_CMC * hrChangeRecovtoStress_C + P4_age_C * stress_CMC + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLsRR)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * hrChangeRecovtoStress_C + P4_age_C *
##     stress_CMC + (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLsRR)
## Observations: 5085; Groups: M2ID, 1030
##
##  Observations: 5085; Groups: M2FAMNUM, 913
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                                    Estimate        SE        F error df
## (Intercept)                       74.624414  0.340075 48082.16    879.4
## stress_CMC                         0.735922  0.020171  1324.51    548.5
## hrChangeRecovtoStress_C           -0.447674  0.101052    19.53   1002.9
## P4_age_C                          -0.144192  0.030311    22.60    911.2
## stress_CMC:hrChangeRecovtoStress_C -0.215940  0.005963  1306.21    672.1
## stress_CMC:P4_age_C               -0.007483  0.001795    17.28    512.3
##                                     Pr(>F)
## (Intercept)                        < 2e-16 ***
## stress_CMC                         < 2e-16 ***
## hrChangeRecovtoStress_C           1.10e-05 ***
## P4_age_C                          2.32e-06 ***
## stress_CMC:hrChangeRecovtoStress_C  < 2e-16 ***
## stress_CMC:P4_age_C               3.78e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
```

```
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.120059
##           stress_CMC  0.023988 1.000
##  M2FAMNUM (Intercept) 5.406043
##  Residual             2.318873
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 27810.0; BIC: 27881.9; logLik: -13894.0; Deviance: 27788.0
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 31: Table continues below

effect	group	term	estimate
fixed	NA	(Intercept)	74.6
fixed	NA	stress_CMC	0.736
fixed	NA	hrChangeRecovtoStress_C	-0.448
fixed	NA	P4_age_C	-0.144
fixed	NA	stress_CMC:hrChangeRecovtoStress_C	-0.216
fixed	NA	stress_CMC:P4_age_C	-0.00748
ran_pars	M2ID	sd___(Intercept)	9.12
ran_pars	M2ID	sd___stress_CMC	0.024
ran_pars	M2ID	cor___(Intercept).stress_CMC	1
ran_pars	M2FAMNUM	sd___(Intercept)	5.41
ran_pars	Residual	sd___Observation	2.32

std.error	statistic	conf.low	conf.high
0.34	219	74	75.3
0.0202	36.5	0.696	0.775
0.101	-4.43	-0.646	-0.25
0.0303	-4.76	-0.204	-0.0848
0.00596	-36.2	-0.228	-0.204

std.error	statistic	conf.low	conf.high
0.0018	-4.17	-0.011	-0.00396
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.32	-13894	27810	27882	27788	5074

Stress recovery

```
# stress recovery
lmerM = lmer(hr ~ stress_CMC * stressChangeRecovtoStress_C + P4_age_C * stress_CMC + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLsRR)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * stressChangeRecovtoStress_C +
##     P4_age_C * stress_CMC + (1 + stress_CMC | M2ID) + (1 | M2FAMNUM),
##     data = dfLsRR)
## Observations: 5174; Groups: M2ID, 1065
##
##  Observations: 5174; Groups: M2FAMNUM, 940
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                                      Estimate        SE         F
## (Intercept)                         74.605982  0.336802 4.900e+04
## stress_CMC                           0.909223  0.036127 6.328e+02
## stressChangeRecovtoStress_C          0.025278  0.198451 1.617e-02
## P4_age_C                            -0.147419  0.029900 2.428e+01
```

```
## stress_CMC:stressChangeRecovtoStress_C  0.045771  0.019964 5.249e+00
## stress_CMC:P4_age_C                    -0.008186  0.003004 7.417e+00
##                                        error df   Pr(>F)
## (Intercept)                               909.1  < 2e-16 ***
## stress_CMC                               1129.4  < 2e-16 ***
## stressChangeRecovtoStress_C              1057.9  0.89884
## P4_age_C                                  950.8 9.81e-07 ***
## stress_CMC:stressChangeRecovtoStress_C    711.3  0.02225 *
## stress_CMC:P4_age_C                       842.0  0.00659 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.12724
##           stress_CMC  0.72744  0.182
##  M2FAMNUM (Intercept) 5.50345
##  Residual             2.36354
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 29212.3; BIC: 29284.4; logLik: -14595.2; Deviance: 29190.3
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 34: Table continues below

effect	group	term	estimate
fixed	NA	(Intercept)	74.6
fixed	NA	stress_CMC	0.909
fixed	NA	stressChangeRecovtoStress_C	0.0253
fixed	NA	P4_age_C	-0.147
fixed	NA	stress_CMC:stressChangeRecovtoStress_C	0.0458
fixed	NA	stress_CMC:P4_age_C	-0.00819

effect	group	term	estimate
ran_pars	M2ID	sd__(Intercept)	9.13
ran_pars	M2ID	sd__stress_CMC	0.727
ran_pars	M2ID	cor__(Intercept).stress_CMC	0.182
ran_pars	M2FAMNUM	sd__(Intercept)	5.5
ran_pars	Residual	sd__Observation	2.36

std.error	statistic	conf.low	conf.high
0.337	222	73.9	75.3
0.0361	25.2	0.838	0.98
0.198	0.127	-0.364	0.414
0.0299	-4.93	-0.206	-0.0888
0.02	2.29	0.00664	0.0849
0.003	-2.73	-0.0141	-0.0023
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14595	29212	29284	29190	5163

Is stress reactivity associated with heart rate reactivity?

```
lmerM = lmer(hrChangeStresstoBase_C ~ stressChangeStresstoBase_C + P4_age_C + (1|M2FAMNUM), data=dfLsW)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hrChangeStresstoBase_C ~ stressChangeStresstoBase_C +
##     P4_age_C + (1 | M2FAMNUM), data = dfLsW)
```

```
## Observations: 1035; Groups: M2FAMNUM, 918
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                            Estimate       SE       F error df Pr(>F)
## (Intercept)                -0.03164  0.12115 0.06813    896.2 0.7941
## stressChangeStresstoBase_C  0.02217  0.06744 0.10769   1031.6 0.7429
## P4_age_C                   -0.02422  0.01082 5.00721    922.0 0.0255 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev.
##  M2FAMNUM (Intercept) 2.3244
##  Residual             2.9720

## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit

##
## AIC: 5687.6; BIC: 5712.3; logLik: -2838.8; Deviance: 5677.6
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 37: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	-0.0316	0.121
fixed	NA	stressChangeStresstoBase_C	0.0222	0.0674
fixed	NA	P4_age_C	-0.0242	0.0108
ran_pars	M2FAMNUM	sd__(Intercept)	2.32	NA
ran_pars	Residual	sd__Observation	2.97	NA

statistic	conf.low	conf.high
-0.261	-0.269	0.206
0.329	-0.11	0.154
-2.24	-0.0454	-0.00301
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.97	-2839	5688	5712	5678	1030

Does coherence predict well-being outcomes when adjusting for reactivity?

PWB + reactivity

```
# PWB
lmerM = lmer(hr ~ stress_CMC * pwb2_C_d10 + P4_age_C * stress_CMC + stressChangeStresstoBase_C + hrChangeStresstoBase_C + (1+ stress_CMC|M
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * pwb2_C_d10 + P4_age_C * stress_CMC +
##     stressChangeStresstoBase_C + hrChangeStresstoBase_C + (1 +
##     stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLsRR)
## Observations: 5078; Groups: M2ID, 1031
##
##  Observations: 5078; Groups: M2FAMNUM, 914
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                              Estimate        SE         F error df   Pr(>F)
## (Intercept)                74.578126  0.338560 4.845e+04    876.9  < 2e-16
## stress_CMC                  0.888089  0.033640 6.964e+02    820.7  < 2e-16
## pwb2_C_d10                 -0.011324  0.096535 1.371e-02   1024.7 0.906805
```

```
## P4_age_C                   -0.133923  0.031055 1.857e+01    917.9 1.81e-05
## stressChangeStresstoBase_C -0.233787  0.191172 1.487e+00   1024.5 0.222906
## hrChangeStresstoBase_C      0.364889  0.088572 1.685e+01   1008.7 4.37e-05
## stress_CMC:pwb2_C_d10       0.050377  0.009741 2.671e+01    816.7 2.97e-07
## stress_CMC:P4_age_C        -0.011161  0.003095 1.299e+01    832.5 0.000331
##
## (Intercept)                ***
## stress_CMC                 ***
## pwb2_C_d10
## P4_age_C                   ***
## stressChangeStresstoBase_C
## hrChangeStresstoBase_C     ***
## stress_CMC:pwb2_C_d10      ***
## stress_CMC:P4_age_C        ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.13765
##           stress_CMC  0.71601  0.006
##  M2FAMNUM (Intercept) 5.29938
##  Residual             2.37262
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28653.0; BIC: 28737.9; logLik: -14313.5; Deviance: 28627.0
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 40: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.339

effect	group	term	estimate	std.error
fixed	NA	stress_CMC	0.888	0.0336
fixed	NA	pwb2_C_d10	-0.0113	0.0965
fixed	NA	P4_age_C	-0.134	0.0311
fixed	NA	stressChangeStresstoBase_C	-0.234	0.191
fixed	NA	hrChangeStresstoBase_C	0.365	0.0886
fixed	NA	stress_CMC:pwb2_C_d10	0.0504	0.00974
fixed	NA	stress_CMC:P4_age_C	-0.0112	0.00309
ran_pars	M2ID	sd___(Intercept)	9.14	NA
ran_pars	M2ID	sd___stress_CMC	0.716	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.00558	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.3	NA
ran_pars	Residual	sd___Observation	2.37	NA

statistic	conf.low	conf.high
220	73.9	75.2
26.4	0.822	0.954
-0.117	-0.201	0.178
-4.31	-0.195	-0.0731
-1.22	-0.608	0.141
4.12	0.191	0.538
5.17	0.0313	0.0695
-3.61	-0.0172	-0.0051
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14314	28653	28738	28627	5065

Depression + reactivity

```
# CESD
lmerM = lmer(hr ~ stress_CMC * P4_CESD_C_d10 + P4_age_C * stress_CMC + stressChangeStresstoBase_C + hrChangeStresstoBase_C + (1+ stress_CM
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * P4_CESD_C_d10 + P4_age_C * stress_CMC +
##     stressChangeStresstoBase_C + hrChangeStresstoBase_C + (1 +
##     stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLsRR)
## Observations: 5060; Groups: M2ID, 1027
##
##  Observations: 5060; Groups: M2FAMNUM, 911
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                              Estimate        SE         F error df   Pr(>F)
## (Intercept)                 74.605761  0.339581 48198.818    874.7  < 2e-16
## stress_CMC                   0.890243  0.033349   711.997    814.5  < 2e-16
## P4_CESD_C_d10                0.615523  0.421293     2.129   1018.8 0.144886
## P4_age_C                    -0.124569  0.031062    16.059    908.1 6.64e-05
## stressChangeStresstoBase_C -0.227692  0.191378     1.408   1020.1 0.235702
## hrChangeStresstoBase_C       0.364627  0.089095    16.631   1010.2 4.90e-05
## stress_CMC:P4_CESD_C_d10    -0.249095  0.041175    36.555    777.6 2.30e-09
## stress_CMC:P4_age_C         -0.011272  0.003039    13.743    819.8 0.000224
##
## (Intercept)                 ***
## stress_CMC                  ***
## P4_CESD_C_d10
## P4_age_C                    ***
## stressChangeStresstoBase_C
## hrChangeStresstoBase_C      ***
## stress_CMC:P4_CESD_C_d10    ***
## stress_CMC:P4_age_C         ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
```

```
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.07188
##           stress_CMC  0.70119  0.028
##  M2FAMNUM (Intercept) 5.41730
##  Residual             2.37370
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28528.2; BIC: 28613.1; logLik: -14251.1; Deviance: 28502.2
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 43: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.34
fixed	NA	stress_CMC	0.89	0.0333
fixed	NA	P4_CESD_C_d10	0.616	0.421
fixed	NA	P4_age_C	-0.125	0.0311
fixed	NA	stressChangeStresstoBase_C	-0.228	0.191
fixed	NA	hrChangeStresstoBase_C	0.365	0.0891
fixed	NA	stress_CMC:P4_CESD_C_d10	-0.249	0.0412
fixed	NA	stress_CMC:P4_age_C	-0.0113	0.00304
ran_pars	M2ID	sd___(Intercept)	9.07	NA
ran_pars	M2ID	sd___stress_CMC	0.701	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.0281	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.42	NA
ran_pars	Residual	sd___Observation	2.37	NA

statistic	conf.low	conf.high
220	73.9	75.3
26.7	0.825	0.956
1.46	-0.21	1.44

statistic	conf.low	conf.high
-4.01	-0.185	-0.0637
-1.19	-0.603	0.147
4.09	0.19	0.539
-6.05	-0.33	-0.168
-3.71	-0.0172	-0.00532
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14251	28528	28613	28502	5047

Anxiety + reactivity

```
# P4_STAItrait
lmerM = lmer(hr ~ stress_CMC * P4_STAItrait_C_d10 + P4_age_C * stress_CMC + stressChangeStresstoBase_C + hrChangeStresstoBase_C + (1+ stre
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * P4_STAItrait_C_d10 + P4_age_C *
##     stress_CMC + stressChangeStresstoBase_C + hrChangeStresstoBase_C +
##     (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLsRR)
## Observations: 5058; Groups: M2ID, 1027
##
##  Observations: 5058; Groups: M2FAMNUM, 910
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                               Estimate       SE         F error df
```

```
## (Intercept)                   74.59753  0.33936 48247.738    873.0
## stress_CMC                     0.88940  0.03355   702.159    817.5
## P4_STAItrait_C_d10             0.39387  0.38083     1.066   1014.6
## P4_age_C                      -0.13014  0.03107    17.518    912.5
## stressChangeStresstoBase_C    -0.20481  0.19117     1.141   1020.5
## hrChangeStresstoBase_C         0.34682  0.08865    15.197   1008.3
## stress_CMC:P4_STAItrait_C_d10 -0.21103  0.03709    32.340    763.0
## stress_CMC:P4_age_C           -0.01083  0.00306    12.519    821.0
##                                 Pr(>F)
## (Intercept)                    < 2e-16 ***
## stress_CMC                     < 2e-16 ***
## P4_STAItrait_C_d10            0.302079
## P4_age_C                      3.12e-05 ***
## stressChangeStresstoBase_C    0.285589
## hrChangeStresstoBase_C        0.000103 ***
## stress_CMC:P4_STAItrait_C_d10 1.84e-08 ***
## stress_CMC:P4_age_C           0.000425 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.12876
##           stress_CMC  0.71007  0.034
##  M2FAMNUM (Intercept) 5.31862
##  Residual             2.37050
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28521.6; BIC: 28606.4; logLik: -14247.8; Deviance: 28495.6
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 46: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.339
fixed	NA	stress_CMC	0.889	0.0335
fixed	NA	P4_STAItrait_C_d10	0.394	0.381
fixed	NA	P4_age_C	-0.13	0.0311
fixed	NA	stressChangeStresstoBase_C	-0.205	0.191
fixed	NA	hrChangeStresstoBase_C	0.347	0.0886
fixed	NA	stress_CMC:P4_STAItrait_C_d10	-0.211	0.0371
fixed	NA	stress_CMC:P4_age_C	-0.0108	0.00306
ran_pars	M2ID	sd___(Intercept)	9.13	NA
ran_pars	M2ID	sd___stress_CMC	0.71	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.034	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.32	NA
ran_pars	Residual	sd___Observation	2.37	NA

statistic	conf.low	conf.high
220	73.9	75.3
26.5	0.824	0.955
1.03	-0.353	1.14
-4.19	-0.191	-0.0692
-1.07	-0.579	0.17
3.91	0.173	0.521
-5.69	-0.284	-0.138
-3.54	-0.0168	-0.00484
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14248	28522	28606	28496	5045

IL6 + reactivity

```
# IL6
lmerM = lmer(hr ~ stress_CMC * IL6_T_C + P4_age_C * stress_CMC + stressChangeStresstoBase_C + hrChangeStresstoBase_C + (1+ stress_CMC|M2ID
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * IL6_T_C + P4_age_C * stress_CMC +
##     stressChangeStresstoBase_C + hrChangeStresstoBase_C + (1 +
##     stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLsRR)
## Observations: 5073; Groups: M2ID, 1030
##
##  Observations: 5073; Groups: M2FAMNUM, 913
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                              Estimate        SE         F error df   Pr(>F)
## (Intercept)                 74.557851  0.336166 4.911e+04    874.0  < 2e-16
## stress_CMC                   0.881594  0.033187 7.050e+02    813.8  < 2e-16
## IL6_T_C                      1.379825  0.318100 1.874e+01   1025.3 1.65e-05
## P4_age_C                    -0.153349  0.030518 2.521e+01    915.8 6.17e-07
## stressChangeStresstoBase_C -0.164777  0.189952 7.484e-01   1022.8   0.3872
## hrChangeStresstoBase_C       0.351570  0.088203 1.578e+01   1007.6 7.63e-05
## stress_CMC:IL6_T_C          -0.147131  0.030982 2.253e+01    754.8 2.48e-06
## stress_CMC:P4_age_C         -0.005968  0.002991 3.975e+00    805.2   0.0465
##
## (Intercept)                 ***
## stress_CMC                  ***
## IL6_T_C                     ***
## P4_age_C                    ***
## stressChangeStresstoBase_C
## hrChangeStresstoBase_C      ***
## stress_CMC:IL6_T_C          ***
```

```
## stress_CMC:P4_age_C        *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.17021
##           stress_CMC  0.69735  0.063
##  M2FAMNUM (Intercept) 5.10177
##  Residual             2.37070
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28575.4; BIC: 28660.3; logLik: -14274.7; Deviance: 28549.4
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 49: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.336
fixed	NA	stress_CMC	0.882	0.0332
fixed	NA	IL6_T_C	1.38	0.318
fixed	NA	P4_age_C	-0.153	0.0305
fixed	NA	stressChangeStresstoBase_C	-0.165	0.19
fixed	NA	hrChangeStresstoBase_C	0.352	0.0882
fixed	NA	stress_CMC:IL6_T_C	-0.147	0.031
fixed	NA	stress_CMC:P4_age_C	-0.00597	0.00299
ran_pars	M2ID	sd___(Intercept)	9.17	NA
ran_pars	M2ID	sd___stress_CMC	0.697	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.0626	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.1	NA
ran_pars	Residual	sd___Observation	2.37	NA

statistic	conf.low	conf.high
222	73.9	75.2
26.6	0.817	0.947
4.34	0.756	2
-5.02	-0.213	-0.0935
-0.867	-0.537	0.208
3.99	0.179	0.524
-4.75	-0.208	-0.0864
-1.99	-0.0118	-0.000105
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14275	28575	28660	28549	5060

CRP + reactivity

```
# CRP
lmerM = lmer(hr ~ stress_CMC * CRP_T_C + P4_age_C * stress_CMC + stressChangeStresstoBase_C + hrChangeStresstoBase_C + (1+ stress_CMC|M2ID
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * CRP_T_C + P4_age_C * stress_CMC +
##     stressChangeStresstoBase_C + hrChangeStresstoBase_C + (1 +
##     stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLsRR)
## Observations: 5043; Groups: M2ID, 1024
##
##  Observations: 5043; Groups: M2FAMNUM, 908
##
## Linear mixed model fit by REML
```

```
##
## Fixed Effects:
##                              Estimate        SE         F error df   Pr(>F)
## (Intercept)                 74.535174  0.336962 4.886e+04    874.2  < 2e-16
## stress_CMC                   0.877712  0.033540 6.842e+02    812.4  < 2e-16
## CRP_T_C                      3.583501  0.656354 2.969e+01   1017.0 6.35e-08
## P4_age_C                    -0.130430  0.030219 1.861e+01    907.6 1.78e-05
## stressChangeStresstoBase_C -0.180621  0.189359 9.048e-01   1018.3  0.34173
## hrChangeStresstoBase_C       0.378851  0.087855 1.847e+01   1007.9 1.90e-05
## stress_CMC:CRP_T_C          -0.183689  0.065729 7.802e+00    818.4  0.00534
## stress_CMC:P4_age_C         -0.008068  0.002996 7.242e+00    817.4  0.00727
##
## (Intercept)                 ***
## stress_CMC                  ***
## CRP_T_C                     ***
## P4_age_C                    ***
## stressChangeStresstoBase_C
## hrChangeStresstoBase_C      ***
## stress_CMC:CRP_T_C          **
## stress_CMC:P4_age_C         **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 8.87187
##           stress_CMC  0.70747  0.037
##  M2FAMNUM (Intercept) 5.52940
##  Residual             2.37327
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28416.6; BIC: 28501.5; logLik: -14195.3; Deviance: 28390.6
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
```

```
pander(table_obj, digits = 3)
```

Table 52: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.5	0.337
fixed	NA	stress_CMC	0.878	0.0335
fixed	NA	CRP_T_C	3.58	0.656
fixed	NA	P4_age_C	-0.13	0.0302
fixed	NA	stressChangeStresstoBase_C	-0.181	0.189
fixed	NA	hrChangeStresstoBase_C	0.379	0.0879
fixed	NA	stress_CMC:CRP_T_C	-0.184	0.0657
fixed	NA	stress_CMC:P4_age_C	-0.00807	0.003
ran_pars	M2ID	sd___(Intercept)	8.87	NA
ran_pars	M2ID	sd___stress_CMC	0.707	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.0366	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.53	NA
ran_pars	Residual	sd___Observation	2.37	NA

statistic	conf.low	conf.high
221	73.9	75.2
26.2	0.812	0.943
5.46	2.3	4.87
-4.32	-0.19	-0.0712
-0.954	-0.552	0.191
4.31	0.207	0.551
-2.79	-0.313	-0.0549
-2.69	-0.0139	-0.0022
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```r
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14195	28417	28501	28391	5030

Denial + reactivity

```r
# denial
lmerM = lmer(hr ~ stress_CMC * COPE_denial_C + P4_age_C * stress_CMC + stressChangeStresstoBase_C + hrChangeStresstoBase_C + (1+ stress_CM
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * COPE_denial_C + P4_age_C * stress_CMC +
##     stressChangeStresstoBase_C + hrChangeStresstoBase_C + (1 +
##     stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLsRR)
## Observations: 5073; Groups: M2ID, 1030
##
##  Observations: 5073; Groups: M2FAMNUM, 914
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                               Estimate        SE         F error df   Pr(>F)
## (Intercept)                  74.611286  0.339904 4.811e+04    875.9  < 2e-16
## stress_CMC                    0.875742  0.033048 7.016e+02    814.4  < 2e-16
## COPE_denial_C                -0.001239  0.150958 6.712e-05   1024.7 0.993465
## P4_age_C                     -0.133549  0.030539 1.910e+01    912.3 1.38e-05
## stressChangeStresstoBase_C -0.212189  0.192810 1.204e+00   1023.3 0.272683
## hrChangeStresstoBase_C        0.333195  0.089631 1.373e+01   1020.1 0.000223
## stress_CMC:COPE_denial_C    -0.070040  0.015188 2.124e+01    847.1 4.67e-06
## stress_CMC:P4_age_C         -0.006992  0.002962 5.566e+00    816.6 0.018552
##
## (Intercept)                  ***
## stress_CMC                   ***
## COPE_denial_C
## P4_age_C                     ***
```

```
## stressChangeStresstoBase_C
## hrChangeStresstoBase_C     ***
## stress_CMC:COPE_denial_C   ***
## stress_CMC:P4_age_C        *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.22149
##           stress_CMC  0.69507  0.023
##  M2FAMNUM (Intercept) 5.24303
##  Residual             2.36299
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28575.4; BIC: 28660.3; logLik: -14274.7; Deviance: 28549.4
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 55: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.34
fixed	NA	stress_CMC	0.876	0.033
fixed	NA	COPE_denial_C	-0.00124	0.151
fixed	NA	P4_age_C	-0.134	0.0305
fixed	NA	stressChangeStresstoBase_C	-0.212	0.193
fixed	NA	hrChangeStresstoBase_C	0.333	0.0896
fixed	NA	stress_CMC:COPE_denial_C	-0.07	0.0152
fixed	NA	stress_CMC:P4_age_C	-0.00699	0.00296
ran_pars	M2ID	sd___(Intercept)	9.22	NA
ran_pars	M2ID	sd___stress_CMC	0.695	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.0229	NA

effect	group	term	estimate	std.error
ran_pars	M2FAMNUM	sd__(Intercept)	5.24	NA
ran_pars	Residual	sd__Observation	2.36	NA

statistic	conf.low	conf.high
220	73.9	75.3
26.5	0.811	0.941
-0.00821	-0.297	0.295
-4.37	-0.193	-0.0737
-1.1	-0.59	0.166
3.72	0.158	0.509
-4.61	-0.0998	-0.0403
-2.36	-0.0128	-0.00119
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14275	28575	28660	28549	5060

Does coherence predict well-being outcomes when adjusting for recovery?

PWB + recovery

