Negative Affect and SM Use - SMASH Study

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Descriptive Statistics

```
## Age

mean(data$Age, na.rm=TRUE)
```

```
## [1] 15.82034
```

```
sd(data$Age, na.rm=TRUE)
```

```
## [1] 0.9989791
```

```
## Race

table(data$Race_012, data$pid)
```

```
##
##     1002 1004 1005 1006 1007 1008 1009 1011 1013 1014 1021 1022 1023 1024 1025
##   0  724  739    0  678  432  652  695    0    0  621  337  675  698    0  817
##   1    0    0  677    0    0    0    0  989    0    0    0    0    0    0    0
##   2    0    0    0    0    0    0    0    0  834    0    0    0    0  672    0
##
##     1026 1027 1029 1030
##   0  815  704  669  602
##   1    0    0    0    0
##   2    0    0    0    0
```

```
table(data$Gender, data$pid)
```

```
##
##     1002 1004 1005 1006 1007 1008 1009 1011 1013 1014 1021 1022 1023 1024 1025
##   0    0    0  677    0    0    0    0  989  834    0    0    0    0  672  817
##   1  724    0    0  678  432  652  695    0    0  621  337  675  698    0    0
##   2    0  739    0    0    0    0    0    0    0    0    0    0    0    0    0
##
##     1026 1027 1029 1030
##   0    0  704    0  602
##   1  815    0  669    0
##   2    0    0    0    0
```

```
## Days in Study

# summarize max days in study
Max_days <- data %>%
  group_by(pid) %>%
  summarise(Max_day = max(day_in_study, na.rm=TRUE))

# get mean/sd day in study
mean(Max_days$Max_day, na.rm=TRUE)
```

```
## [1] 30.57895
```

```
sd(Max_days$Max_day, na.rm=TRUE)
```

```
## [1] 5