```
# PWB
lmerM = lmer(hr ~ stress_CMC * pwb2_C_d10 + P4_age_C * stress_CMC + stressChangeRecovtoStress_C + hrChangeRecovtoStress_C + (1+ stress_CMC
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * pwb2_C_d10 + P4_age_C * stress_CMC +
##     stressChangeRecovtoStress_C + hrChangeRecovtoStress_C + (1 +
##     stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLsRR)
## Observations: 5065; Groups: M2ID, 1026
##
##  Observations: 5065; Groups: M2FAMNUM, 909
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                               Estimate        SE         F error df
## (Intercept)                  74.593814  0.339673 4.815e+04    871.9
## stress_CMC                    0.888587  0.033730 6.934e+02    818.1
## pwb2_C_d10                   -0.025748  0.097221 6.989e-02   1019.7
## P4_age_C                     -0.143135  0.030927 2.139e+01    910.0
## stressChangeRecovtoStress_C  0.177241  0.201195 7.717e-01   1018.6
## hrChangeRecovtoStress_C     -0.492615  0.102359 2.300e+01    996.2
## stress_CMC:pwb2_C_d10         0.050460  0.009764 2.668e+01    813.9
## stress_CMC:P4_age_C          -0.011079  0.003103 1.273e+01    830.6
##                                Pr(>F)
## (Intercept)                   < 2e-16 ***
## stress_CMC                    < 2e-16 ***
## pwb2_C_d10                    0.79155
## P4_age_C                     4.29e-06 ***
## stressChangeRecovtoStress_C  0.37989
## hrChangeRecovtoStress_C     1.87e-06 ***
## stress_CMC:pwb2_C_d10       3.03e-07 ***
## stress_CMC:P4_age_C          0.00038 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.13735
##           stress_CMC  0.71725  -0.024
##  M2FAMNUM (Intercept) 5.31393
##  Residual             2.37442
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit

##
## AIC: 28579.8; BIC: 28664.7; logLik: -14276.9; Deviance: 28553.8
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 58: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.34
fixed	NA	stress_CMC	0.889	0.0337
fixed	NA	pwb2_C_d10	-0.0257	0.0972
fixed	NA	P4_age_C	-0.143	0.0309
fixed	NA	stressChangeRecovtoStress_C	0.177	0.201
fixed	NA	hrChangeRecovtoStress_C	-0.493	0.102
fixed	NA	stress_CMC:pwb2_C_d10	0.0505	0.00976
fixed	NA	stress_CMC:P4_age_C	-0.0111	0.0031
ran_pars	M2ID	sd___(Intercept)	9.14	NA
ran_pars	M2ID	sd___stress_CMC	0.717	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	-0.0241	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.31	NA
ran_pars	Residual	sd___Observation	2.37	NA

statistic	conf.low	conf.high
220	73.9	75.3
26.3	0.822	0.955
-0.265	-0.216	0.165
-4.63	-0.204	-0.0825
0.881	-0.217	0.572
-4.81	-0.693	-0.292
5.17	0.0313	0.0696
-3.57	-0.0172	-0.005
NA	NA	NA

statistic	conf.low	conf.high
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14277	28580	28665	28554	5052

Depression + recovery

```
# CESD
lmerM = lmer(hr ~ stress_CMC * P4_CESD_C_d10 + P4_age_C * stress_CMC + stressChangeRecovtoStress_C + hrChangeRecovtoStress_C + (1+ stress_
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * P4_CESD_C_d10 + P4_age_C * stress_CMC +
##     stressChangeRecovtoStress_C + hrChangeRecovtoStress_C + (1 +
##     stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLsRR)
## Observations: 5047; Groups: M2ID, 1022
##
##  Observations: 5047; Groups: M2FAMNUM, 906
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                              Estimate        SE         F error df
## (Intercept)                 74.619523  0.340800 4.787e+04    869.7
## stress_CMC                   0.891440  0.033444 7.098e+02    811.9
## P4_CESD_C_d10                0.602676  0.422189 2.032e+00   1013.5
## P4_age_C                    -0.134388  0.030921 1.886e+01    900.2
## stressChangeRecovtoStress_C  0.149214  0.202155 5.418e-01   1013.8
## hrChangeRecovtoStress_C     -0.465876  0.102887 2.036e+01    997.1
```

```
## stress_CMC:P4_CESD_C_d10    -0.249206  0.041267 3.642e+01    775.2
## stress_CMC:P4_age_C         -0.011174  0.003047 1.344e+01    817.7
##                               Pr(>F)
## (Intercept)                  < 2e-16 ***
## stress_CMC                   < 2e-16 ***
## P4_CESD_C_d10               0.154329
## P4_age_C                    1.56e-05 ***
## stressChangeRecovtoStress_C 0.461857
## hrChangeRecovtoStress_C     7.19e-06 ***
## stress_CMC:P4_CESD_C_d10    2.46e-09 ***
## stress_CMC:P4_age_C         0.000263 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.0786
##           stress_CMC  0.7025   0.007
##  M2FAMNUM (Intercept) 5.4271
##  Residual             2.3755
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28456.2; BIC: 28541.1; logLik: -14215.1; Deviance: 28430.2
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 61: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.341
fixed	NA	stress_CMC	0.891	0.0334
fixed	NA	P4_CESD_C_d10	0.603	0.422
fixed	NA	P4_age_C	-0.134	0.0309

effect	group	term	estimate	std.error
fixed	NA	stressChangeRecovtoStress_C	0.149	0.202
fixed	NA	hrChangeRecovtoStress_C	-0.466	0.103
fixed	NA	stress_CMC:P4_CESD_C_d10	-0.249	0.0413
fixed	NA	stress_CMC:P4_age_C	-0.0112	0.00305
ran_pars	M2ID	sd___(Intercept)	9.08	NA
ran_pars	M2ID	sd___stress_CMC	0.703	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.0074	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.43	NA
ran_pars	Residual	sd___Observation	2.38	NA

statistic	conf.low	conf.high
219	74	75.3
26.7	0.826	0.957
1.43	-0.225	1.43
-4.35	-0.195	-0.0738
0.738	-0.247	0.545
-4.53	-0.668	-0.264
-6.04	-0.33	-0.168
-3.67	-0.0171	-0.0052
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.38	-14215	28456	28541	28430	5034

Anxiety + recovery

```
# P4_STAItrait
lmerM = lmer(hr ~ stress_CMC * P4_STAItrait_C_d10 + P4_age_C * stress_CMC + stressChangeRecovtoStress_C + hrChangeRecovtoStress_C + (1+ st
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * P4_STAItrait_C_d10 + P4_age_C *
##     stress_CMC + stressChangeRecovtoStress_C + hrChangeRecovtoStress_C +
##     (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLsRR)
## Observations: 5045; Groups: M2ID, 1022
##
##  Observations: 5045; Groups: M2FAMNUM, 905
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                                Estimate       SE         F error df
## (Intercept)                    74.61361  0.34055 4.793e+04    868.3
## stress_CMC                      0.89041  0.03365 6.995e+02    814.8
## P4_STAItrait_C_d10              0.42860  0.38237 1.252e+00   1008.0
## P4_age_C                       -0.13877  0.03096 2.007e+01    904.0
## stressChangeRecovtoStress_C     0.12520  0.20186 3.825e-01   1014.9
## hrChangeRecovtoStress_C        -0.45084  0.10254 1.920e+01    993.8
## stress_CMC:P4_STAItrait_C_d10 -0.21021  0.03720 3.189e+01    760.9
## stress_CMC:P4_age_C           -0.01076  0.00307 1.227e+01    819.0
##                                  Pr(>F)
## (Intercept)                     < 2e-16 ***
## stress_CMC                      < 2e-16 ***
## P4_STAItrait_C_d10             0.263387
## P4_age_C                       8.44e-06 ***
## stressChangeRecovtoStress_C    0.536413
## hrChangeRecovtoStress_C        1.31e-05 ***
## stress_CMC:P4_STAItrait_C_d10 2.31e-08 ***
## stress_CMC:P4_age_C            0.000485 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
```

```
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.11856
##           stress_CMC  0.71169  0.013
##  M2FAMNUM (Intercept) 5.35208
##  Residual             2.37225
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28449.3; BIC: 28534.1; logLik: -14211.6; Deviance: 28423.3
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 64: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.341
fixed	NA	stress_CMC	0.89	0.0337
fixed	NA	P4_STAItrait_C_d10	0.429	0.382
fixed	NA	P4_age_C	-0.139	0.031
fixed	NA	stressChangeRecovtoStress_C	0.125	0.202
fixed	NA	hrChangeRecovtoStress_C	-0.451	0.103
fixed	NA	stress_CMC:P4_STAItrait_C_d10	-0.21	0.0372
fixed	NA	stress_CMC:P4_age_C	-0.0108	0.00307
ran_pars	M2ID	sd___(Intercept)	9.12	NA
ran_pars	M2ID	sd___stress_CMC	0.712	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.0133	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.35	NA
ran_pars	Residual	sd___Observation	2.37	NA

statistic	conf.low	conf.high
219	73.9	75.3
26.5	0.824	0.956
1.12	-0.321	1.18

statistic	conf.low	conf.high
-4.48	-0.199	-0.0781
0.62	-0.27	0.521
-4.4	-0.652	-0.25
-5.65	-0.283	-0.137
-3.51	-0.0168	-0.00474
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14212	28449	28534	28423	5032

IL6 + recovery

```
# IL6
lmerM = lmer(hr ~ stress_CMC * IL6_T_C + P4_age_C * stress_CMC + stressChangeRecovtoStress_C + hrChangeRecovtoStress_C + (1+ stress_CMC|M2
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * IL6_T_C + P4_age_C * stress_CMC +
##     stressChangeRecovtoStress_C + hrChangeRecovtoStress_C + (1 +
##     stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLsRR)
## Observations: 5060; Groups: M2ID, 1025
##
##  Observations: 5060; Groups: M2FAMNUM, 908
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                              Estimate        SE         F error df
```

```
## (Intercept)                 74.568839  0.337214 4.882e+04    868.6
## stress_CMC                   0.883553  0.033271 7.046e+02    811.0
## IL6_T_C                      1.397468  0.319880 1.901e+01   1020.1
## P4_age_C                    -0.163139  0.030483 2.860e+01    909.0
## stressChangeRecovtoStress_C  0.103183  0.200904 2.623e-01   1016.9
## hrChangeRecovtoStress_C     -0.472659  0.102183 2.124e+01    995.6
## stress_CMC:IL6_T_C          -0.150195  0.031183 2.317e+01    753.8
## stress_CMC:P4_age_C         -0.005778  0.003000 3.705e+00    803.0
##                               Pr(>F)
## (Intercept)                  < 2e-16 ***
## stress_CMC                   < 2e-16 ***
## IL6_T_C                     1.44e-05 ***
## P4_age_C                    1.13e-07 ***
## stressChangeRecovtoStress_C   0.6087
## hrChangeRecovtoStress_C     4.57e-06 ***
## stress_CMC:IL6_T_C          1.79e-06 ***
## stress_CMC:P4_age_C           0.0546 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.17114
##           stress_CMC  0.69821  0.034
##  M2FAMNUM (Intercept) 5.10969
##  Residual             2.37240
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28502.3; BIC: 28587.1; logLik: -14238.1; Deviance: 28476.3
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 67: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.337
fixed	NA	stress_CMC	0.884	0.0333
fixed	NA	IL6_T_C	1.4	0.32
fixed	NA	P4_age_C	-0.163	0.0305
fixed	NA	stressChangeRecovtoStress_C	0.103	0.201
fixed	NA	hrChangeRecovtoStress_C	-0.473	0.102
fixed	NA	stress_CMC:IL6_T_C	-0.15	0.0312
fixed	NA	stress_CMC:P4_age_C	-0.00578	0.003
ran_pars	M2ID	sd___(Intercept)	9.17	NA
ran_pars	M2ID	sd___stress_CMC	0.698	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.0336	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.11	NA
ran_pars	Residual	sd___Observation	2.37	NA

statistic	conf.low	conf.high
221	73.9	75.2
26.6	0.818	0.949
4.37	0.771	2.02
-5.35	-0.223	-0.103
0.514	-0.291	0.497
-4.63	-0.673	-0.272
-4.82	-0.211	-0.0891
-1.93	-0.0117	0.000102
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14238	28502	28587	28476	5047

CRP + recovery

```
# CRP
lmerM = lmer(hr ~ stress_CMC * CRP_T_C + P4_age_C * stress_CMC + stressChangeRecovtoStress_C + hrChangeRecovtoStress_C + (1+ stress_CMC|M2
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * CRP_T_C + P4_age_C * stress_CMC +
##     stressChangeRecovtoStress_C + hrChangeRecovtoStress_C + (1 +
##     stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLsRR)
## Observations: 5030; Groups: M2ID, 1019
##
##  Observations: 5030; Groups: M2FAMNUM, 903
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                               Estimate        SE         F error df
## (Intercept)                  74.550368  0.338407 4.846e+04    868.9
## stress_CMC                    0.878823  0.033635 6.821e+02    809.7
## CRP_T_C                       3.478391  0.657730 2.786e+01   1012.2
## P4_age_C                     -0.140863  0.030162 2.178e+01    900.1
## stressChangeRecovtoStress_C   0.106584  0.199570 2.836e-01   1012.7
## hrChangeRecovtoStress_C      -0.452388  0.101554 1.970e+01    998.2
## stress_CMC:CRP_T_C           -0.183965  0.065897 7.785e+00    815.1
## stress_CMC:P4_age_C          -0.007978  0.003004 7.047e+00    815.2
##                                Pr(>F)
## (Intercept)                   < 2e-16 ***
## stress_CMC                    < 2e-16 ***
## CRP_T_C                      1.60e-07 ***
## P4_age_C                     3.51e-06 ***
## stressChangeRecovtoStress_C   0.59447
## hrChangeRecovtoStress_C      1.01e-05 ***
## stress_CMC:CRP_T_C            0.00539 **
```

```
## stress_CMC:P4_age_C          0.00810 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 8.88324
##           stress_CMC  0.70876  0.029
##  M2FAMNUM (Intercept) 5.54219
##  Residual             2.37504
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28345.6; BIC: 28430.4; logLik: -14159.8; Deviance: 28319.6
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 70: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.338
fixed	NA	stress_CMC	0.879	0.0336
fixed	NA	CRP_T_C	3.48	0.658
fixed	NA	P4_age_C	-0.141	0.0302
fixed	NA	stressChangeRecovtoStress_C	0.107	0.2
fixed	NA	hrChangeRecovtoStress_C	-0.452	0.102
fixed	NA	stress_CMC:CRP_T_C	-0.184	0.0659
fixed	NA	stress_CMC:P4_age_C	-0.00798	0.003
ran_pars	M2ID	sd___(Intercept)	8.88	NA
ran_pars	M2ID	sd___stress_CMC	0.709	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.0292	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.54	NA
ran_pars	Residual	sd___Observation	2.38	NA

statistic	conf.low	conf.high
220	73.9	75.2
26.1	0.813	0.945
5.29	2.19	4.77
-4.67	-0.2	-0.0817
0.534	-0.285	0.498
-4.45	-0.651	-0.253
-2.79	-0.313	-0.0548
-2.66	-0.0139	-0.00209
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.38	-14160	28346	28430	28320	5017

denial + recovery

```
# Denial
lmerM = lmer(hr ~ stress_CMC * COPE_denial_C + P4_age_C * stress_CMC + stressChangeRecovtoStress_C + hrChangeRecovtoStress_C + (1+ stress_
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * COPE_denial_C + P4_age_C * stress_CMC +
##     stressChangeRecovtoStress_C + hrChangeRecovtoStress_C + (1 +
##     stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLsRR)
## Observations: 5060; Groups: M2ID, 1025
##
##  Observations: 5060; Groups: M2FAMNUM, 909
##
## Linear mixed model fit by REML
```

```
##
## Fixed Effects:
##                               Estimate        SE         F error df
## (Intercept)                  74.625852  0.341007 4.782e+04    870.9
## stress_CMC                    0.876828  0.033145 6.992e+02    811.9
## COPE_denial_C                 0.022099  0.151639 2.117e-02   1019.7
## P4_age_C                     -0.143177  0.030459 2.207e+01    904.7
## stressChangeRecovtoStress_C   0.140866  0.202670 4.804e-01   1017.8
## hrChangeRecovtoStress_C      -0.453425  0.102980 1.926e+01   1009.0
## stress_CMC:COPE_denial_C     -0.069778  0.015221 2.099e+01    844.6
## stress_CMC:P4_age_C          -0.006915  0.002970 5.416e+00    814.6
##                                Pr(>F)
## (Intercept)                  < 2e-16 ***
## stress_CMC                   < 2e-16 ***
## COPE_denial_C                  0.8843
## P4_age_C                     3.04e-06 ***
## stressChangeRecovtoStress_C    0.4884
## hrChangeRecovtoStress_C      1.26e-05 ***
## stress_CMC:COPE_denial_C     5.31e-06 ***
## stress_CMC:P4_age_C            0.0202 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.21550
##           stress_CMC  0.69656  -0.006
##  M2FAMNUM (Intercept) 5.26576
##  Residual             2.36471
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28502.5; BIC: 28587.4; logLik: -14238.3; Deviance: 28476.5
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
```

```
pander(table_obj, digits = 3)
```

Table 73: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.341
fixed	NA	stress_CMC	0.877	0.0331
fixed	NA	COPE_denial_C	0.0221	0.152
fixed	NA	P4_age_C	-0.143	0.0305
fixed	NA	stressChangeRecovtoStress_C	0.141	0.203
fixed	NA	hrChangeRecovtoStress_C	-0.453	0.103
fixed	NA	stress_CMC:COPE_denial_C	-0.0698	0.0152
fixed	NA	stress_CMC:P4_age_C	-0.00692	0.00297
ran_pars	M2ID	sd__(Intercept)	9.22	NA
ran_pars	M2ID	sd__stress_CMC	0.697	NA
ran_pars	M2ID	cor__(Intercept).stress_CMC	-0.00635	NA
ran_pars	M2FAMNUM	sd__(Intercept)	5.27	NA
ran_pars	Residual	sd__Observation	2.36	NA

statistic	conf.low	conf.high
219	74	75.3
26.5	0.812	0.942
0.146	-0.275	0.319
-4.7	-0.203	-0.0835
0.695	-0.256	0.538
-4.4	-0.655	-0.252
-4.58	-0.0996	-0.0399
-2.33	-0.0127	-0.00109
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14238	28503	28587	28477	5047

Does coherence predict well-being outcomes when adjusting for reactivity and recovery?

PWB + reactivity + recovery

```
# PWB
lmerM = lmer(hr ~ stress_CMC * pwb2_C_d10 + P4_age_C * stress_CMC + stressChangeStresstoBase_C + hrChangeStresstoBase_C + stressChangeRecc
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * pwb2_C_d10 + P4_age_C * stress_CMC +
##     stressChangeStresstoBase_C + hrChangeStresstoBase_C + stressChangeRecovtoStress_C +
##     hrChangeRecovtoStress_C + (1 + stress_CMC | M2ID) + (1 |
##     M2FAMNUM), data = dfLsRR)
## Observations: 5065; Groups: M2ID, 1026
##
##  Observations: 5065; Groups: M2FAMNUM, 909
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                              Estimate        SE         F error df
## (Intercept)                 74.593679  0.339682 4.815e+04    870.6
## stress_CMC                   0.889094  0.033734 6.941e+02    818.8
## pwb2_C_d10                  -0.046161  0.097345 2.240e-01   1018.0
## P4_age_C                    -0.133034  0.031256 1.809e+01    915.1
## stressChangeStresstoBase_C  -0.397955  0.307519 1.665e+00   1015.0
## hrChangeStresstoBase_C       0.235610  0.134554 3.046e+00   1011.2
## stressChangeRecovtoStress_C -0.135131  0.323852 1.731e-01   1016.4
## hrChangeRecovtoStress_C     -0.380672  0.155512 5.953e+00   1015.9
## stress_CMC:pwb2_C_d10        0.050703  0.009763 2.694e+01    814.3
## stress_CMC:P4_age_C         -0.011072  0.003102 1.272e+01    831.0
```

```
##                               Pr(>F)
## (Intercept)                 < 2e-16 ***
## stress_CMC                  < 2e-16 ***
## pwb2_C_d10                 0.636075
## P4_age_C                   2.32e-05 ***
## stressChangeStresstoBase_C 0.197200
## hrChangeStresstoBase_C     0.081228 .
## stressChangeRecovtoStress_C 0.677443
## hrChangeRecovtoStress_C    0.014862 *
## stress_CMC:pwb2_C_d10      2.65e-07 ***
## stress_CMC:P4_age_C        0.000382 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.16015
##           stress_CMC  0.71758  -0.093
##  M2FAMNUM (Intercept) 5.28067
##  Residual             2.37428
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28582.7; BIC: 28680.6; logLik: -14276.3; Deviance: 28552.7
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 76: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.34
fixed	NA	stress_CMC	0.889	0.0337
fixed	NA	pwb2_C_d10	-0.0462	0.0973
fixed	NA	P4_age_C	-0.133	0.0313

effect	group	term	estimate	std.error
fixed	NA	stressChangeStresstoBase_C	-0.398	0.308
fixed	NA	hrChangeStresstoBase_C	0.236	0.135
fixed	NA	stressChangeRecovtoStress_C	-0.135	0.324
fixed	NA	hrChangeRecovtoStress_C	-0.381	0.156
fixed	NA	stress_CMC:pwb2_C_d10	0.0507	0.00976
fixed	NA	stress_CMC:P4_age_C	-0.0111	0.0031
ran_pars	M2ID	sd__(Intercept)	9.16	NA
ran_pars	M2ID	sd__stress_CMC	0.718	NA
ran_pars	M2ID	cor__(Intercept).stress_CMC	-0.0926	NA
ran_pars	M2FAMNUM	sd__(Intercept)	5.28	NA
ran_pars	Residual	sd__Observation	2.37	NA

statistic	conf.low	conf.high
220	73.9	75.3
26.4	0.823	0.955
-0.474	-0.237	0.145
-4.26	-0.194	-0.0718
-1.29	-1	0.205
1.75	-0.0281	0.499
-0.417	-0.77	0.5
-2.45	-0.685	-0.0759
5.19	0.0316	0.0698
-3.57	-0.0172	-0.00499
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14276	28583	28681	28553	5050

Depression + reactivity + recovery

```
# CESD
lmerM = lmer(hr ~ stress_CMC * P4_CESD_C_d10 + P4_age_C * stress_CMC + stressChangeStresstoBase_C + hrChangeStresstoBase_C + stressChangeR
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * P4_CESD_C_d10 + P4_age_C * stress_CMC +
##     stressChangeStresstoBase_C + hrChangeStresstoBase_C + stressChangeRecovtoStress_C +
##     hrChangeRecovtoStress_C + (1 + stress_CMC | M2ID) + (1 |
##     M2FAMNUM), data = dfLsRR)
## Observations: 5047; Groups: M2ID, 1022
##
##  Observations: 5047; Groups: M2FAMNUM, 906
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                               Estimate        SE         F error df
## (Intercept)                  74.616926  0.340520 4.795e+04    867.8
## stress_CMC                    0.891897  0.033454 7.102e+02    812.4
## P4_CESD_C_d10                 0.734480  0.423220 3.003e+00   1011.6
## P4_age_C                     -0.123428  0.031242 1.558e+01    905.3
## stressChangeStresstoBase_C   -0.423482  0.308693 1.871e+00   1012.0
## hrChangeStresstoBase_C        0.245795  0.134937 3.296e+00   1005.1
## stressChangeRecovtoStress_C -0.184334  0.325909 3.181e-01   1013.5
## hrChangeRecovtoStress_C      -0.348963  0.155682 4.991e+00   1011.2
## stress_CMC:P4_CESD_C_d10     -0.249599  0.041276 3.652e+01    775.5
## stress_CMC:P4_age_C          -0.011161  0.003047 1.340e+01    818.0
##                                 Pr(>F)
## (Intercept)                   < 2e-16 ***
## stress_CMC                    < 2e-16 ***
## P4_CESD_C_d10                0.083410 .
## P4_age_C                     8.50e-05 ***
## stressChangeStresstoBase_C   0.171643
## hrChangeStresstoBase_C       0.069739 .
## stressChangeRecovtoStress_C 0.572895
## hrChangeRecovtoStress_C      0.025693 *
## stress_CMC:P4_CESD_C_d10     2.34e-09 ***
```

```
## stress_CMC:P4_age_C         0.000268 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.09182
##           stress_CMC  0.70304  -0.064
##  M2FAMNUM (Intercept) 5.39227
##  Residual             2.37526
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28458.7; BIC: 28556.6; logLik: -14214.3; Deviance: 28428.7
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 79: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.341
fixed	NA	stress_CMC	0.892	0.0335
fixed	NA	P4_CESD_C_d10	0.734	0.423
fixed	NA	P4_age_C	-0.123	0.0312
fixed	NA	stressChangeStresstoBase_C	-0.423	0.309
fixed	NA	hrChangeStresstoBase_C	0.246	0.135
fixed	NA	stressChangeRecovtoStress_C	-0.184	0.326
fixed	NA	hrChangeRecovtoStress_C	-0.349	0.156
fixed	NA	stress_CMC:P4_CESD_C_d10	-0.25	0.0413
fixed	NA	stress_CMC:P4_age_C	-0.0112	0.00305
ran_pars	M2ID	sd___(Intercept)	9.09	NA
ran_pars	M2ID	sd___stress_CMC	0.703	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	-0.064	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.39	NA

effect	group	term	estimate	std.error
ran_pars	Residual	sd__Observation	2.38	NA

statistic	conf.low	conf.high
219	73.9	75.3
26.7	0.826	0.957
1.74	-0.095	1.56
-3.95	-0.185	-0.0622
-1.37	-1.03	0.182
1.82	-0.0187	0.51
-0.566	-0.823	0.454
-2.24	-0.654	-0.0438
-6.05	-0.33	-0.169
-3.66	-0.0171	-0.00519
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.38	-14214	28459	28557	28429	5032

Anxiety + reactivity + recovery

```
# P4_STAItrait
lmerM = lmer(hr ~ stress_CMC * P4_STAItrait_C_d10 + P4_age_C * stress_CMC + stressChangeStresstoBase_C + hrChangeStresstoBase_C + stressCh
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * P4_STAItrait_C_d10 + P4_age_C *
```

```
##     stress_CMC + stressChangeStresstoBase_C + hrChangeStresstoBase_C +
##     stressChangeRecovtoStress_C + hrChangeRecovtoStress_C + (1 +
##     stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLsRR)
## Observations: 5045; Groups: M2ID, 1022
##
##  Observations: 5045; Groups: M2FAMNUM, 905
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                                 Estimate        SE         F error df
## (Intercept)                    74.612817  0.340275 4.801e+04    866.2
## stress_CMC                      0.890835  0.033662 6.998e+02    815.2
## P4_STAItrait_C_d10              0.513393  0.382536 1.795e+00   1006.4
## P4_age_C                       -0.128776  0.031255 1.695e+01    909.6
## stressChangeStresstoBase_C     -0.408762  0.308290 1.748e+00   1012.5
## hrChangeStresstoBase_C          0.229227  0.134685 2.878e+00   1005.9
## stressChangeRecovtoStress_C    -0.196904  0.325555 3.637e-01   1013.8
## hrChangeRecovtoStress_C        -0.341217  0.155726 4.770e+00   1012.4
## stress_CMC:P4_STAItrait_C_d10 -0.210219  0.037213 3.188e+01    761.2
## stress_CMC:P4_age_C            -0.010741  0.003071 1.222e+01    819.2
##                                  Pr(>F)
## (Intercept)                     < 2e-16 ***
## stress_CMC                      < 2e-16 ***
## P4_STAItrait_C_d10             0.180603
## P4_age_C                       4.18e-05 ***
## stressChangeStresstoBase_C     0.186418
## hrChangeStresstoBase_C         0.090125 .
## stressChangeRecovtoStress_C    0.546577
## hrChangeRecovtoStress_C        0.029190 *
## stress_CMC:P4_STAItrait_C_d10 2.32e-08 ***
## stress_CMC:P4_age_C            0.000498 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.13165
```

```
##           stress_CMC  0.71217  -0.054
##  M2FAMNUM (Intercept) 5.31720
##  Residual             2.37205
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28452.2; BIC: 28550.1; logLik: -14211.1; Deviance: 28422.2
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 82: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.34
fixed	NA	stress_CMC	0.891	0.0337
fixed	NA	P4_STAItrait_C_d10	0.513	0.383
fixed	NA	P4_age_C	-0.129	0.0313
fixed	NA	stressChangeStresstoBase_C	-0.409	0.308
fixed	NA	hrChangeStresstoBase_C	0.229	0.135
fixed	NA	stressChangeRecovtoStress_C	-0.197	0.326
fixed	NA	hrChangeRecovtoStress_C	-0.341	0.156
fixed	NA	stress_CMC:P4_STAItrait_C_d10	-0.21	0.0372
fixed	NA	stress_CMC:P4_age_C	-0.0107	0.00307
ran_pars	M2ID	sd___(Intercept)	9.13	NA
ran_pars	M2ID	sd___stress_CMC	0.712	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	-0.0536	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.32	NA
ran_pars	Residual	sd___Observation	2.37	NA

statistic	conf.low	conf.high
219	73.9	75.3
26.5	0.825	0.957
1.34	-0.236	1.26
-4.12	-0.19	-0.0675

statistic	conf.low	conf.high
-1.33	-1.01	0.195
1.7	-0.0348	0.493
-0.605	-0.835	0.441
-2.19	-0.646	-0.036
-5.65	-0.283	-0.137
-3.5	-0.0168	-0.00472
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14211	28452	28550	28422	5030

IL6 + reactivity + recovery

```
# IL6
lmerM = lmer(hr ~ stress_CMC * IL6_T_C + P4_age_C * stress_CMC + stressChangeStresstoBase_C + hrChangeStresstoBase_C + stressChangeRecovtc
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * IL6_T_C + P4_age_C * stress_CMC +
##     stressChangeStresstoBase_C + hrChangeStresstoBase_C + stressChangeRecovtoStress_C +
##     hrChangeRecovtoStress_C + (1 + stress_CMC | M2ID) + (1 |
##     M2FAMNUM), data = dfLsRR)
## Observations: 5060; Groups: M2ID, 1025
##
##  Observations: 5060; Groups: M2FAMNUM, 908
##
## Linear mixed model fit by REML
##
```

```
## Fixed Effects:
##                               Estimate        SE         F error df
## (Intercept)                  74.567090  0.336865 4.892e+04    866.5
## stress_CMC                    0.884057  0.033291 7.046e+02    811.3
## IL6_T_C                       1.455603  0.320079 2.059e+01   1018.1
## P4_age_C                     -0.155226  0.030738 2.546e+01    913.3
## stressChangeStresstoBase_C   -0.367590  0.306759 1.428e+00   1016.1
## hrChangeStresstoBase_C        0.235175  0.133642 3.077e+00   1011.7
## stressChangeRecovtoStress_C -0.185247  0.324567 3.239e-01   1017.3
## hrChangeRecovtoStress_C     -0.363101  0.154765 5.469e+00   1015.7
## stress_CMC:IL6_T_C          -0.150199  0.031203 2.314e+01    754.1
## stress_CMC:P4_age_C         -0.005741  0.003002 3.653e+00    803.3
##                                Pr(>F)
## (Intercept)                  < 2e-16 ***
## stress_CMC                   < 2e-16 ***
## IL6_T_C                     6.35e-06 ***
## P4_age_C                    5.44e-07 ***
## stressChangeStresstoBase_C    0.2324
## hrChangeStresstoBase_C        0.0797 .
## stressChangeRecovtoStress_C   0.5694
## hrChangeRecovtoStress_C       0.0196 *
## stress_CMC:IL6_T_C          1.81e-06 ***
## stress_CMC:P4_age_C           0.0563 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.17308
##           stress_CMC  0.69911  -0.036
##  M2FAMNUM (Intercept) 5.08653
##  Residual             2.37204
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
##
## AIC: 28505.3; BIC: 28603.3; logLik: -14237.7; Deviance: 28475.3
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 85: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.337
fixed	NA	stress_CMC	0.884	0.0333
fixed	NA	IL6_T_C	1.46	0.32
fixed	NA	P4_age_C	-0.155	0.0307
fixed	NA	stressChangeStresstoBase_C	-0.368	0.307
fixed	NA	hrChangeStresstoBase_C	0.235	0.134
fixed	NA	stressChangeRecovtoStress_C	-0.185	0.325
fixed	NA	hrChangeRecovtoStress_C	-0.363	0.155
fixed	NA	stress_CMC:IL6_T_C	-0.15	0.0312
fixed	NA	stress_CMC:P4_age_C	-0.00574	0.003
ran_pars	M2ID	sd___(Intercept)	9.17	NA
ran_pars	M2ID	sd___stress_CMC	0.699	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	-0.0363	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.09	NA
ran_pars	Residual	sd___Observation	2.37	NA

statistic	conf.low	conf.high
221	73.9	75.2
26.6	0.819	0.949
4.55	0.828	2.08
-5.05	-0.215	-0.095
-1.2	-0.969	0.234
1.76	-0.0268	0.497
-0.571	-0.821	0.451
-2.35	-0.666	-0.0598
-4.81	-0.211	-0.089
-1.91	-0.0116	0.000143
NA	NA	NA
NA	NA	NA
NA	NA	NA

statistic	conf.low	conf.high
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14238	28505	28603	28475	5045

CRP + reactivity + recovery

```
# CRP
lmerM = lmer(hr ~ stress_CMC * CRP_T_C + P4_age_C * stress_CMC + stressChangeStresstoBase_C + hrChangeStresstoBase_C + stressChangeRecovto
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * CRP_T_C + P4_age_C * stress_CMC +
##     stressChangeStresstoBase_C + hrChangeStresstoBase_C + stressChangeRecovtoStress_C +
##     hrChangeRecovtoStress_C + (1 + stress_CMC | M2ID) + (1 |
##     M2FAMNUM), data = dfLsRR)
## Observations: 5030; Groups: M2ID, 1019
##
##  Observations: 5030; Groups: M2FAMNUM, 903
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                               Estimate        SE         F error df
## (Intercept)                  74.547630  0.337978 4.858e+04    867.1
## stress_CMC                    0.879474  0.033662 6.820e+02    810.2
## CRP_T_C                       3.631461  0.659316 3.022e+01   1009.8
## P4_age_C                     -0.130733  0.030449 1.841e+01    904.7
## stressChangeStresstoBase_C   -0.377893  0.304279 1.533e+00   1008.8
## hrChangeStresstoBase_C        0.273761  0.133554 4.174e+00   1001.9
## stressChangeRecovtoStress_C -0.190391  0.320632 3.506e-01   1010.5
```

```
## hrChangeRecovtoStress_C     -0.325312  0.154199 4.421e+00   1006.5
## stress_CMC:CRP_T_C          -0.182874  0.065948 7.681e+00    815.5
## stress_CMC:P4_age_C         -0.007918  0.003006 6.929e+00    815.6
##                               Pr(>F)
## (Intercept)                  < 2e-16 ***
## stress_CMC                   < 2e-16 ***
## CRP_T_C                     4.89e-08 ***
## P4_age_C                    1.97e-05 ***
## stressChangeStresstoBase_C   0.21588
## hrChangeStresstoBase_C       0.04131 *
## stressChangeRecovtoStress_C  0.55393
## hrChangeRecovtoStress_C      0.03574 *
## stress_CMC:CRP_T_C           0.00571 **
## stress_CMC:P4_age_C          0.00864 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 8.88799
##           stress_CMC  0.70999  -0.054
##  M2FAMNUM (Intercept) 5.51247
##  Residual             2.37455

## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit

##
## AIC: 28347.8; BIC: 28445.7; logLik: -14158.9; Deviance: 28317.8
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 88: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.5	0.338

effect	group	term	estimate	std.error	statistic	conf.low	conf.high
fixed	NA	stress_CMC	0.879	0.0337	221	73.9	75.2
fixed	NA	CRP_T_C	3.63	0.659	26.1	0.813	0.945
fixed	NA	P4_age_C	-0.131	0.0304	5.51	2.34	4.92
fixed	NA	stressChangeStresstoBase_C	-0.378	0.304	-4.29	-0.19	-0.0711
fixed	NA	hrChangeStresstoBase_C	0.274	0.134	-1.24	-0.974	0.218
fixed	NA	stressChangeRecovtoStress_C	-0.19	0.321	2.05	0.012	0.536
fixed	NA	hrChangeRecovtoStress_C	-0.325	0.154	-0.594	-0.819	0.438
fixed	NA	stress_CMC:CRP_T_C	-0.183	0.0659	-2.11	-0.628	-0.0231
fixed	NA	stress_CMC:P4_age_C	-0.00792	0.00301	-2.77	-0.312	-0.0536
ran_pars	M2ID	sd___(Intercept)	8.89	NA	-2.63	-0.0138	-0.00203
ran_pars	M2ID	sd___stress_CMC	0.71	NA	NA	NA	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	-0.0544	NA	NA	NA	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.51	NA	NA	NA	NA
ran_pars	Residual	sd___Observation	2.37	NA	NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14159	28348	28446	28318	5015

Denial + reactivity + recovery

```
# Denial
lmerM = lmer(hr ~ stress_CMC * COPE_denial_C + P4_age_C * stress_CMC + stressChangeStresstoBase_C + hrChangeStresstoBase_C + stressChangeR
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * COPE_denial_C + P4_age_C * stress_CMC +
##     stressChangeStresstoBase_C + hrChangeStresstoBase_C + stressChangeRecovtoStress_C +
##     hrChangeRecovtoStress_C + (1 + stress_CMC | M2ID) + (1 |
##     M2FAMNUM), data = dfLsRR)
## Observations: 5060; Groups: M2ID, 1025
##
##  Observations: 5060; Groups: M2FAMNUM, 909
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                               Estimate        SE         F error df
## (Intercept)                  74.628681  0.340924 4.784e+04    869.2
## stress_CMC                    0.877327  0.033155 6.996e+02    812.4
## COPE_denial_C                 0.043947  0.151725 8.364e-02   1017.8
## P4_age_C                     -0.134598  0.030781 1.909e+01    909.7
## stressChangeStresstoBase_C   -0.394045  0.309939 1.607e+00   1015.1
## hrChangeStresstoBase_C        0.215421  0.135955 2.494e+00   1009.3
## stressChangeRecovtoStress_C -0.169537  0.326045 2.688e-01   1016.3
## hrChangeRecovtoStress_C     -0.351093  0.156274 5.015e+00   1015.3
## stress_CMC:COPE_denial_C    -0.069679  0.015224 2.092e+01    844.9
## stress_CMC:P4_age_C         -0.006902  0.002970 5.392e+00    815.0
##                                 Pr(>F)
## (Intercept)                   < 2e-16 ***
## stress_CMC                    < 2e-16 ***
## COPE_denial_C                  0.7725
## P4_age_C                     1.39e-05 ***
```

```
## stressChangeStresstoBase_C    0.2052
## hrChangeStresstoBase_C        0.1146
## stressChangeRecovtoStress_C   0.6042
## hrChangeRecovtoStress_C       0.0253 *
## stress_CMC:COPE_denial_C    5.50e-06 ***
## stress_CMC:P4_age_C           0.0205 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.23298
##           stress_CMC  0.69714  -0.069
##  M2FAMNUM (Intercept) 5.23450
##  Residual             2.36447
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28505.9; BIC: 28603.8; logLik: -14237.9; Deviance: 28475.9
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsRR)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 91: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.341
fixed	NA	stress_CMC	0.877	0.0332
fixed	NA	COPE_denial_C	0.0439	0.152
fixed	NA	P4_age_C	-0.135	0.0308
fixed	NA	stressChangeStresstoBase_C	-0.394	0.31
fixed	NA	hrChangeStresstoBase_C	0.215	0.136
fixed	NA	stressChangeRecovtoStress_C	-0.17	0.326
fixed	NA	hrChangeRecovtoStress_C	-0.351	0.156
fixed	NA	stress_CMC:COPE_denial_C	-0.0697	0.0152

effect	group	term	estimate	std.error
fixed	NA	stress_CMC:P4_age_C	-0.0069	0.00297
ran_pars	M2ID	sd__(Intercept)	9.23	NA
ran_pars	M2ID	sd__stress_CMC	0.697	NA
ran_pars	M2ID	cor__(Intercept).stress_CMC	-0.0689	NA
ran_pars	M2FAMNUM	sd__(Intercept)	5.23	NA
ran_pars	Residual	sd__Observation	2.36	NA

statistic	conf.low	conf.high
219	74	75.3
26.5	0.812	0.942
0.29	-0.253	0.341
-4.37	-0.195	-0.0743
-1.27	-1	0.213
1.58	-0.051	0.482
-0.52	-0.809	0.469
-2.25	-0.657	-0.0448
-4.58	-0.0995	-0.0398
-2.32	-0.0127	-0.00108
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14238	28506	28604	28476	5045

Does reactivity and/or recovery predict well-being outcomes?

PWB ~ reactivity + recovery

```
# PWB
lmerM = lmer(pwb2 ~ P4_age_C + stressChangeStresstoBase_C + hrChangeStresstoBase_C + stressChangeRecovtoStress_C + hrChangeRecovtoStress_C
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = pwb2 ~ P4_age_C + stressChangeStresstoBase_C +
##     hrChangeStresstoBase_C + stressChangeRecovtoStress_C + hrChangeRecovtoStress_C +
##     (1 | M2FAMNUM), data = dfLsW)
## Observations: 1026; Groups: M2FAMNUM, 909
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                              Estimate        SE         F error df
## (Intercept)                232.71937   1.10048 4.467e+04    878.4
## P4_age_C                     0.60304   0.09934 3.681e+01    912.2
## stressChangeStresstoBase_C  -1.24258   0.98868 1.574e+00   1015.9
## hrChangeStresstoBase_C       0.26974   0.43217 3.877e-01   1000.6
## stressChangeRecovtoStress_C -1.13350   1.04175 1.180e+00   1017.8
## hrChangeRecovtoStress_C     -1.23929   0.49841 6.153e+00   1009.1
##                              Pr(>F)
## (Intercept)                 < 2e-16 ***
## P4_age_C                   1.91e-09 ***
## stressChangeStresstoBase_C    0.2099
## hrChangeStresstoBase_C        0.5337
## stressChangeRecovtoStress_C   0.2776
## hrChangeRecovtoStress_C       0.0133 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev.
##  M2FAMNUM (Intercept) 19.268
##  Residual             28.323
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 10158.8; BIC: 10198.2; logLik: -5071.4; Deviance: 10142.8
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsW)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 94: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	233	1.1
fixed	NA	P4_age_C	0.603	0.0993
fixed	NA	stressChangeStresstoBase_C	-1.24	0.989
fixed	NA	hrChangeStresstoBase_C	0.27	0.432
fixed	NA	stressChangeRecovtoStress_C	-1.13	1.04
fixed	NA	hrChangeRecovtoStress_C	-1.24	0.498
ran_pars	M2FAMNUM	sd___(Intercept)	19.3	NA
ran_pars	Residual	sd___Observation	28.3	NA

statistic	conf.low	conf.high
211	231	235
6.07	0.408	0.798
-1.26	-3.18	0.695
0.624	-0.577	1.12
-1.09	-3.18	0.908
-2.49	-2.22	-0.262
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
28.3	-5071	10159	10198	10143	1018

Depression ~ reactivity + recovery

```
# CESD
lmerM = lmer(P4_CESD ~ P4_age_C + stressChangeStresstoBase_C + hrChangeStresstoBase_C + stressChangeRecovtoStress_C + hrChangeRecovtoStres
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = P4_CESD ~ P4_age_C + stressChangeStresstoBase_C +
##     hrChangeStresstoBase_C + stressChangeRecovtoStress_C + hrChangeRecovtoStress_C +
##     (1 | M2FAMNUM), data = dfLsW)
## Observations: 1022; Groups: M2FAMNUM, 906
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                              Estimate       SE        F error df   Pr(>F)
## (Intercept)                   8.74762  0.25692 1158.397    884.9  < 2e-16
## P4_age_C                     -0.14504  0.02306   39.521    912.1 5.02e-10
## stressChangeStresstoBase_C    0.43391  0.22738    3.627   1002.8   0.0571
## hrChangeStresstoBase_C       -0.16332  0.09899    2.707    963.5   0.1002
## stressChangeRecovtoStress_C   0.30200  0.24055    1.570   1007.3   0.2105
## hrChangeRecovtoStress_C       0.20803  0.11439    3.289    977.7   0.0700
##
## (Intercept)                  ***
## P4_age_C                     ***
## stressChangeStresstoBase_C   .
## hrChangeStresstoBase_C
## stressChangeRecovtoStress_C
## hrChangeRecovtoStress_C      .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
```

```
##  Groups   Name        Std.Dev.
##  M2FAMNUM (Intercept) 5.1922
##  Residual             5.9877
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 7133.4; BIC: 7172.8; logLik: -3558.7; Deviance: 7117.4
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsW)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 97: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	8.75	0.257
fixed	NA	P4_age_C	-0.145	0.0231
fixed	NA	stressChangeStresstoBase_C	0.434	0.227
fixed	NA	hrChangeStresstoBase_C	-0.163	0.099
fixed	NA	stressChangeRecovtoStress_C	0.302	0.241
fixed	NA	hrChangeRecovtoStress_C	0.208	0.114
ran_pars	M2FAMNUM	sd___(Intercept)	5.19	NA
ran_pars	Residual	sd___Observation	5.99	NA

statistic	conf.low	conf.high
34	8.24	9.25
-6.29	-0.19	-0.0998
1.91	-0.0117	0.88
-1.65	-0.357	0.0307
1.26	-0.169	0.773
1.82	-0.0162	0.432
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
5.99	-3559	7133	7173	7117	1014

Anxiety ~ reactivity + recovery

```
# P4_STAItrait
lmerM = lmer(P4_STAItrait ~ P4_age_C + stressChangeStresstoBase_C + hrChangeStresstoBase_C + stressChangeRecovtoStress_C + hrChangeRecovtc
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = P4_STAItrait ~ P4_age_C + stressChangeStresstoBase_C +
##     hrChangeStresstoBase_C + stressChangeRecovtoStress_C + hrChangeRecovtoStress_C +
##     (1 | M2FAMNUM), data = dfLsW)
## Observations: 1022; Groups: M2FAMNUM, 905
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                             Estimate       SE         F error df   Pr(>F)
## (Intercept)                 34.30337  0.28445 1.453e+04    884.8  < 2e-16
## P4_age_C                    -0.15161  0.02560 3.506e+01    912.0 4.52e-09
## stressChangeStresstoBase_C   0.26772  0.25108 1.132e+00   1001.8   0.2875
## hrChangeStresstoBase_C      -0.09308  0.10915 7.231e-01    959.0   0.3953
## stressChangeRecovtoStress_C  0.19755  0.26545 5.516e-01   1004.9   0.4578
## hrChangeRecovtoStress_C      0.28432  0.12625 5.044e+00    974.5   0.0249
##
## (Intercept)                 ***
## P4_age_C                    ***
## stressChangeStresstoBase_C
## hrChangeStresstoBase_C
## stressChangeRecovtoStress_C
## hrChangeRecovtoStress_C     *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev.
##  M2FAMNUM (Intercept) 5.8277
##  Residual             6.5470

## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit

##
## AIC: 7336.2; BIC: 7375.6; logLik: -3660.1; Deviance: 7320.2
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsW)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 100: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	34.3	0.284
fixed	NA	P4_age_C	-0.152	0.0256
fixed	NA	stressChangeStresstoBase_C	0.268	0.251
fixed	NA	hrChangeStresstoBase_C	-0.0931	0.109
fixed	NA	stressChangeRecovtoStress_C	0.198	0.265
fixed	NA	hrChangeRecovtoStress_C	0.284	0.126
ran_pars	M2FAMNUM	sd___(Intercept)	5.83	NA
ran_pars	Residual	sd___Observation	6.55	NA

statistic	conf.low	conf.high
121	33.7	34.9
-5.92	-0.202	-0.101
1.07	-0.224	0.76
-0.853	-0.307	0.121
0.744	-0.323	0.718
2.25	0.0369	0.532
NA	NA	NA

statistic	conf.low	conf.high
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
6.55	-3660	7336	7376	7320	1014

IL6 ~ reactivity + recovery

```
# IL6
lmerM = lmer(IL6_T ~ P4_age_C + stressChangeStresstoBase_C + hrChangeStresstoBase_C + stressChangeRecovtoStress_C + hrChangeRecovtoStress_
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = IL6_T ~ P4_age_C + stressChangeStresstoBase_C +
##     hrChangeStresstoBase_C + stressChangeRecovtoStress_C + hrChangeRecovtoStress_C +
##     (1 | M2FAMNUM), data = dfLsW)
## Observations: 1025; Groups: M2FAMNUM, 908
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                              Estimate        SE         F error df
## (Intercept)                  1.164457  0.032946 1.247e+03    866.8
## P4_age_C                     0.015695  0.002967 2.795e+01    908.0
## stressChangeStresstoBase_C  -0.024005  0.030023 6.373e-01   1017.6
## hrChangeStresstoBase_C      -0.019359  0.013069 2.184e+00   1012.8
## stressChangeRecovtoStress_C  0.002180  0.031774 4.691e-03   1018.6
## hrChangeRecovtoStress_C      0.025605  0.015129 2.852e+00   1017.1
##                               Pr(>F)
## (Intercept)                  < 2e-16 ***
## P4_age_C                    1.56e-07 ***
## stressChangeStresstoBase_C    0.4249
## hrChangeStresstoBase_C        0.1397
```

```
## stressChangeRecovtoStress_C   0.9454
## hrChangeRecovtoStress_C       0.0916 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev.
##  M2FAMNUM (Intercept) 0.49237
##  Residual             0.90673
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 3016.9; BIC: 3056.3; logLik: -1500.4; Deviance: 3000.9
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsW)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 103: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	1.16	0.0329
fixed	NA	P4_age_C	0.0157	0.00297
fixed	NA	stressChangeStresstoBase_C	-0.024	0.03
fixed	NA	hrChangeStresstoBase_C	-0.0194	0.0131
fixed	NA	stressChangeRecovtoStress_C	0.00218	0.0318
fixed	NA	hrChangeRecovtoStress_C	0.0256	0.0151
ran_pars	M2FAMNUM	sd___(Intercept)	0.492	NA
ran_pars	Residual	sd___Observation	0.907	NA

statistic	conf.low	conf.high
35.3	1.1	1.23
5.29	0.00988	0.0215
-0.8	-0.0828	0.0348
-1.48	-0.045	0.00626

statistic	conf.low	conf.high
0.0686	-0.0601	0.0645
1.69	-0.00405	0.0553
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
0.907	-1500	3017	3056	3001	1017

CRP ~ reactivity + recovery

```
# CRP
lmerM = lmer(CRP_T ~ P4_age_C + stressChangeStresstoBase_C + hrChangeStresstoBase_C + stressChangeRecovtoStress_C + hrChangeRecovtoStress_
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = CRP_T ~ P4_age_C + stressChangeStresstoBase_C +
##     hrChangeStresstoBase_C + stressChangeRecovtoStress_C + hrChangeRecovtoStress_C +
##     (1 | M2FAMNUM), data = dfLsW)
## Observations: 1019; Groups: M2FAMNUM, 903
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                               Estimate         SE         F error df
## (Intercept)                  0.1759434  0.0162444 117.19641    876.0
## P4_age_C                    -0.0008763  0.0014614   0.35924    908.5
## stressChangeStresstoBase_C  -0.0020457  0.0144782   0.01989   1006.5
## hrChangeStresstoBase_C      -0.0169171  0.0063217   7.12470    985.5
## stressChangeRecovtoStress_C  0.0072199  0.0152617   0.22300   1009.3
## hrChangeRecovtoStress_C     -0.0044591  0.0073278   0.36842    994.1
##                               Pr(>F)
## (Intercept)                 < 2e-16 ***
```

```
## P4_age_C                    0.54908
## stressChangeStresstoBase_C  0.88787
## hrChangeStresstoBase_C      0.00773 **
## stressChangeRecovtoStress_C 0.63687
## hrChangeRecovtoStress_C     0.54401
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev.
##  M2FAMNUM (Intercept) 0.30093
##  Residual             0.40238
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 1531.8; BIC: 1571.2; logLik: -757.9; Deviance: 1515.8
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsW)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 106: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	0.176	0.0162
fixed	NA	P4_age_C	-0.000876	0.00146
fixed	NA	stressChangeStresstoBase_C	-0.00205	0.0145
fixed	NA	hrChangeStresstoBase_C	-0.0169	0.00632
fixed	NA	stressChangeRecovtoStress_C	0.00722	0.0153
fixed	NA	hrChangeRecovtoStress_C	-0.00446	0.00733
ran_pars	M2FAMNUM	sd___(Intercept)	0.301	NA
ran_pars	Residual	sd___Observation	0.402	NA

statistic	conf.low	conf.high
10.8	0.144	0.208

statistic	conf.low	conf.high
-0.6	-0.00374	0.00199
-0.141	-0.0304	0.0263
-2.68	-0.0293	-0.00453
0.473	-0.0227	0.0371
-0.609	-0.0188	0.0099
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
0.402	-758	1532	1571	1516	1011

Denial ~ reactivity + recovery

```
# Denial
lmerM = lmer(COPE_denial ~ P4_age_C + stressChangeStresstoBase_C + hrChangeStresstoBase_C + stressChangeRecovtoStress_C + hrChangeRecovtoS
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = COPE_denial ~ P4_age_C + stressChangeStresstoBase_C +
##     hrChangeStresstoBase_C + stressChangeRecovtoStress_C + hrChangeRecovtoStress_C +
##     (1 | M2FAMNUM), data = dfLsW)
## Observations: 1025; Groups: M2FAMNUM, 909
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                              Estimate        SE         F error df Pr(>F)
## (Intercept)                  6.116677  0.070898 7.434e+03    878.0 <2e-16
## P4_age_C                     0.004907  0.006392 5.886e-01    912.1 0.4432
## stressChangeStresstoBase_C  -0.005232  0.063977 6.665e-03   1014.8 0.9349
## hrChangeStresstoBase_C      -0.029976  0.028007 1.140e+00    998.7 0.2859
## stressChangeRecovtoStress_C  0.102182  0.067245 2.301e+00   1016.8 0.1296
```

```
## hrChangeRecovtoStress_C      0.062365  0.032178 3.739e+00   1008.9 0.0534
##
## (Intercept)                 ***
## P4_age_C
## stressChangeStresstoBase_C
## hrChangeStresstoBase_C
## stressChangeRecovtoStress_C
## hrChangeRecovtoStress_C     .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev.
##  M2FAMNUM (Intercept) 1.2288
##  Residual             1.8336
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 4561.1; BIC: 4600.6; logLik: -2272.6; Deviance: 4545.1
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLsW)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 109: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	6.12	0.0709
fixed	NA	P4_age_C	0.00491	0.00639
fixed	NA	stressChangeStresstoBase_C	-0.00523	0.064
fixed	NA	hrChangeStresstoBase_C	-0.03	0.028
fixed	NA	stressChangeRecovtoStress_C	0.102	0.0672
fixed	NA	hrChangeRecovtoStress_C	0.0624	0.0322
ran_pars	M2FAMNUM	sd___(Intercept)	1.23	NA
ran_pars	Residual	sd___Observation	1.83	NA

statistic	conf.low	conf.high
86.3	5.98	6.26
0.768	-0.00762	0.0174
-0.0818	-0.131	0.12
-1.07	-0.0849	0.0249
1.52	-0.0296	0.234
1.94	-0.000702	0.125
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
1.83	-2273	4561	4601	4545	1017

PLOT

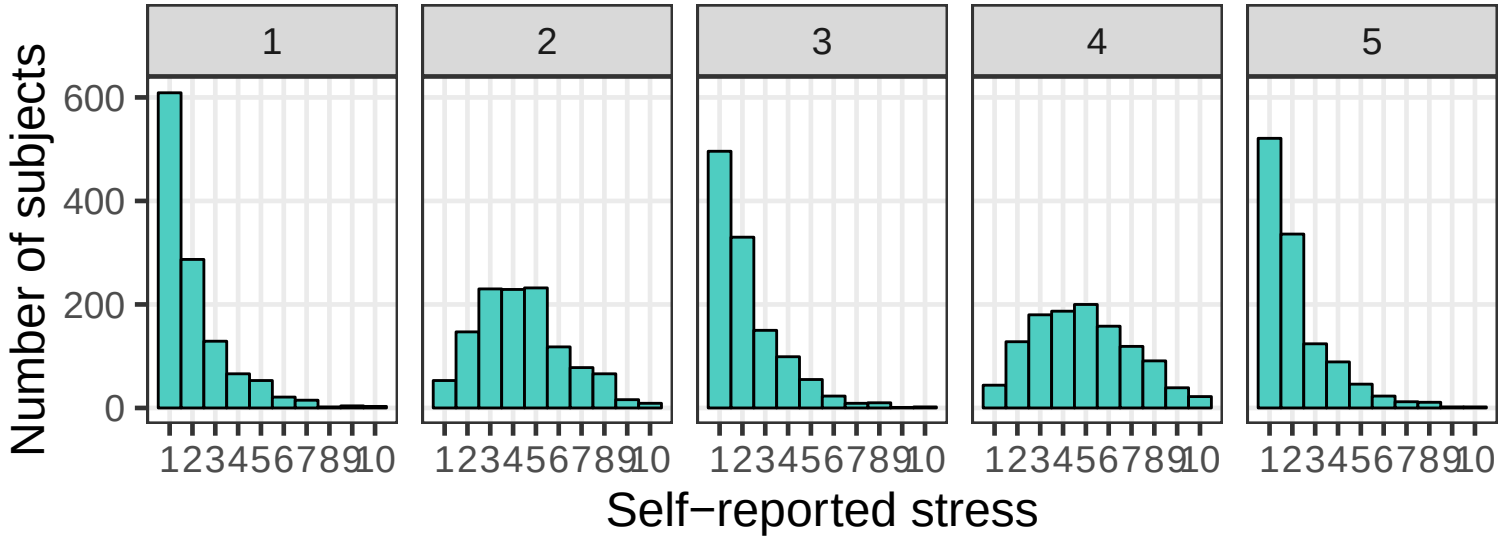
FIGURE 1: Stress and heart rate by phase histograms

Facet-wrapped histograms of stress and heart rate at each phase of stress induction

```
ylimits = c(0, 610)
colcode = "#4ECDC1"
stressHist=ggplot()+
geom_histogram(data=dfL, aes(stress), fill=colcode, binwidth=1, color="black") +
facet_wrap(~timepoint, ncol=5) +
labs(x="Self-reported stress", y="Number of subjects") +
ylim(ylimits)+
scale_x_continuous(breaks=c(1,2,3,4,5,6,7,8,9,10) )+
theme_bw(base_size=18)+
theme(axis.text.x=element_text(size=14),
axis.text.y=element_text(size=14),
panel.grid.minor=element_blank(),
panel.background=element_rect(fill="transparent"),
plot.background=element_rect(fill="transparent") )
```

```
stressHist
```

```
# Warning: Removed 32624 rows containing non-finite values (stat_bin).
```

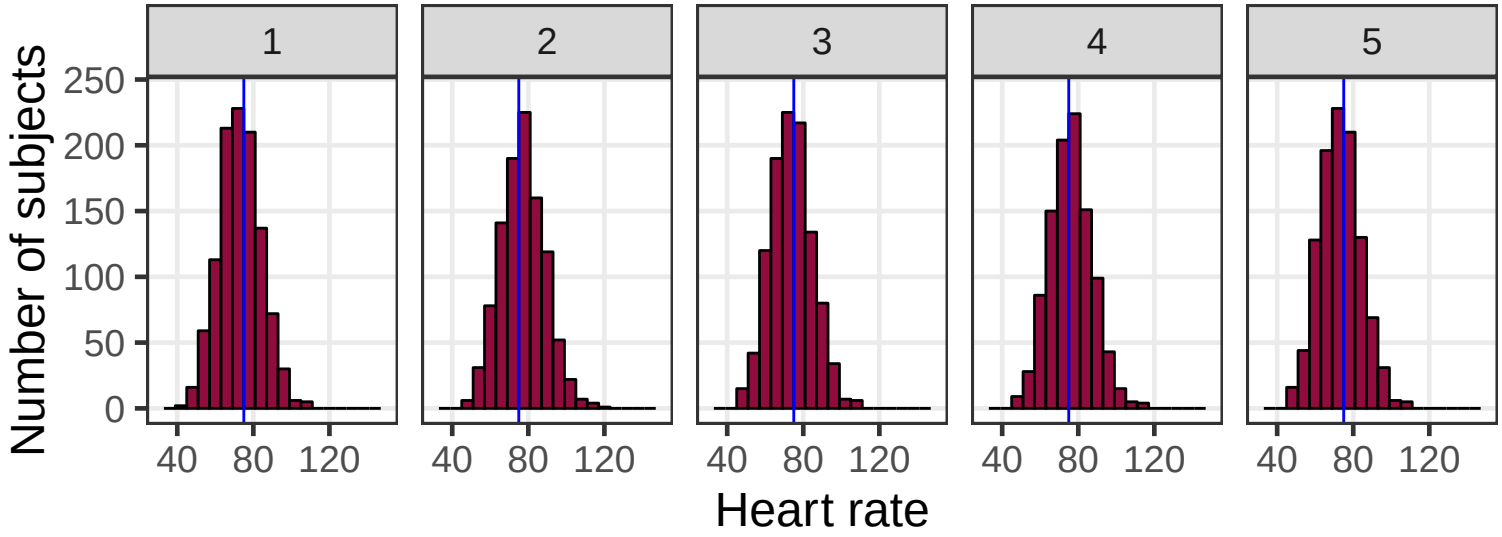



```
#ggsave(stressHist, filename=paste(adir,"/stressHist.png", sep=''), bg="transparent", height=2.8, width=10.45, units="in")
```

```
xlimits = c(30,150)
ylimits = c(0, 240)
colcode = "#900C3F"
hrHist=ggplot()+
geom_histogram(data=dfL, aes(hr), fill=colcode, binwidth=6, color="black") +
facet_wrap(~timepoint, ncol=5) +
labs(x="Heart rate", y="Number of subjects") +
ylim(ylimits)+
xlim(xlimits)+
geom_vline(xintercept=75, size=.5, color="blue")+
#scale_x_continuous(breaks=c(1,2,3,4,5,6,7,8,9,10) )+
theme_bw(base_size=18)+
theme(axis.text.x=element_text(size=14),
axis.text.y=element_text(size=14),
panel.grid.minor= element_blank(),
panel.background=element_rect(fill="transparent"),
```

```
plot.background=element_rect(fill="transparent") )
hrHist
```

```
# Warning: Removed 33222 rows containing non-finite values (stat_bin).
```

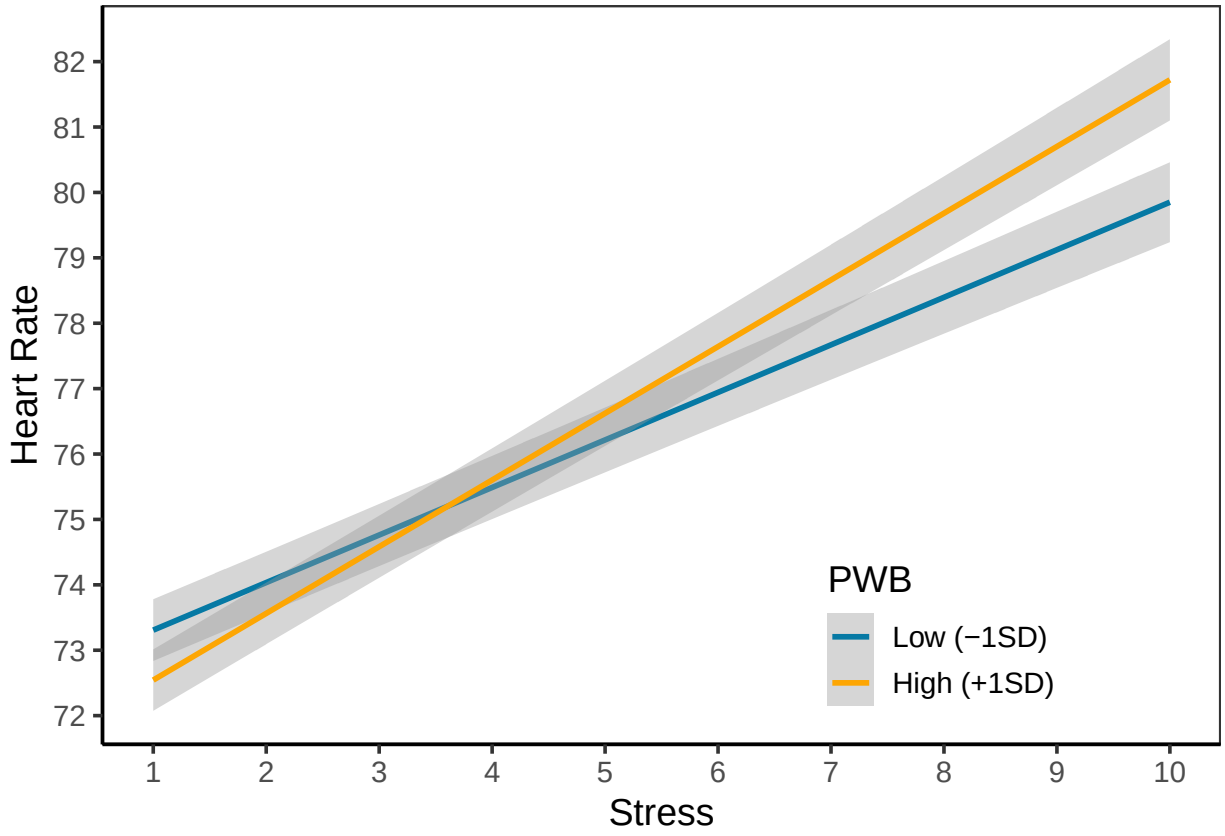



```
#ggsave(hrHist, filename=paste(adir,"/hrHist.png", sep=''), bg="transparent", height=2.8, width=10.45, units="in")
```

FIGURE 2: Interaction plots

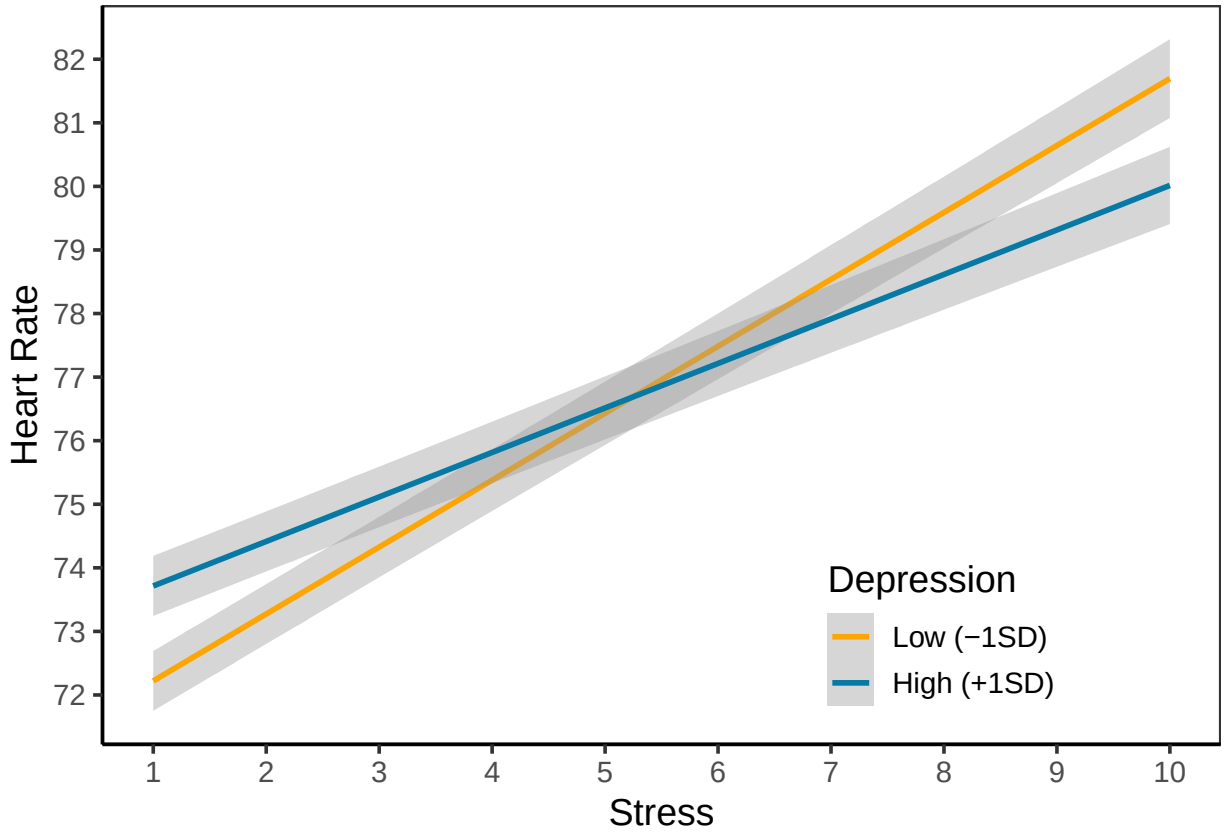
```
# PWB
mod = lmer(hr ~ stress*pwb2 + (1 + stress| M2ID), data=dfLs)
# Prepare independent variables for ggplot
XToPredict = seq(min(dfLs$stress), max(dfLs$stress), length = 100)
pwb2_lo = mean(dfLsW$pwb2, na.rm=T) - sd(dfLsW$pwb2, na.rm=T)
pwb2_hi = mean(dfLsW$pwb2, na.rm=T) + sd(dfLsW$pwb2, na.rm=T)

# Use modelPredictions() to generate Y-hats
yHats = expand.grid(stress = XToPredict, pwb2=c(pwb2_lo, pwb2_hi))  # all IVs
yHats = modelPredictions(mod, yHats)
```

```
modelplot = ggplot() +
            geom_smooth(aes(ymin = CILo, ymax = CIHi, x = stress, y = Predicted,
                  colour=as.factor(pwb2), group=as.factor(pwb2)),
                  data = yHats, stat = "identity")
#modelplot

pwb2plot = modelplot + scale_x_continuous("Stress", breaks = seq(0, 10, by=1)) +
             scale_y_continuous("Heart Rate", breaks = seq(60, 100, by=1)) +
             scale_color_manual(name ="PWB",
                    labels=c("Low (-1SD)", "High (+1SD)"), values=c("#0679A4","#FDA603")) +
             theme_bw(base_size = 14) +
             theme(legend.position = c(0.75, 0.15), panel.grid.major = element_blank(), panel.grid.minor = element_blank(),
                  panel.background = element_blank(), axis.line = element_line(colour = "black"))

pwb2plot
```



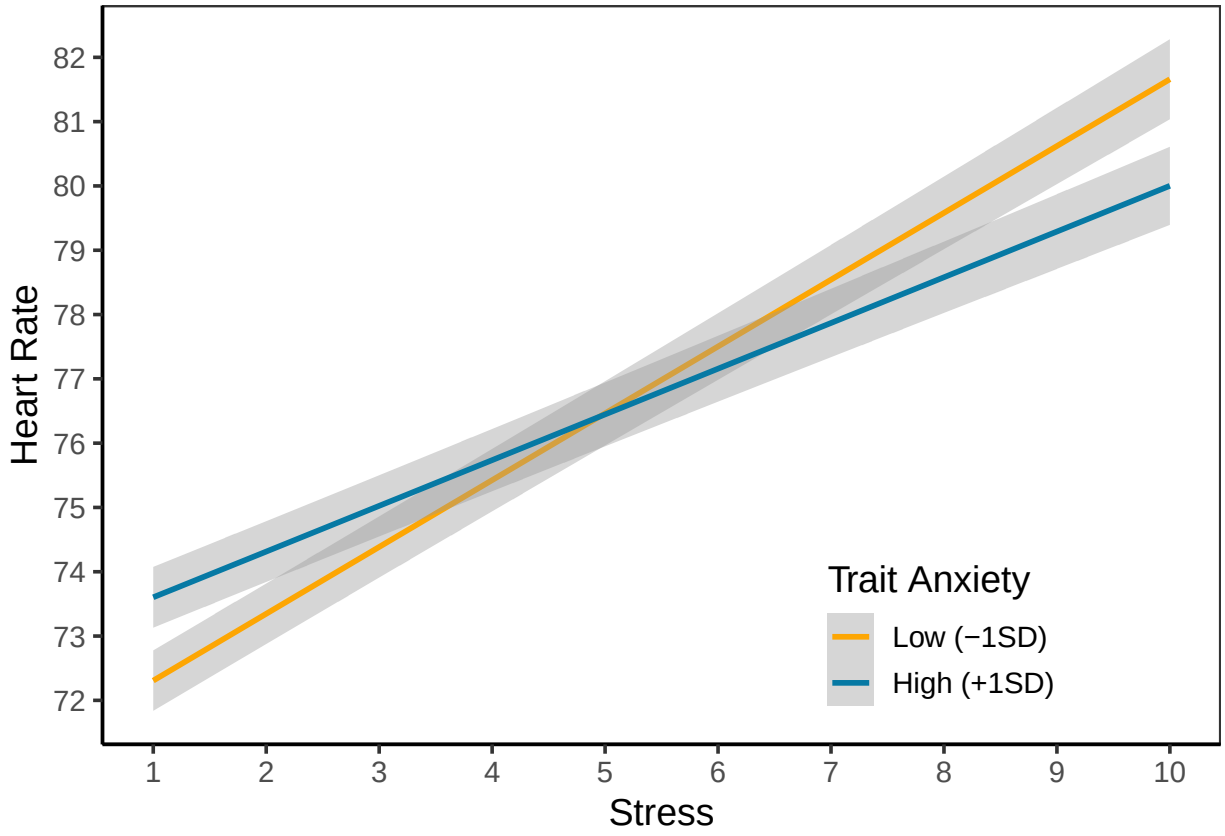

```
## CESD
mod = lmer(hr ~ stress*P4_CESD + (1 + stress| M2ID), data=dfLs)
# Prepare independent variables for ggplot
XToPredict = seq(min(dfLs$stress), max(dfLs$stress), length = 100)
P4_CESD_lo = mean(dfLsW$P4_CESD, na.rm=T) - sd(dfLsW$P4_CESD, na.rm=T)
P4_CESD_hi = mean(dfLsW$P4_CESD, na.rm=T) + sd(dfLsW$P4_CESD, na.rm=T)

# Use modelPredictions() to generate Y-hats
yHats = expand.grid(stress = XToPredict, P4_CESD=c(P4_CESD_lo, P4_CESD_hi))  # all IVs
yHats = modelPredictions(mod, yHats)

modelplot = ggplot() +
```

```
  geom_smooth(aes(ymin = CILo, ymax = CIHi, x = stress, y = Predicted,
                  colour=as.factor(P4_CESD), group=as.factor(P4_CESD)),
                  data = yHats, stat = "identity")
#modelplot

P4_CESDplot = modelplot + scale_x_continuous("Stress", breaks = seq(0, 10, by=1)) +
              scale_y_continuous("Heart Rate", breaks = seq(60, 100, by=1)) +
              scale_color_manual(name ="Depression",
                      labels=c("Low (-1SD)", "High (+1SD)"), values=c("#FDA603","#0679A4")) +
              theme_bw(base_size = 14) +
              theme(legend.position = c(0.75, 0.15), panel.grid.major = element_blank(), panel.grid.minor = element_blank(),
                    panel.background = element_blank(), axis.line = element_line(colour = "black"))

P4_CESDplot
```




```
## P4_STAItrait
mod = lmer(hr ~ stress*P4_STAItrait +(1 + stress| M2ID), data=dfLs)
# Prepare independent variables for ggplot
XToPredict = seq(min(dfLs$stress), max(dfLs$stress), length = 100)
P4_STAItrait_lo = mean(dfLsW$P4_STAItrait, na.rm=T) - sd(dfLsW$P4_STAItrait, na.rm=T)
P4_STAItrait_hi = mean(dfLsW$P4_STAItrait, na.rm=T) + sd(dfLsW$P4_STAItrait, na.rm=T)

# Use modelPredictions() to generate Y-hats
yHats = expand.grid(stress = XToPredict, P4_STAItrait=c(P4_STAItrait_lo, P4_STAItrait_hi))  # all IVs
yHats = modelPredictions(mod, yHats)

modelplot = ggplot() +
```

```
  geom_smooth(aes(ymin = CILo, ymax = CIHi, x = stress, y = Predicted,
                  colour=as.factor(P4_STAItrait), group=as.factor(P4_STAItrait)),
                  data = yHats, stat = "identity")
#modelplot

P4_STAItraitplot = modelplot + scale_x_continuous("Stress", breaks = seq(0, 10, by=1)) +
                   scale_y_continuous("Heart Rate", breaks = seq(60, 100, by=1)) +
                   scale_color_manual(name ="Trait Anxiety",
                     labels=c("Low (-1SD)", "High (+1SD)"), values=c("#FDA603","#0679A4")) +
                   theme_bw(base_size = 14) +
                   theme(legend.position = c(0.75, 0.15), panel.grid.major = element_blank(), panel.grid.minor = element_blank(),
                         panel.background = element_blank(), axis.line = element_line(colour = "black"))

P4_STAItraitplot
```

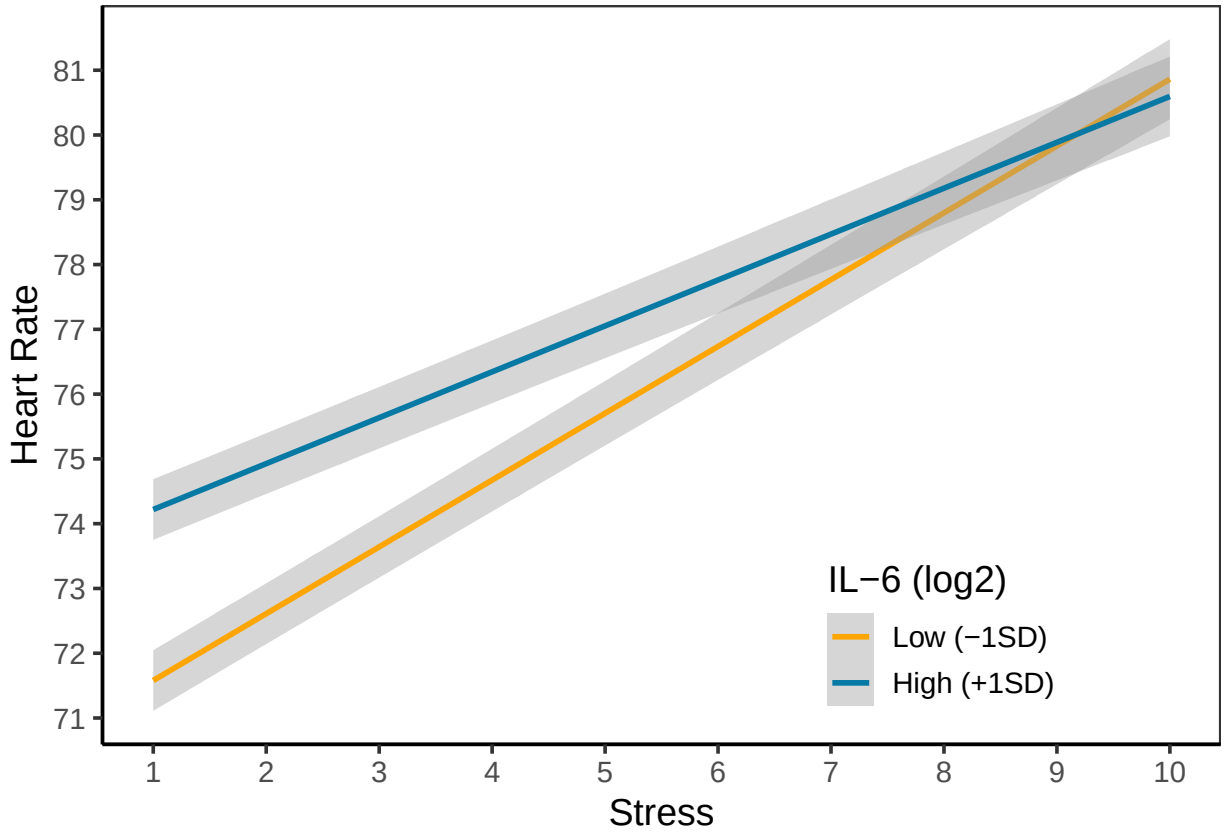



```
## IL6
mod = lmer(hr ~ stress*IL6_T + (1 + stress| M2ID), data=dfLs)
# Prepare independent variables for ggplot
XToPredict = seq(min(dfLs$stress), max(dfLs$stress), length = 100)
IL6_T_lo = mean(dfLsW$IL6_T, na.rm=T) - sd(dfLsW$IL6_T, na.rm=T)
IL6_T_hi = mean(dfLsW$IL6_T, na.rm=T) + sd(dfLsW$IL6_T, na.rm=T)

# Use modelPredictions() to generate Y-hats
yHats = expand.grid(stress = XToPredict, IL6_T=c(IL6_T_lo, IL6_T_hi))  # all IVs
yHats = modelPredictions(mod, yHats)

# Starting plot in which we graph regression lines
```

```
modelplot = ggplot() +
  geom_smooth(aes(ymin = CILo, ymax = CIHi, x = stress, y = Predicted,
                  colour=as.factor(IL6_T), group=as.factor(IL6_T), lineIL6_T=as.factor(IL6_T)),
                  data = yHats, stat = "identity")
```

```
## Warning: Ignoring unknown aesthetics: lineIL6_T
```

```
#modelplot

IL6_Tplot = modelplot + scale_x_continuous("Stress", breaks = seq(0, 10, by=1)) +
             scale_y_continuous("Heart Rate", breaks = seq(60, 100, by=1)) +
             scale_color_manual(name ="IL-6 (log2)",
                     labels=c("Low (-1SD)", "High (+1SD)"), values=c("#FDA603","#0679A4")) +
             theme_bw(base_size = 14) +
             theme(legend.position = c(0.75, 0.15), panel.grid.major = element_blank(), panel.grid.minor = element_blank(),
                         panel.background = element_blank(), axis.line = element_line(colour = "black"))

IL6_Tplot
```

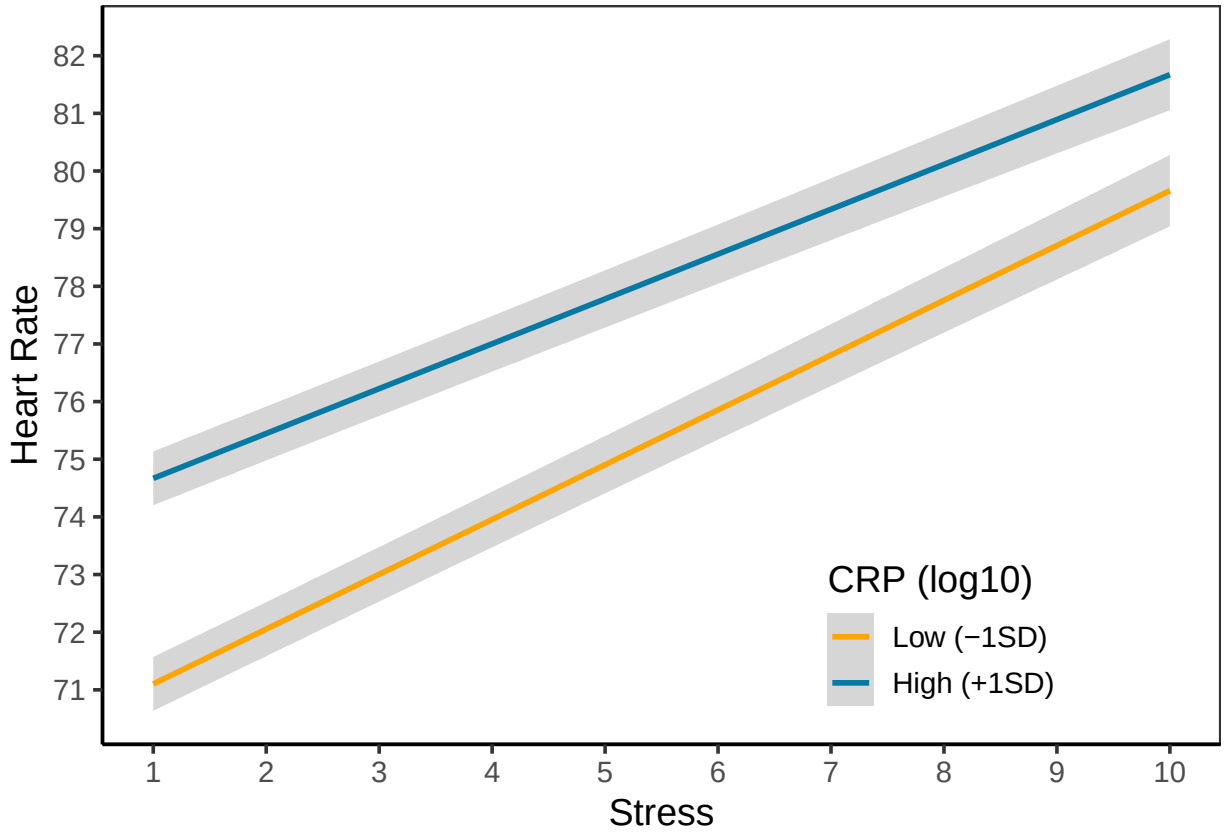



```
## CRP
mod = lmer(hr ~ stress*CRP_T + (1 + stress| M2ID), data=dfLs)
# Prepare independent variables for ggplot
XToPredict = seq(min(dfLs$stress), max(dfLs$stress), length = 100)
CRP_T_lo = mean(dfLsW$CRP_T, na.rm=T) - sd(dfLsW$CRP_T, na.rm=T)
CRP_T_hi = mean(dfLsW$CRP_T, na.rm=T) + sd(dfLsW$CRP_T, na.rm=T)

# Use modelPredictions() to generate Y-hats
yHats = expand.grid(stress = XToPredict, CRP_T=c(CRP_T_lo, CRP_T_hi))  # all IVs
yHats = modelPredictions(mod, yHats)

modelplot = ggplot() +
```

```
  geom_smooth(aes(ymin = CILo, ymax = CIHi, x = stress, y = Predicted,
                  colour=as.factor(CRP_T), group=as.factor(CRP_T), lineCRP_T=as.factor(CRP_T)),
              data = yHats, stat = "identity")
```

```
## Warning: Ignoring unknown aesthetics: lineCRP_T
```

```
#modelplot

CRP_Tplot = modelplot + scale_x_continuous("Stress", breaks = seq(0, 10, by=1)) +
            scale_y_continuous("Heart Rate", breaks = seq(60, 100, by=1)) +
            scale_color_manual(name ="CRP (log10)",
                     labels=c("Low (-1SD)", "High (+1SD)"), values=c("#FDA603","#0679A4")) +
            theme_bw(base_size = 14) +
            theme(legend.position = c(0.75, 0.15), panel.grid.major = element_blank(), panel.grid.minor = element_blank(),
                        panel.background = element_blank(), axis.line = element_line(colour = "black"))

CRP_Tplot
```




```
## Denial
mod = lmer(hr ~ stress*COPE_denial + (1 + stress| M2ID), data=dfLs)
# Prepare independent variables for ggplot
XToPredict = seq(min(dfLs$stress), max(dfLs$stress), length = 100)
COPE_denial_lo = mean(dfLsW$COPE_denial, na.rm=T) - sd(dfLsW$COPE_denial, na.rm=T)
COPE_denial_hi = mean(dfLsW$COPE_denial, na.rm=T) + sd(dfLsW$COPE_denial, na.rm=T)

# Use modelPredictions() to generate Y-hats
yHats = expand.grid(stress = XToPredict, COPE_denial=c(COPE_denial_lo, COPE_denial_hi))  # all IVs
yHats = modelPredictions(mod, yHats)

modelplot = ggplot() +
```

```
  geom_smooth(aes(ymin = CILo, ymax = CIHi, x = stress, y = Predicted,
                  colour=as.factor(COPE_denial), group=as.factor(COPE_denial), lineCOPE_denial=as.factor(COPE_denial)),
                  data = yHats, stat = "identity")
```

```
## Warning: Ignoring unknown aesthetics: lineCOPE_denial
```

```
#modelplot

COPE_denialplot = modelplot + scale_x_continuous("Stress", breaks = seq(0, 10, by=1)) +
             scale_y_continuous("Heart Rate", breaks = seq(60, 100, by=1)) +
             scale_color_manual(name ="Denial coping",
                     labels=c("Low (-1SD)", "High (+1SD)"), values=c("#FDA603","#0679A4")) +
             theme_bw(base_size = 14) +
             theme(legend.position = c(0.75, 0.15), panel.grid.major = element_blank(), panel.grid.minor = element_blank(),
                         panel.background = element_blank(), axis.line = element_line(colour = "black"))
COPE_denialplot
```

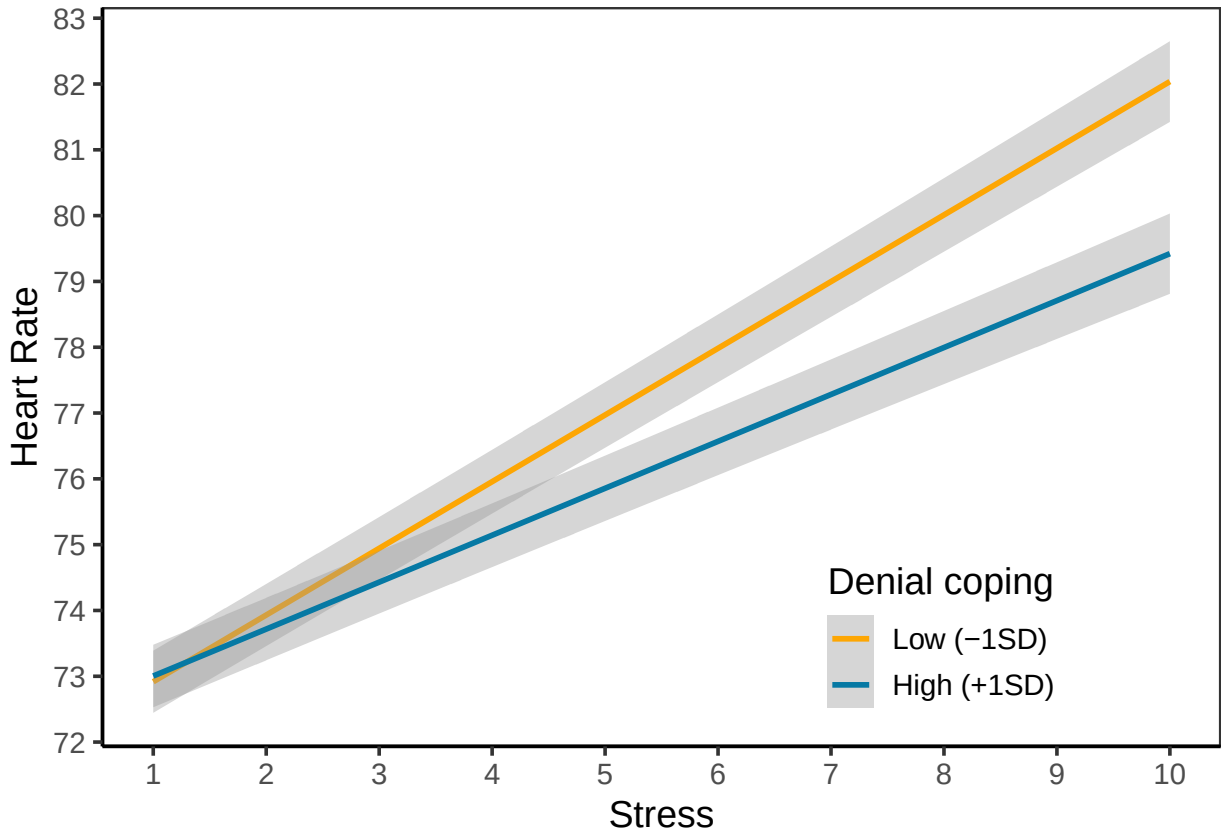
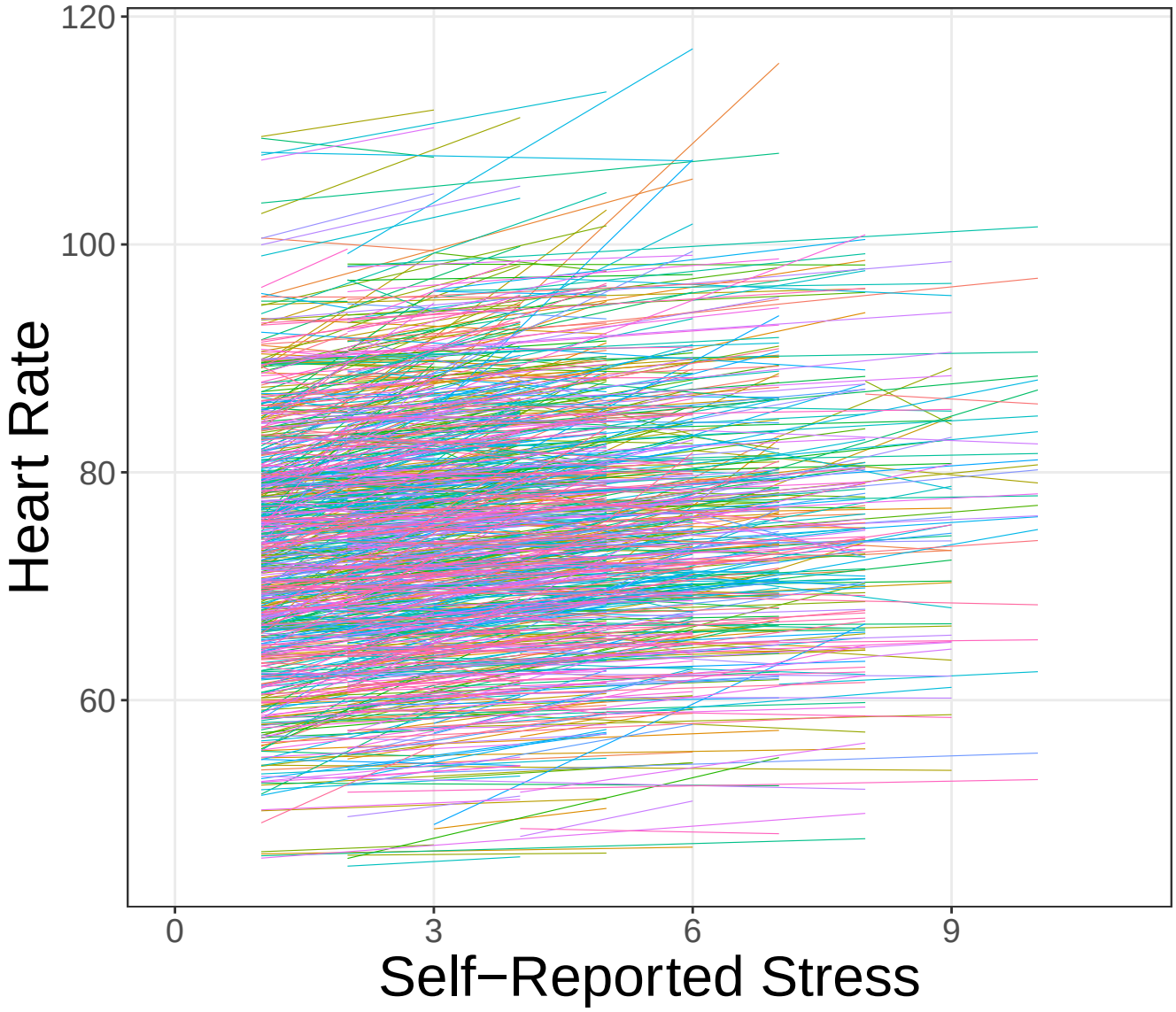


FIGURE 3: Plot individual subject slopes

```
dfL$stressMC = dfL$stress - ave(dfL$stress, dfL$M2ID)
dfL$hrM = ave(dfL$stress, dfL$M2ID)

ggplot(dfL, aes(stress, hr, color=as.factor(M2ID)))+
geom_smooth(aes(group=as.factor(M2ID)),method="lm",se=F,size=.2, alpha=.6, position="jitter")+
xlim(c(0,11))+
theme_bw() +
theme(panel.grid.minor = element_blank(), axis.text=element_text(size=14), axis.title=element_text(size=24)) +
```

```
labs(x="Self-Reported Stress", y="Heart Rate")+
theme(legend.position="none")
```

```
## Warning: Removed 33248 rows containing non-finite values (stat_smooth).
```



With heat map where color is the magnitude of the slope

```r
mycol = c("#0710C4", "gray",# negative & zero
          "#FFEC00", "#FFC300", "#FF5733", "#C70039", "#900C3F", "#581845")   # positive
mybreaks = c(-.4, 0,
             .5, 1, 1.5, 2, 3, 4)

ggplot(dfL, aes(stress, hr, color=coherence_slope))+
  geom_smooth(aes(group=as.factor(M2ID)),method="lm",se=F,size=.2, alpha=.6, position="jitter")+
  xlim(c(0,11))+
  theme_bw() +
  theme(panel.grid.minor = element_blank(), axis.text=element_text(size=14), axis.title=element_text(size=24)) +
  labs(x="Self-Reported Stress", y="Heart Rate")+
  scale_colour_gradientn("",colours=mycol, limits=c(-.4, 4.5), values = scales::rescale(c(-0.5, -0.05, 0, 0.05, 0.5,1,2,3,4)), breaks = my
  scale_x_continuous("Stress", breaks = seq(0, 10, by=1))
```

```
## Warning: Removed 33248 rows containing non-finite values (stat_smooth).
```

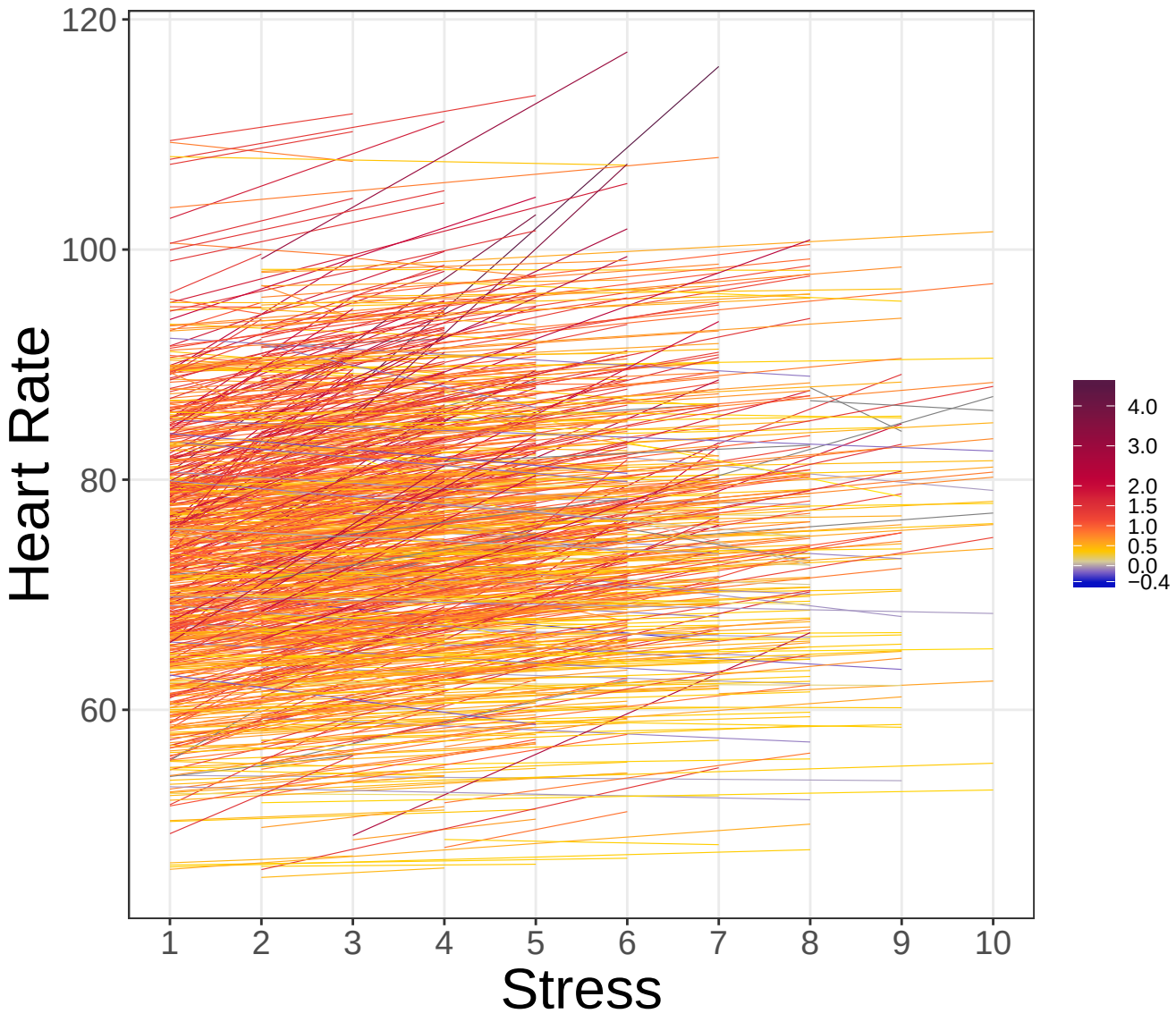
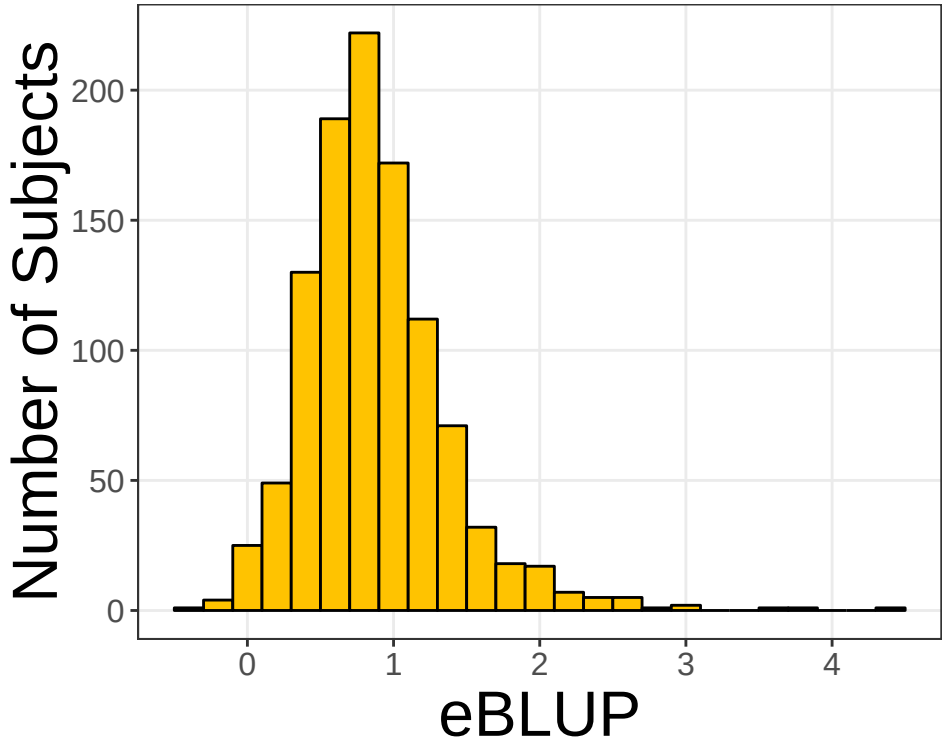

120
100
80
60
Heart Rate
1
2
3
4
5
6
7
8
9
10
Stress
4.0
3.0
2.0
1.5
1.0
0.5
0.0
−0.4

FIGURE 3: Histogram of BLUPS

```
ggplot(dfLsW, aes(coherence_slope)) +
  geom_histogram(aes(fill=as.factor(coherence_slope)), binwidth=.2, col="black",         fill="#FFC300") +
  #scale_fill_gradientn("Slope", colours=mycol, limits=c(-.4, 4.5), values = scales::rescale(c(-0.5, -0.05, 0, 0.05, 0.5,1,2,3,4)), breaks
  labs(x="eBLUP", y="Number of Subjects") +
  theme_bw() +
  theme(panel.grid.minor = element_blank(), axis.text=element_text(size=12), axis.title=element_text(size=24)) +
  theme(legend.position="none")
```



SUPPLEMENTAL

I. Correlation (r) as coherence

See Prep_Coherence_MIDUSII.R for correlation computation. There, each subject's set of heart rate and stress measures are subset to their own data frame and a correlation is computed. The resulting within-subject (i.e., single-subject) r's compose a new variable in the main dataframe. ### Center correlations variable

```
varDescribe(dfLsW$coherence_as_r) # .49(.47) median.66 skew = -1.18, kurtosis = .55
```

```
##    vars    n mean   sd median min max  skew kurtosis
## X1    1 1019 0.49 0.47   0.66  -1   1 -1.18     0.55
```

```
# Center age for subjects in this analysis
dfLsW$P4_age_C = dfLsW$P4_age - mean(dfLsW$P4_age[!is.na(dfLsW$coherence_as_r)], na.rm=T)
# Center correlations
dfLsW$coherence_as_r_C = dfLsW$coherence_as_r - mean(dfLsW$coherence_as_r, na.rm=T)
```

PWB ~ coherence as r

```
# Run the test
lmerM = lmer(pwb2 ~ coherence_as_r_C + P4_age_C + (1|M2FAMNUM), data=dfLsW)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = F)
```

```
## lmer(formula = pwb2 ~ coherence_as_r_C + P4_age_C + (1 | M2FAMNUM),
##     data = dfLsW)
## Observations: 1015; Groups: M2FAMNUM, 902
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                  Estimate       SE        F error df   Pr(>F)
## (Intercept)      232.7142   1.0960 45020.08    869.8  < 2e-16 ***
## coherence_as_r_C  10.7949   2.2832    22.27   1009.7 2.71e-06 ***
## P4_age_C           0.5901   0.0977    36.44    899.6 2.30e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev.
##  M2FAMNUM (Intercept) 17.659
##  Residual             29.136

## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit

##
## AIC: 10038.8; BIC: 10063.4; logLik: -5014.4; Deviance: 10028.8
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)    # Using pander() to view the created table, with 3 sig figs
```

Table 112: Table continues below

effect	group	term	estimate	std.error	statistic
fixed	NA	(Intercept)	233	1.1	212
fixed	NA	coherence_as_r_C	10.8	2.28	4.73
fixed	NA	P4_age_C	0.59	0.0977	6.04
ran_pars	M2FAMNUM	sd___(Intercept)	17.7	NA	NA
ran_pars	Residual	sd___Observation	29.1	NA	NA

conf.low	conf.high
231	235
6.32	15.3
0.399	0.782
NA	NA
NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
29.1	-5014	10039	10063	10029	1010

Depression ~ coherence as r

```
# Run the test
lmerM = lmer(P4_CESD ~ coherence_as_r_C + P4_age_C + (1|M2FAMNUM), data=dfLsW)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = F)
```

```
## lmer(formula = P4_CESD ~ coherence_as_r_C + P4_age_C + (1 | M2FAMNUM),
##     data = dfLsW)
## Observations: 1011; Groups: M2FAMNUM, 899
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                  Estimate       SE       F error df   Pr(>F)
## (Intercept)       8.80758  0.25887 1156.71    880.2  < 2e-16 ***
## coherence_as_r_C -2.74867  0.53010   26.76    991.5 2.78e-07 ***
## P4_age_C         -0.13159  0.02296   32.83    901.7 1.37e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev.
##  M2FAMNUM (Intercept) 5.1310
##  Residual             6.0791
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
##
## AIC: 7053.7; BIC: 7078.3; logLik: -3521.9; Deviance: 7043.7
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)   # Using pander() to view the created table, with 3 sig figs
```

Table 115: Table continues below

effect	group	term	estimate	std.error	statistic
fixed	NA	(Intercept)	8.81	0.259	34
fixed	NA	coherence_as_r_C	-2.75	0.53	-5.19
fixed	NA	P4_age_C	-0.132	0.023	-5.73
ran_pars	M2FAMNUM	sd___(Intercept)	5.13	NA	NA
ran_pars	Residual	sd___Observation	6.08	NA	NA

conf.low	conf.high
8.3	9.31
-3.79	-1.71
-0.177	-0.0866
NA	NA
NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
6.08	-3522	7054	7078	7044	1006

Anxiety ~ coherence as r

```
# Run the test
lmerM = lmer(P4_STAItrait ~ coherence_as_r_C + P4_age_C + (1|M2FAMNUM), data=dfLsW)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = F)
```

```
## lmer(formula = P4_STAItrait ~ coherence_as_r_C + P4_age_C + (1 |
```

```
##     M2FAMNUM), data = dfLsW)
## Observations: 1011; Groups: M2FAMNUM, 898
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                  Estimate       SE        F error df   Pr(>F)
## (Intercept)      34.37249  0.28453 14579.98    876.1  < 2e-16 ***
## coherence_as_r_C -2.99025  0.58495    26.02    996.7 4.05e-07 ***
## P4_age_C         -0.14050  0.02531    30.79    900.2 3.77e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev.
##  M2FAMNUM (Intercept) 5.3626
##  Residual             6.9312

## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit

##
## AIC: 7253.1; BIC: 7277.7; logLik: -3621.6; Deviance: 7243.1
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)   # Using pander() to view the created table, with 3 sig figs
```

Table 118: Table continues below

effect	group	term	estimate	std.error	statistic
fixed	NA	(Intercept)	34.4	0.285	121
fixed	NA	coherence_as_r_C	-2.99	0.585	-5.11
fixed	NA	P4_age_C	-0.141	0.0253	-5.55
ran_pars	M2FAMNUM	sd___(Intercept)	5.36	NA	NA
ran_pars	Residual	sd___Observation	6.93	NA	NA

conf.low	conf.high
33.8	34.9
-4.14	-1.84
-0.19	-0.0909
NA	NA
NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
6.93	-3622	7253	7278	7243	1006

IL6 ~ coherence as r

```
# Run the test
lmerM = lmer(IL6_T ~ coherence_as_r_C + P4_age_C + (1|M2FAMNUM), data=dfLsW)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = F)
```

```
## lmer(formula = IL6_T ~ coherence_as_r_C + P4_age_C + (1 | M2FAMNUM),
##     data = dfLsW)
## Observations: 1014; Groups: M2FAMNUM, 901
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                   Estimate        SE       F error df   Pr(>F)
## (Intercept)       1.141957  0.033184 1182.50    867.6  < 2e-16 ***
## coherence_as_r_C -0.251793  0.069300   13.15   1009.1 0.000302 ***
## P4_age_C          0.015702  0.002946   28.37    899.0 1.27e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
```

```
##  Groups   Name        Std.Dev.
##  M2FAMNUM (Intercept) 0.52492
##  Residual             0.88825
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 2958.3; BIC: 2982.9; logLik: -1474.2; Deviance: 2948.3
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)   # Using pander() to view the created table, with 3 sig figs
```

Table 121: Table continues below

effect	group	term	estimate	std.error	statistic
fixed	NA	(Intercept)	1.14	0.0332	34.4
fixed	NA	coherence_as_r_C	-0.252	0.0693	-3.63
fixed	NA	P4_age_C	0.0157	0.00295	5.33
ran_pars	M2FAMNUM	sd___(Intercept)	0.525	NA	NA
ran_pars	Residual	sd___Observation	0.888	NA	NA

conf.low	conf.high
1.08	1.21
-0.388	-0.116
0.00993	0.0215
NA	NA
NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
0.888	-1474	2958	2983	2948	1009

CRP ~ coherence as r

```
# Run the test
lmerM = lmer(CRP_T ~ coherence_as_r_C + P4_age_C + (1|M2FAMNUM), data=dfLsW)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = F)
```

```
## lmer(formula = CRP_T ~ coherence_as_r_C + P4_age_C + (1 | M2FAMNUM),
##     data = dfLsW)
## Observations: 1009; Groups: M2FAMNUM, 897
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                     Estimate         SE        F error df Pr(>F)
## (Intercept)       0.1660189  0.0164776 101.4269    876.1 <2e-16 ***
## coherence_as_r_C -0.0462399  0.0337564   1.8679    992.3  0.172
## P4_age_C         -0.0007146  0.0014594   0.2395    899.9  0.625
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev.
##  M2FAMNUM (Intercept) 0.31641
##  Residual             0.39558
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 1501.7; BIC: 1526.3; logLik: -745.8; Deviance: 1491.7
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)   # Using pander() to view the created table, with 3 sig figs
```

Table 124: Table continues below

effect	group	term	estimate	std.error	statistic
fixed	NA	(Intercept)	0.166	0.0165	10.1
fixed	NA	coherence_as_r_C	-0.0462	0.0338	-1.37
fixed	NA	P4_age_C	-0.000715	0.00146	-0.49
ran_pars	M2FAMNUM	sd__(Intercept)	0.316	NA	NA
ran_pars	Residual	sd__Observation	0.396	NA	NA

conf.low	conf.high
0.134	0.198
-0.112	0.0199
-0.00357	0.00215
NA	NA
NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
0.396	-746	1502	1526	1492	1004

Denial ~ coherence as r

```
# Run the test
lmerM = lmer(COPE_denial ~ coherence_as_r_C + P4_age_C + (1|M2FAMNUM), data=dfLsW)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = F)
```

```
## lmer(formula = COPE_denial ~ coherence_as_r_C + P4_age_C + (1 |
##     M2FAMNUM), data = dfLsW)
## Observations: 1015; Groups: M2FAMNUM, 903
##
## Linear mixed model fit by REML
##
```

```
## Fixed Effects:
##                    Estimate        SE         F error df   Pr(>F)
## (Intercept)       6.091732  0.070556 7444.9908    874.4  < 2e-16 ***
## coherence_as_r_C -0.614323  0.146718   17.4605   1007.5 3.19e-05 ***
## P4_age_C          0.005407  0.006277    0.7412    901.5     0.39
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev.
##  M2FAMNUM (Intercept) 1.1962
##  Residual             1.8335
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 4481.1; BIC: 4505.8; logLik: -2235.6; Deviance: 4471.1
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)   # Using pander() to view the created table, with 3 sig figs
```

Table 127: Table continues below

effect	group	term	estimate	std.error	statistic
fixed	NA	(Intercept)	6.09	0.0706	86.3
fixed	NA	coherence_as_r_C	-0.614	0.147	-4.19
fixed	NA	P4_age_C	0.00541	0.00628	0.861
ran_pars	M2FAMNUM	sd___(Intercept)	1.2	NA	NA
ran_pars	Residual	sd___Observation	1.83	NA	NA

conf.low	conf.high
5.95	6.23
-0.902	-0.327
-0.0069	0.0177
NA	NA

conf.low	conf.high
NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
1.83	-2236	4481	4506	4471	1010

Multiple Comparisons Correction

Holm-Bonferonni

```
## p value for each test of a well-being marker/denial
p = c(2.71E-06, 2.78E-07, 4.05E-07, 3.02E-04, 0.172, 3.19E-05)
## Holm-bonferonni
p.adjust(p, method= 'holm')
```

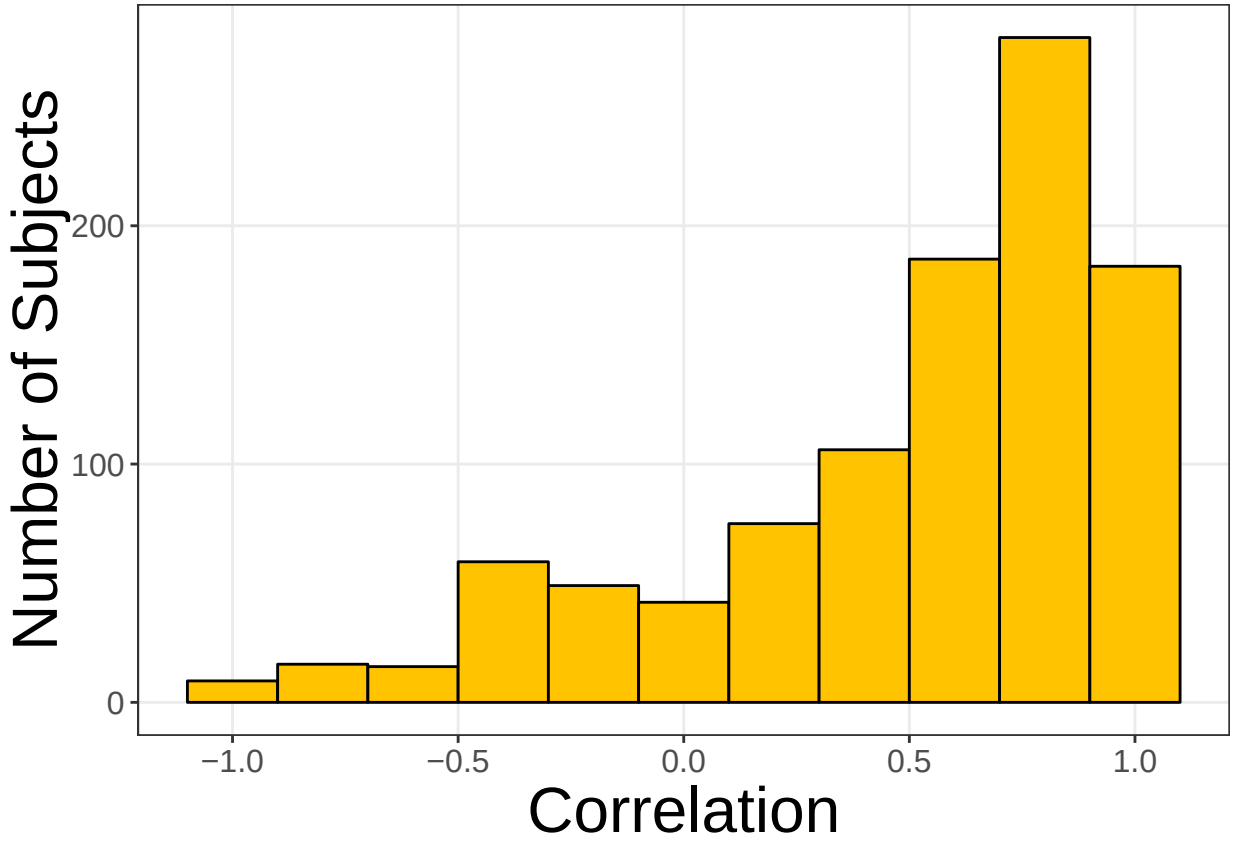
```
## [1] 1.084e-05 1.668e-06 2.025e-06 6.040e-04 1.720e-01 9.570e-05
```

```
# 1.084e-05 1.668e-06 2.025e-06 6.040e-04 1.720e-01 9.570e-05
```

FIGURE S1: Correlations histogram

```
ggplot(dfLsW, aes(coherence_as_r)) +
geom_histogram(aes(fill=as.factor(coherence_as_r)), binwidth=.2, col="black", fill="#FFC300") +
#scale_fill_gradientn("Slope", colours=mycol, limits=c(-.4, 4.5), values = scales::rescale(c(-0.5, -0.05, 0, 0.05, 0.5,1,2,3,4)), breaks =
labs(x="Correlation", y="Number of Subjects") +
theme_bw() +
theme(panel.grid.minor = element_blank(), axis.text=element_text(size=12), axis.title=element_text(size=24)) +
theme(legend.position="none")
```

```
## Warning: Removed 46 rows containing non-finite values (stat_bin).
```



II. Lag from Survey to Biomarker substudies

There was a lag of 0-60 months from the survey to the stress-induction (biomarker) substudies. The COPE and PWB were completed as part of the Survey substudy. All other measures were collected as part of the stress-induction substudy.

PWB + lag

```
# Center age for subjects in this analysis
length(dfLs$P4_age[!is.na(dfLs$pwb2_C)])
```

```
## [1] 5305
```

```
dfLs$P4_age_C = dfLs$P4_age - mean(dfLs$P4_age[!is.na(dfLs$pwb2_C)], na.rm=T)
# Center lag for subjects in this analysis
length(dfLs$months_P1SAQ_to_P4[!is.na(dfLs$pwb2_C)])
```

```
## [1] 5305
```

```
dfLs$months_P1SAQ_to_P4_C = dfLs$months_P1SAQ_to_P4 - mean(dfLs$months_P1SAQ_to_P4[!is.na(dfLs$pwb2_C)], na.rm=T)

# Lag moderate?
lmerM = lmer(hr ~ stress_CMC * pwb2_C * months_P1SAQ_to_P4_C + P4_age_C*stress_CMC + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * pwb2_C * months_P1SAQ_to_P4_C +
##     P4_age_C * stress_CMC + (1 + stress_CMC | M2ID) + (1 | M2FAMNUM),
##     data = dfLs)
## Observations: 5154; Groups: M2ID, 1061
##
##  Observations: 5154; Groups: M2FAMNUM, 936
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                                        Estimate         SE         F
## (Intercept)                           7.456e+01  3.366e-01 4.899e+04
## stress_CMC                            8.817e-01  3.363e-02 6.867e+02
## pwb2_C                                7.993e-04  9.488e-03 7.073e-03
## months_P1SAQ_to_P4_C                 -3.534e-02  2.390e-02 2.179e+00
## P4_age_C                             -1.514e-01  3.053e-02 2.456e+01
## stress_CMC:pwb2_C                     5.056e-03  9.740e-04 2.692e+01
## stress_CMC:months_P1SAQ_to_P4_C      -3.430e-03  2.311e-03 2.199e+00
## pwb2_C:months_P1SAQ_to_P4_C          -5.223e-04  6.615e-04 6.201e-01
## stress_CMC:P4_age_C                  -1.197e-02  3.082e-03 1.506e+01
## stress_CMC:pwb2_C:months_P1SAQ_to_P4_C -1.095e-04  6.484e-05 2.851e+00
##                                       error df   Pr(>F)
## (Intercept)                              897.2  < 2e-16 ***
## stress_CMC                               826.0  < 2e-16 ***
## pwb2_C                                  1056.2 0.932993
```

```
## months_P1SAQ_to_P4_C                      898.4 0.140239
## P4_age_C                                  951.3 8.53e-07 ***
## stress_CMC:pwb2_C                         822.8 2.68e-07 ***
## stress_CMC:months_P1SAQ_to_P4_C           791.7 0.138470
## pwb2_C:months_P1SAQ_to_P4_C              1045.4 0.431197
## stress_CMC:P4_age_C                       843.2 0.000112 ***
## stress_CMC:pwb2_C:months_P1SAQ_to_P4_C    744.8 0.091740 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.09319
##           stress_CMC  0.72077  0.176
##  M2FAMNUM (Intercept) 5.49700
##  Residual             2.36216
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 29144.4; BIC: 29242.6; logLik: -14557.2; Deviance: 29114.4
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 130: Table continues below

effect	group	term	estimate
fixed	NA	(Intercept)	74.6
fixed	NA	stress_CMC	0.882
fixed	NA	pwb2_C	0.000799
fixed	NA	months_P1SAQ_to_P4_C	-0.0353
fixed	NA	P4_age_C	-0.151
fixed	NA	stress_CMC:pwb2_C	0.00506
fixed	NA	stress_CMC:months_P1SAQ_to_P4_C	-0.00343
fixed	NA	pwb2_C:months_P1SAQ_to_P4_C	-0.000522

effect	group	term	estimate
fixed	NA	stress_CMC:P4_age_C	-0.012
fixed	NA	stress_CMC:pwb2_C:months_P1SAQ_to_P4_C	-0.00011
ran_pars	M2ID	sd___(Intercept)	9.09
ran_pars	M2ID	sd___stress_CMC	0.721
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.176
ran_pars	M2FAMNUM	sd___(Intercept)	5.5
ran_pars	Residual	sd___Observation	2.36

std.error	statistic	conf.low	conf.high
0.337	221	73.9	75.2
0.0336	26.2	0.816	0.948
0.00949	0.0842	-0.0178	0.0194
0.0239	-1.48	-0.0822	0.0115
0.0305	-4.96	-0.211	-0.0915
0.000974	5.19	0.00315	0.00697
0.00231	-1.48	-0.00796	0.0011
0.000661	-0.79	-0.00182	0.000774
0.00308	-3.88	-0.018	-0.00593
6.48e-05	-1.69	-0.000237	1.75e-05
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14557	29144	29243	29114	5139

```
# Adjust for lag
lmerM = lmer(hr ~ stress_CMC * pwb2_C + months_P1SAQ_to_P4_C + P4_age_C*stress_CMC + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
```

```r
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * pwb2_C + months_P1SAQ_to_P4_C +
##     P4_age_C * stress_CMC + (1 + stress_CMC | M2ID) + (1 | M2FAMNUM),
##     data = dfLs)
## Observations: 5154; Groups: M2ID, 1061
##
##  Observations: 5154; Groups: M2FAMNUM, 936
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                          Estimate         SE         F error df   Pr(>F)
## (Intercept)          74.5628781  0.3366110 4.900e+04    898.2  < 2e-16 ***
## stress_CMC            0.8835150  0.0335559 6.924e+02    827.7  < 2e-16 ***
## pwb2_C                0.0006656  0.0094850 4.908e-03   1057.4 0.944162
## months_P1SAQ_to_P4_C -0.0319043  0.0237671 1.792e+00    895.6 0.181005
## P4_age_C             -0.1513089  0.0305267 2.454e+01    952.2 8.61e-07 ***
## stress_CMC:pwb2_C     0.0050275  0.0009719 2.672e+01    822.7 2.95e-07 ***
## stress_CMC:P4_age_C  -0.0118830  0.0030747 1.492e+01    846.0 0.000121 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.08019
##           stress_CMC  0.71827  0.179
##  M2FAMNUM (Intercept) 5.51505
##  Residual             2.36421
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 29103.2; BIC: 29181.7; logLik: -14539.6; Deviance: 29079.2
```

```r
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
```

```
pander(table_obj, digits = 3)
```

Table 133: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.337
fixed	NA	stress_CMC	0.884	0.0336
fixed	NA	pwb2_C	0.000666	0.00949
fixed	NA	months_P1SAQ_to_P4_C	-0.0319	0.0238
fixed	NA	P4_age_C	-0.151	0.0305
fixed	NA	stress_CMC:pwb2_C	0.00503	0.000972
fixed	NA	stress_CMC:P4_age_C	-0.0119	0.00307
ran_pars	M2ID	sd___(Intercept)	9.08	NA
ran_pars	M2ID	sd___stress_CMC	0.718	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.179	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.52	NA
ran_pars	Residual	sd___Observation	2.36	NA

statistic	conf.low	conf.high
222	73.9	75.2
26.3	0.818	0.949
0.0702	-0.0179	0.0193
-1.34	-0.0785	0.0147
-4.96	-0.211	-0.0915
5.17	0.00312	0.00693
-3.86	-0.0179	-0.00586
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14540	29103	29182	29079	5142

Denial + lag

```
# Center age for subjects in this analysis
length(dfLs$P4_age[!is.na(dfLs$COPE_denial_C)])
```

```
## [1] 5300
```

```
dfLs$P4_age_C = dfLs$P4_age - mean(dfLs$P4_age[!is.na(dfLs$COPE_denial_C)], na.rm=T)
# Center lag for subjects in this analysis
length(dfLs$months_P1SAQ_to_P4[!is.na(dfLs$COPE_denial_C)])
```

```
## [1] 5300
```

```
dfLs$months_P1SAQ_to_P4_C = dfLs$months_P1SAQ_to_P4 - mean(dfLs$months_P1SAQ_to_P4[!is.na(dfLs$COPE_denial_C)], na.rm=T)

# Lag moderate?
lmerM = lmer(hr ~ stress_CMC * COPE_denial_C * months_P1SAQ_to_P4_C + P4_age_C*stress_CMC + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * COPE_denial_C * months_P1SAQ_to_P4_C +
##     P4_age_C * stress_CMC + (1 + stress_CMC | M2ID) + (1 | M2FAMNUM),
##     data = dfLs)
## Observations: 5149; Groups: M2ID, 1060
##
##  Observations: 5149; Groups: M2FAMNUM, 936
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                                          Estimate         SE
## (Intercept)                            74.5871496  0.3375500
## stress_CMC                              0.8704579  0.0330203
## COPE_denial_C                          -0.0338159  0.1482474
## months_P1SAQ_to_P4_C                   -0.0376248  0.0240167
```

```
## P4_age_C                                        -0.1490200  0.0300271
## stress_CMC:COPE_denial_C                        -0.0686662  0.0151799
## stress_CMC:months_P1SAQ_to_P4_C                 -0.0038323  0.0022746
## COPE_denial_C:months_P1SAQ_to_P4_C               0.0062525  0.0106480
## stress_CMC:P4_age_C                             -0.0079143  0.0029532
## stress_CMC:COPE_denial_C:months_P1SAQ_to_P4_C    0.0002999  0.0010848
##                                                        F error df   Pr(>F)
## (Intercept)                                     4.876e+04    895.7  < 2e-16
## stress_CMC                                      6.941e+02    820.0  < 2e-16
## COPE_denial_C                                   5.189e-02   1055.6  0.81986
## months_P1SAQ_to_P4_C                            2.445e+00    891.8  0.11823
## P4_age_C                                        2.460e+01    946.3 8.35e-07
## stress_CMC:COPE_denial_C                        2.044e+01    854.5 7.03e-06
## stress_CMC:months_P1SAQ_to_P4_C                 2.835e+00    788.6  0.09260
## COPE_denial_C:months_P1SAQ_to_P4_C              3.430e-01   1030.2  0.55826
## stress_CMC:P4_age_C                             7.173e+00    827.6  0.00755
## stress_CMC:COPE_denial_C:months_P1SAQ_to_P4_C 7.632e-02    858.3  0.78241
##
## (Intercept)                                     ***
## stress_CMC                                      ***
## COPE_denial_C
## months_P1SAQ_to_P4_C
## P4_age_C                                        ***
## stress_CMC:COPE_denial_C                        ***
## stress_CMC:months_P1SAQ_to_P4_C                 .
## COPE_denial_C:months_P1SAQ_to_P4_C
## stress_CMC:P4_age_C                             **
## stress_CMC:COPE_denial_C:months_P1SAQ_to_P4_C
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.18805
##           stress_CMC  0.69922  0.177
##  M2FAMNUM (Intercept) 5.40524
##  Residual             2.35406
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit

##
## AIC: 29048.5; BIC: 29146.7; logLik: -14509.2; Deviance: 29018.5
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 136: Table continues below

effect	group	term	estimate
fixed	NA	(Intercept)	74.6
fixed	NA	stress_CMC	0.87
fixed	NA	COPE_denial_C	-0.0338
fixed	NA	months_P1SAQ_to_P4_C	-0.0376
fixed	NA	P4_age_C	-0.149
fixed	NA	stress_CMC:COPE_denial_C	-0.0687
fixed	NA	stress_CMC:months_P1SAQ_to_P4_C	-0.00383
fixed	NA	COPE_denial_C:months_P1SAQ_to_P4_C	0.00625
fixed	NA	stress_CMC:P4_age_C	-0.00791
fixed	NA	stress_CMC:COPE_denial_C:months_P1SAQ_to_P4_C	3e-04
ran_pars	M2ID	sd___(Intercept)	9.19
ran_pars	M2ID	sd___stress_CMC	0.699
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.177
ran_pars	M2FAMNUM	sd___(Intercept)	5.41
ran_pars	Residual	sd___Observation	2.35

std.error	statistic	conf.low	conf.high
0.338	221	73.9	75.2
0.033	26.4	0.806	0.935
0.148	-0.228	-0.324	0.257
0.024	-1.57	-0.0847	0.00945
0.03	-4.96	-0.208	-0.0902
0.0152	-4.52	-0.0984	-0.0389
0.00227	-1.68	-0.00829	0.000626

std.error	statistic	conf.low	conf.high
0.0106	0.587	-0.0146	0.0271
0.00295	-2.68	-0.0137	-0.00213
0.00108	0.276	-0.00183	0.00243
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.35	-14509	29048	29147	29018	5134

```
# Adjust for lag
lmerM = lmer(hr ~ stress_CMC * COPE_denial_C + months_P1SAQ_to_P4_C + P4_age_C*stress_CMC + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * COPE_denial_C + months_P1SAQ_to_P4_C +
##     P4_age_C * stress_CMC + (1 + stress_CMC | M2ID) + (1 | M2FAMNUM),
##     data = dfLs)
## Observations: 5149; Groups: M2ID, 1060
##
##  Observations: 5149; Groups: M2FAMNUM, 936
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                          Estimate        SE         F error df  Pr(>F)
## (Intercept)             74.589990  0.337551 4.877e+04    896.8 < 2e-16
## stress_CMC               0.871111  0.032960 6.976e+02    821.2 < 2e-16
## COPE_denial_C           -0.034070  0.148200 5.270e-02   1056.7 0.81847
## months_P1SAQ_to_P4_C    -0.033501  0.023894 1.955e+00    890.4 0.16240
## P4_age_C                -0.149210  0.030013 2.469e+01    947.1 8.0e-07
```

```
## stress_CMC:COPE_denial_C -0.068942  0.015149 2.068e+01    853.2 6.2e-06
## stress_CMC:P4_age_C      -0.007738  0.002942 6.908e+00    829.9 0.00874
##
## (Intercept)              ***
## stress_CMC               ***
## COPE_denial_C
## months_P1SAQ_to_P4_C
## P4_age_C                 ***
## stress_CMC:COPE_denial_C ***
## stress_CMC:P4_age_C      **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.16151
##           stress_CMC  0.69693  0.178
##  M2FAMNUM (Intercept) 5.44592
##  Residual             2.35533
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 29016.3; BIC: 29094.9; logLik: -14496.1; Deviance: 28992.3
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 139: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.338
fixed	NA	stress_CMC	0.871	0.033
fixed	NA	COPE_denial_C	-0.0341	0.148
fixed	NA	months_P1SAQ_to_P4_C	-0.0335	0.0239
fixed	NA	P4_age_C	-0.149	0.03

effect	group	term	estimate	std.error
fixed	NA	stress_CMC:COPE_denial_C	-0.0689	0.0151
fixed	NA	stress_CMC:P4_age_C	-0.00774	0.00294
ran_pars	M2ID	sd__(Intercept)	9.16	NA
ran_pars	M2ID	sd__stress_CMC	0.697	NA
ran_pars	M2ID	cor__(Intercept).stress_CMC	0.178	NA
ran_pars	M2FAMNUM	sd__(Intercept)	5.45	NA
ran_pars	Residual	sd__Observation	2.36	NA

statistic	conf.low	conf.high
221	73.9	75.3
26.4	0.807	0.936
-0.23	-0.325	0.256
-1.4	-0.0803	0.0133
-4.97	-0.208	-0.0904
-4.55	-0.0986	-0.0392
-2.63	-0.0135	-0.00197
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14496	29016	29095	28992	5137

III. PWB subscales

Exploratory analyses investigating individual subscales of the Psychological Well-Being Scales

```r
# Center age for subjects in this analysis
varDescribe(dfLs$pwb2_C)
```

```
##    vars    n mean    sd median     min   max skew kurtosis
## X1    1 5305    0 35.23   5.19 -135.81 61.19 -0.7     0.14
```

```r
length(dfLs$P4_age[!is.na(dfLs$pwb2_C)])
```

```
## [1] 5305
```

```r
dfLs$P4_age_C = dfLs$P4_age - mean(dfLs$P4_age[!is.na(dfLs$pwb2_C)], na.rm=T)
```

Autonomy

```r
# Run the test
lmerM = lmer(hr ~ stress_CMC * autonomy2_C + P4_age_C*stress_CMC + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * autonomy2_C + P4_age_C * stress_CMC +
##     (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5154; Groups: M2ID, 1061
##
##  Observations: 5154; Groups: M2FAMNUM, 936
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                            Estimate         SE         F error df   Pr(>F)
## (Intercept)              74.5786003  0.3365674 4.903e+04    904.9  < 2e-16
## stress_CMC                0.8826133  0.0339117 6.766e+02    831.9  < 2e-16
## autonomy2_C              -0.0004671  0.0497839 8.771e-05   1051.9  0.99253
## P4_age_C                 -0.1489096  0.0301827 2.431e+01    947.7 9.67e-07
## stress_CMC:autonomy2_C    0.0105787  0.0051036 4.292e+00    831.0  0.03861
## stress_CMC:P4_age_C      -0.0091880  0.0030543 9.039e+00    840.0  0.00272
##
## (Intercept)              ***
## stress_CMC               ***
## autonomy2_C
```

```
## P4_age_C               ***
## stress_CMC:autonomy2_C *
## stress_CMC:P4_age_C    **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.11385
##           stress_CMC  0.73139  0.186
##  M2FAMNUM (Intercept) 5.47204
##  Residual             2.36620
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 29113.1; BIC: 29185.1; logLik: -14545.6; Deviance: 29091.1
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 142: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.337
fixed	NA	stress_CMC	0.883	0.0339
fixed	NA	autonomy2_C	-0.000467	0.0498
fixed	NA	P4_age_C	-0.149	0.0302
fixed	NA	stress_CMC:autonomy2_C	0.0106	0.0051
fixed	NA	stress_CMC:P4_age_C	-0.00919	0.00305
ran_pars	M2ID	sd___(Intercept)	9.11	NA
ran_pars	M2ID	sd___stress_CMC	0.731	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.186	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.47	NA
ran_pars	Residual	sd___Observation	2.37	NA

statistic	conf.low	conf.high
222	73.9	75.2
26	0.816	0.949
-0.00938	-0.098	0.0971
-4.93	-0.208	-0.0898
2.07	0.000576	0.0206
-3.01	-0.0152	-0.0032
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14546	29113	29185	29091	5143

Environmental Mastery

```
# Run the test
lmerM = lmer(hr ~ stress_CMC * envMast2_C + P4_age_C*stress_CMC + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * envMast2_C + P4_age_C * stress_CMC +
##     (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5154; Groups: M2ID, 1061
##
##  Observations: 5154; Groups: M2FAMNUM, 936
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                        Estimate        SE         F error df    Pr(>F)
```

```
## (Intercept)           74.577110  0.336463 4.906e+04    905.2  < 2e-16 ***
## stress_CMC             0.882616  0.033601 6.892e+02    828.0  < 2e-16 ***
## envMast2_C            -0.014026  0.043465 1.037e-01   1058.1    0.747
## P4_age_C              -0.146770  0.030755 2.275e+01    961.6 2.13e-06 ***
## stress_CMC:envMast2_C  0.021893  0.004469 2.397e+01    825.2 1.18e-06 ***
## stress_CMC:P4_age_C   -0.012700  0.003130 1.645e+01    863.3 5.45e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.11606
##           stress_CMC  0.72031  0.187
##  M2FAMNUM (Intercept) 5.46367
##  Residual             2.36431
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 29093.4; BIC: 29165.4; logLik: -14535.7; Deviance: 29071.4
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 145: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.336
fixed	NA	stress_CMC	0.883	0.0336
fixed	NA	envMast2_C	-0.014	0.0435
fixed	NA	P4_age_C	-0.147	0.0308
fixed	NA	stress_CMC:envMast2_C	0.0219	0.00447
fixed	NA	stress_CMC:P4_age_C	-0.0127	0.00313
ran_pars	M2ID	sd___(Intercept)	9.12	NA
ran_pars	M2ID	sd___stress_CMC	0.72	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.187	NA

effect	group	term	estimate	std.error
ran_pars	M2FAMNUM	sd__(Intercept)	5.46	NA
ran_pars	Residual	sd__Observation	2.36	NA

statistic	conf.low	conf.high
222	73.9	75.2
26.3	0.817	0.948
-0.323	-0.0992	0.0712
-4.77	-0.207	-0.0865
4.9	0.0131	0.0307
-4.06	-0.0188	-0.00657
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14536	29093	29165	29071	5143

Personal Growth

```
# Run the test
lmerM = lmer(hr ~ stress_CMC * persGrow2_C + P4_age_C*stress_CMC + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * persGrow2_C + P4_age_C * stress_CMC +
##     (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5154; Groups: M2ID, 1061
##
```

```
##  Observations: 5154; Groups: M2FAMNUM, 936
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                         Estimate        SE         F error df   Pr(>F)
## (Intercept)            74.578359  0.336418 4.908e+04    905.0  < 2e-16 ***
## stress_CMC              0.881072  0.033697 6.828e+02    828.4  < 2e-16 ***
## persGrow2_C            -0.014627  0.048120 9.209e-02   1058.7 0.761595
## P4_age_C               -0.148115  0.030036 2.429e+01    945.5 9.78e-07 ***
## stress_CMC:persGrow2_C  0.018304  0.004927 1.379e+01    821.1 0.000219 ***
## stress_CMC:P4_age_C    -0.009370  0.003025 9.586e+00    839.1 0.002026 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.12625
##           stress_CMC  0.72378  0.187
##  M2FAMNUM (Intercept) 5.44637
##  Residual             2.36622

## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit

##
## AIC: 29103.3; BIC: 29175.3; logLik: -14540.7; Deviance: 29081.3
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 148: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.336
fixed	NA	stress_CMC	0.881	0.0337
fixed	NA	persGrow2_C	-0.0146	0.0481

effect	group	term	estimate	std.error
fixed	NA	P4_age_C	-0.148	0.03
fixed	NA	stress_CMC:persGrow2_C	0.0183	0.00493
fixed	NA	stress_CMC:P4_age_C	-0.00937	0.00302
ran_pars	M2ID	sd___(Intercept)	9.13	NA
ran_pars	M2ID	sd___stress_CMC	0.724	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.187	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.45	NA
ran_pars	Residual	sd___Observation	2.37	NA

statistic	conf.low	conf.high
222	73.9	75.2
26.1	0.815	0.947
-0.304	-0.109	0.0797
-4.93	-0.207	-0.0892
3.72	0.00865	0.028
-3.1	-0.0153	-0.00344
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14541	29103	29175	29081	5143

Positive Relations with Others

```
# Run the test
lmerM = lmer(hr ~ stress_CMC * posRela2_C + P4_age_C*stress_CMC + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
```

```r
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * posRela2_C + P4_age_C * stress_CMC +
##     (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5154; Groups: M2ID, 1061
##
##  Observations: 5154; Groups: M2FAMNUM, 936
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                       Estimate       SE         F error df   Pr(>F)
## (Intercept)           74.57943  0.33626 49124.067    903.6  < 2e-16 ***
## stress_CMC             0.88091  0.03357   687.839    827.3  < 2e-16 ***
## posRela2_C             0.05221  0.04629     1.268   1058.0 0.260325
## P4_age_C              -0.15601  0.03060    25.964    947.8 4.20e-07 ***
## stress_CMC:posRela2_C  0.02277  0.00474    23.047    802.1 1.89e-06 ***
## stress_CMC:P4_age_C   -0.01189  0.00309    14.800    850.0 0.000128 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.10577
##           stress_CMC  0.71878  0.173
##  M2FAMNUM (Intercept) 5.46586
##  Residual             2.36529
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 29094.5; BIC: 29166.5; logLik: -14536.2; Deviance: 29072.5
```

```r
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 151: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.336
fixed	NA	stress_CMC	0.881	0.0336
fixed	NA	posRela2_C	0.0522	0.0463
fixed	NA	P4_age_C	-0.156	0.0306
fixed	NA	stress_CMC:posRela2_C	0.0228	0.00474
fixed	NA	stress_CMC:P4_age_C	-0.0119	0.00309
ran_pars	M2ID	sd__(Intercept)	9.11	NA
ran_pars	M2ID	sd__stress_CMC	0.719	NA
ran_pars	M2ID	cor__(Intercept).stress_CMC	0.173	NA
ran_pars	M2FAMNUM	sd__(Intercept)	5.47	NA
ran_pars	Residual	sd__Observation	2.37	NA

statistic	conf.low	conf.high
222	73.9	75.2
26.2	0.815	0.947
1.13	-0.0385	0.143
-5.1	-0.216	-0.096
4.8	0.0135	0.0321
-3.85	-0.018	-0.00584
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14536	29094	29167	29072	5143

Purpose in Life

```
# Run the test
lmerM = lmer(hr ~ stress_CMC * purpLife2_C + P4_age_C*stress_CMC + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * purpLife2_C + P4_age_C * stress_CMC +
##     (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5154; Groups: M2ID, 1061
##
##  Observations: 5154; Groups: M2FAMNUM, 936
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                          Estimate        SE         F error df   Pr(>F)
## (Intercept)             74.576549  0.336495 4.905e+04    905.2  < 2e-16 ***
## stress_CMC               0.881153  0.033704 6.827e+02    829.0  < 2e-16 ***
## purpLife2_C             -0.017454  0.049705 1.229e-01   1058.8  0.72598
## P4_age_C                -0.148133  0.030047 2.428e+01    947.7 9.84e-07 ***
## stress_CMC:purpLife2_C   0.022370  0.005079 1.938e+01    836.9 1.21e-05 ***
## stress_CMC:P4_age_C     -0.009688  0.003028 1.022e+01    837.5  0.00144 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.11243
##           stress_CMC  0.72465  0.187
##  M2FAMNUM (Intercept) 5.47049
##  Residual             2.36403
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 29097.4; BIC: 29169.4; logLik: -14537.7; Deviance: 29075.4
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 154: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.336
fixed	NA	stress_CMC	0.881	0.0337
fixed	NA	purpLife2_C	-0.0175	0.0497
fixed	NA	P4_age_C	-0.148	0.03
fixed	NA	stress_CMC:purpLife2_C	0.0224	0.00508
fixed	NA	stress_CMC:P4_age_C	-0.00969	0.00303
ran_pars	M2ID	sd___(Intercept)	9.11	NA
ran_pars	M2ID	sd___stress_CMC	0.725	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.187	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.47	NA
ran_pars	Residual	sd___Observation	2.36	NA

statistic	conf.low	conf.high
222	73.9	75.2
26.1	0.815	0.947
-0.351	-0.115	0.08
-4.93	-0.207	-0.0892
4.4	0.0124	0.0323
-3.2	-0.0156	-0.00375
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14538	29097	29169	29075	5143

Self Acceptance

```
# Run the test
lmerM = lmer(hr ~ stress_CMC * selfAcce2_C + P4_age_C*stress_CMC + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * selfAcce2_C + P4_age_C * stress_CMC +
##     (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5154; Groups: M2ID, 1061
##
##  Observations: 5154; Groups: M2FAMNUM, 936
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                          Estimate        SE         F error df   Pr(>F)
## (Intercept)            74.576559  0.336488 4.905e+04    904.7  < 2e-16 ***
## stress_CMC              0.883295  0.033543 6.926e+02    828.2  < 2e-16 ***
## selfAcce2_C             0.007714  0.039906 3.723e-02   1058.7 0.847026
## P4_age_C               -0.149799  0.030434 2.420e+01    949.6 1.02e-06 ***
## stress_CMC:selfAcce2_C  0.018883  0.004034 2.189e+01    800.4 3.39e-06 ***
## stress_CMC:P4_age_C    -0.011376  0.003066 1.375e+01    842.8 0.000222 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.11409
##           stress_CMC  0.71718  0.181
##  M2FAMNUM (Intercept) 5.46743
##  Residual             2.36625
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit

##
## AIC: 29096.5; BIC: 29168.6; logLik: -14537.3; Deviance: 29074.5
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 157: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.6	0.336
fixed	NA	stress_CMC	0.883	0.0335
fixed	NA	selfAcce2_C	0.00771	0.0399
fixed	NA	P4_age_C	-0.15	0.0304
fixed	NA	stress_CMC:selfAcce2_C	0.0189	0.00403
fixed	NA	stress_CMC:P4_age_C	-0.0114	0.00307
ran_pars	M2ID	sd__(Intercept)	9.11	NA
ran_pars	M2ID	sd__stress_CMC	0.717	NA
ran_pars	M2ID	cor__(Intercept).stress_CMC	0.181	NA
ran_pars	M2FAMNUM	sd__(Intercept)	5.47	NA
ran_pars	Residual	sd__Observation	2.37	NA

statistic	conf.low	conf.high
222	73.9	75.2
26.3	0.818	0.949
0.193	-0.0705	0.0859
-4.92	-0.209	-0.0901
4.68	0.011	0.0268
-3.71	-0.0174	-0.00537
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14537	29097	29169	29075	5143

Non-linear Age

Including age^2 in our model did not impact results.

```
# Center age (been centered for subsets of participants on different analyses where participants are missing data on well-being indicators
dfLs$P4_age_C = dfLs$P4_age - mean(dfLs$P4_age, na.rm=T)

dfLs$P4_age_C2 = dfLs$P4_age_C^2
```

HR ~ age^2

```
lmerM = lmer(hr ~ P4_age_C + P4_age_C2 + (1|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ P4_age_C + P4_age_C2 + (1 | M2ID) + (1 |
##     M2FAMNUM), data = dfLs)
## Observations: 5174; Groups: M2ID, 1065
##
##  Observations: 5174; Groups: M2FAMNUM, 940
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##              Estimate        SE         F error df   Pr(>F)
## (Intercept) 74.417042  0.444334 2.801e+04    904.8  < 2e-16 ***
## P4_age_C    -0.153042  0.031730 2.324e+01    944.2 1.67e-06 ***
## P4_age_C2    0.001090  0.002288 2.268e-01    951.3    0.634
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev.
##  M2ID     (Intercept) 8.9695
##  M2FAMNUM (Intercept) 5.6906
##  Residual             2.9892

## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit

##
## AIC: 30420.7; BIC: 30460.0; logLik: -15204.4; Deviance: 30408.7
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 160: Table continues below

effect	group	term	estimate	std.error	statistic
fixed	NA	(Intercept)	74.4	0.444	167
fixed	NA	P4_age_C	-0.153	0.0317	-4.82
fixed	NA	P4_age_C2	0.00109	0.00229	0.477
ran_pars	M2ID	sd__(Intercept)	8.97	NA	NA
ran_pars	M2FAMNUM	sd__(Intercept)	5.69	NA	NA
ran_pars	Residual	sd__Observation	2.99	NA	NA

conf.low	conf.high
73.5	75.3
-0.215	-0.0909
-0.00339	0.00557
NA	NA
NA	NA
NA	NA

```r
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.99	-15204	30421	30460	30409	5168

PWB + age^2

```r
# Center age for subjects in this analysis
varDescribe(dfLs$pwb2_C)
```

```
##    vars    n mean    sd median     min   max skew kurtosis
## X1    1 5305    0 35.23   5.19 -135.81 61.19 -0.7     0.14
```

```r
length(dfLs$P4_age[!is.na(dfLs$pwb2_C)])
```

```
## [1] 5305
```

```r
dfLs$P4_age_C = dfLs$P4_age - mean(dfLs$P4_age[!is.na(dfLs$pwb2_C)], na.rm=T)
dfLs$P4_age_C2 = dfLs$P4_age_C^2
# Run the test
lmerM = lmer(hr ~ stress_CMC * pwb2_C + P4_age_C + P4_age_C2 + (1+ stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * pwb2_C + P4_age_C + P4_age_C2 +
##     (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5154; Groups: M2ID, 1061
##
##  Observations: 5154; Groups: M2FAMNUM, 936
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                     Estimate         SE         F error df   Pr(>F)
## (Intercept)        7.451e+01  4.429e-01 2.824e+04    903.3  < 2e-16 ***
## stress_CMC         8.798e-01  3.379e-02 6.774e+02    829.2  < 2e-16 ***
## pwb2_C             3.793e-06  9.494e-03 1.591e-07   1058.1    1.000
## P4_age_C          -1.394e-01  3.211e-02 1.879e+01    942.0 1.61e-05 ***
```

```
## P4_age_C2          4.995e-04  2.290e-03 4.743e-02    944.4    0.828
## stress_CMC:pwb2_C  4.217e-03  9.555e-04 1.946e+01    817.1 1.17e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.11751
##           stress_CMC  0.72804  0.182
##  M2FAMNUM (Intercept) 5.47457
##  Residual             2.36461
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 29112.7; BIC: 29184.7; logLik: -14545.3; Deviance: 29090.7
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 163: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.5	0.443
fixed	NA	stress_CMC	0.88	0.0338
fixed	NA	pwb2_C	3.79e-06	0.00949
fixed	NA	P4_age_C	-0.139	0.0321
fixed	NA	P4_age_C2	5e-04	0.00229
fixed	NA	stress_CMC:pwb2_C	0.00422	0.000956
ran_pars	M2ID	sd___(Intercept)	9.12	NA
ran_pars	M2ID	sd___stress_CMC	0.728	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.182	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.47	NA
ran_pars	Residual	sd___Observation	2.36	NA

statistic	conf.low	conf.high
168	73.6	75.4
26	0.814	0.946
4e-04	-0.0186	0.0186
-4.34	-0.202	-0.0765
0.218	-0.00399	0.00499
4.41	0.00234	0.00609
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14545	29113	29185	29091	5143

Depression + age^2

```
# Center age for subjects in this analysis
varDescribe(dfLs$P4_CESD_C)
```

```
##    vars    n mean  sd median   min   max skew kurtosis
## X1    1 5285    0 8.1  -2.61 -8.61 45.39 1.61     3.17
```

```
length(dfLs$P4_age[!is.na(dfLs$P4_CESD_C)])
```

```
## [1] 5285
```

```
dfLs$P4_age_C = dfLs$P4_age - mean(dfLs$P4_age[!is.na(dfLs$P4_CESD_C)], na.rm=T)
dfLs$P4_age_C2 = dfLs$P4_age_C^2
# Run the test
lmerM = lmer(hr ~ stress_CMC * P4_CESD_C + P4_age_C + P4_age_C2 + (1 + hr_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
```

```
## Warning in checkConv(attr(opt, "derivs"), opt$par, ctrl =
## control$checkConv, : unable to evaluate scaled gradient
```

```
## Warning in checkConv(attr(opt, "derivs"), opt$par, ctrl =
## control$checkConv, : Model failed to converge: degenerate Hessian with 1
## negative eigenvalues
```

```
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * P4_CESD_C + P4_age_C + P4_age_C2 +
##     (1 + hr_CMC | M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 4800; Groups: M2ID, 960
##
##  Observations: 4800; Groups: M2FAMNUM, 859
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                          Estimate         SE         F error df Pr(>F)
## (Intercept)           7.653e+01  2.110e-01        NA      Inf     NA
## stress_CMC           -9.057e-14  5.960e-08 2.310e-12     2879      1
## P4_CESD_C             2.764e-02  1.955e-02        NA      Inf     NA
## P4_age_C             -1.759e-01  1.533e-02        NA      Inf     NA
## P4_age_C2             3.539e-03  1.138e-03        NA      Inf     NA
## stress_CMC:P4_CESD_C  1.857e-15  6.948e-09 7.146e-14     2877      1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev.   Corr
##  M2ID     (Intercept) 5.6416e+00
##           hr_CMC      5.1218e+00 -0.634
##  M2FAMNUM (Intercept) 2.1535e+00
##  Residual             4.7878e-06
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: -46366.1; BIC: -46294.8; logLik: 23194.0; Deviance: -46388.1
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
```

```
pander(table_obj, digits = 3)
```

Table 166: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	76.5	0.211
fixed	NA	stress_CMC	-9.06e-14	5.96e-08
fixed	NA	P4_CESD_C	0.0276	0.0195
fixed	NA	P4_age_C	-0.176	0.0153
fixed	NA	P4_age_C2	0.00354	0.00114
fixed	NA	stress_CMC:P4_CESD_C	1.86e-15	6.95e-09
ran_pars	M2ID	sd__(Intercept)	5.64	NA
ran_pars	M2ID	sd__hr_CMC	5.12	NA
ran_pars	M2ID	cor__(Intercept).hr_CMC	-0.634	NA
ran_pars	M2FAMNUM	sd__(Intercept)	2.15	NA
ran_pars	Residual	sd__Observation	4.79e-06	NA

statistic	conf.low	conf.high
363	76.1	76.9
-1.52e-06	-1.17e-07	1.17e-07
1.41	-0.0107	0.066
-11.5	-0.206	-0.146
3.11	0.00131	0.00577
2.67e-07	-1.36e-08	1.36e-08
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
4.79e-06	23194	-46366	-46295	-46388	4789

Anxiety + age^2

```
# Center age for subjects in this analysis
varDescribe(dfLs$P4_STAItrait_C)
```

```
##    vars    n mean   sd median   min  max skew kurtosis
## X1    1 5285    0 8.98   -1.2 -14.2 36.8 0.84      0.4
```

```
length(dfLs$P4_age[!is.na(dfLs$P4_STAItrait_C)])
```

```
## [1] 5285
```

```
dfLs$P4_age_C = dfLs$P4_age - mean(dfLs$P4_age[!is.na(dfLs$P4_STAItrait_C)], na.rm=T)
dfLs$P4_age_C2 = dfLs$P4_age_C^2
# Run the test
lmerM = lmer(hr ~ stress_CMC * P4_STAItrait_C + P4_age_C + P4_age_C2 + (1 + stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * P4_STAItrait_C + P4_age_C +
##     P4_age_C2 + (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5134; Groups: M2ID, 1057
##
##  Observations: 5134; Groups: M2FAMNUM, 932
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                              Estimate        SE         F error df   Pr(>F)
## (Intercept)                 74.467443  0.443101 2.818e+04    902.0  < 2e-16
## stress_CMC                   0.881004  0.033687 6.832e+02    825.8  < 2e-16
## P4_STAItrait_C               0.032431  0.037425 7.483e-01   1050.5    0.387
## P4_age_C                    -0.136744  0.032204 1.797e+01    936.7 2.46e-05
## P4_age_C2                    0.001006  0.002280 1.943e-01    940.7    0.659
## stress_CMC:P4_STAItrait_C -0.018367  0.003656 2.521e+01    768.8 6.38e-07
##
## (Intercept)                 ***
## stress_CMC                  ***
## P4_STAItrait_C
## P4_age_C                    ***
```

```
## P4_age_C2
## stress_CMC:P4_STAItrait_C ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.10637
##           stress_CMC  0.72223  0.200
##  M2FAMNUM (Intercept) 5.50315
##  Residual             2.36241
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28979.7; BIC: 29051.7; logLik: -14478.9; Deviance: 28957.7
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 169: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.5	0.443
fixed	NA	stress_CMC	0.881	0.0337
fixed	NA	P4_STAItrait_C	0.0324	0.0374
fixed	NA	P4_age_C	-0.137	0.0322
fixed	NA	P4_age_C2	0.00101	0.00228
fixed	NA	stress_CMC:P4_STAItrait_C	-0.0184	0.00366
ran_pars	M2ID	sd___(Intercept)	9.11	NA
ran_pars	M2ID	sd___stress_CMC	0.722	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.2	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.5	NA
ran_pars	Residual	sd___Observation	2.36	NA

statistic	conf.low	conf.high
168	73.6	75.3
26.2	0.815	0.947
0.867	-0.0409	0.106
-4.25	-0.2	-0.0736
0.441	-0.00346	0.00548
-5.02	-0.0255	-0.0112
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14479	28980	29052	28958	5123

IL6 + age^2

```
# Center age for subjects in this analysis
varDescribe(dfLs$IL6_T_C)
```

```
##    vars    n mean   sd median   min max skew kurtosis
## X1    1 5290    0 1.06  -0.07 -3.09 3.3 0.31     0.46
```

```
length(dfLs$P4_age[!is.na(dfLs$IL6_T_C)])
```

```
## [1] 5290
```

```
dfLs$P4_age_C = dfLs$P4_age - mean(dfLs$P4_age[!is.na(dfLs$IL6_T_C)], na.rm=T)
dfLs$P4_age_C2 = dfLs$P4_age_C^2
# Run the test
lmerM = lmer(hr ~ stress_CMC * IL6_T_C + P4_age_C + P4_age_C2 + (1 + stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * IL6_T_C + P4_age_C + P4_age_C2 +
##     (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5147; Groups: M2ID, 1058
##
##  Observations: 5147; Groups: M2FAMNUM, 933
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                      Estimate        SE         F error df   Pr(>F)
## (Intercept)        74.397161  0.440991 2.840e+04    901.8  < 2e-16 ***
## stress_CMC          0.874287  0.033123 6.959e+02    821.0  < 2e-16 ***
## IL6_T_C             1.178947  0.314964 1.396e+01   1055.4 0.000197 ***
## P4_age_C           -0.160345  0.031643 2.560e+01    939.8 5.06e-07 ***
## P4_age_C2           0.001355  0.002273 3.543e-01    938.2 0.551842
## stress_CMC:IL6_T_C -0.154875  0.030658 2.549e+01    773.2 5.55e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 9.17608
##           stress_CMC  0.70208  0.229
##  M2FAMNUM (Intercept) 5.29144
##  Residual             2.36289
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
##
## AIC: 29001.5; BIC: 29073.5; logLik: -14489.7; Deviance: 28979.5
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 172: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.4	0.441
fixed	NA	stress_CMC	0.874	0.0331
fixed	NA	IL6_T_C	1.18	0.315
fixed	NA	P4_age_C	-0.16	0.0316
fixed	NA	P4_age_C2	0.00136	0.00227
fixed	NA	stress_CMC:IL6_T_C	-0.155	0.0307
ran_pars	M2ID	sd___(Intercept)	9.18	NA
ran_pars	M2ID	sd___stress_CMC	0.702	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.229	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.29	NA
ran_pars	Residual	sd___Observation	2.36	NA

statistic	conf.low	conf.high
169	73.5	75.3
26.4	0.809	0.939
3.74	0.562	1.8
-5.07	-0.222	-0.0983
0.596	-0.0031	0.00581
-5.05	-0.215	-0.0948
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.36	-14490	29001	29073	28979	5136

CRP + age^2

```
# Center age for subjects in this analysis
varDescribe(dfLs$CRP_T_C)
```

```
##    vars    n mean   sd median   min  max skew kurtosis
## X1    1 5260    0 0.51  -0.03 -1.02 1.61 0.05    -0.44
```

```
length(dfLs$P4_age[!is.na(dfLs$CRP_T_C)])
```

```
## [1] 5260
```

```
dfLs$P4_age_C = dfLs$P4_age - mean(dfLs$P4_age[!is.na(dfLs$CRP_T_C)], na.rm=T)
dfLs$P4_age_C2 = dfLs$P4_age_C^2
# Run the test
lmerM = lmer(hr ~ stress_CMC * CRP_T_C + P4_age_C + P4_age_C2 + (1 + stress_CMC|M2ID) + (1|M2FAMNUM), data=dfLs)
#Anova(lmerM, type=3, test="F")
modelSummary(lmerM, t = FALSE)
```

```
## lmer(formula = hr ~ stress_CMC * CRP_T_C + P4_age_C + P4_age_C2 +
##     (1 + stress_CMC | M2ID) + (1 | M2FAMNUM), data = dfLs)
## Observations: 5117; Groups: M2ID, 1052
##
##  Observations: 5117; Groups: M2FAMNUM, 928
##
## Linear mixed model fit by REML
##
## Fixed Effects:
##                      Estimate        SE         F error df   Pr(>F)
## (Intercept)        74.307688  0.441866 2.822e+04    900.6  < 2e-16 ***
## stress_CMC          0.869309  0.033551 6.705e+02    819.9  < 2e-16 ***
## CRP_T_C             3.209457  0.650282 2.427e+01   1045.9 9.73e-07 ***
## P4_age_C           -0.141302  0.031385 2.021e+01    932.3 7.81e-06 ***
## P4_age_C2           0.001912  0.002275 7.039e-01    934.5   0.4017
## stress_CMC:CRP_T_C -0.166243  0.065678 6.400e+00    827.4   0.0116 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## NOTE: F, error df, and p-values from Kenward-Roger approximation
##
## Random Effects:
```

```
##  Groups   Name        Std.Dev. Corr
##  M2ID     (Intercept) 8.88095
##           stress_CMC  0.71505  0.220
##  M2FAMNUM (Intercept) 5.70903
##  Residual             2.36550
```

```
## Warning in deviance.merMod(Model): deviance() is deprecated for REML fits;
## use REMLcrit for the REML criterion or deviance(.,REML=FALSE) for deviance
## calculated at the REML fit
```

```
##
## AIC: 28848.4; BIC: 28920.4; logLik: -14413.2; Deviance: 28826.4
```

```
table_obj = broom.mixed::tidy(lmerM, conf.int=TRUE, conf.level=.95, conf.method="Wald", effects = c("ran_pars", "fixed"), data=dfLs)
glance_obj = broom.mixed::glance(lmerM)
pander(table_obj, digits = 3)
```

Table 175: Table continues below

effect	group	term	estimate	std.error
fixed	NA	(Intercept)	74.3	0.442
fixed	NA	stress_CMC	0.869	0.0336
fixed	NA	CRP_T_C	3.21	0.65
fixed	NA	P4_age_C	-0.141	0.0314
fixed	NA	P4_age_C2	0.00191	0.00228
fixed	NA	stress_CMC:CRP_T_C	-0.166	0.0657
ran_pars	M2ID	sd___(Intercept)	8.88	NA
ran_pars	M2ID	sd___stress_CMC	0.715	NA
ran_pars	M2ID	cor___(Intercept).stress_CMC	0.22	NA
ran_pars	M2FAMNUM	sd___(Intercept)	5.71	NA
ran_pars	Residual	sd___Observation	2.37	NA

statistic	conf.low	conf.high
168	73.4	75.2
25.9	0.804	0.935
4.94	1.93	4.48
-4.5	-0.203	-0.0798
0.84	-0.00255	0.00637
-2.53	-0.295	-0.0375

statistic	conf.low	conf.high
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA

```
pander(glance_obj, digits = 3)
```

sigma	logLik	AIC	BIC	REMLcrit	df.residual
2.37	-14413	28848	28920	28826	5106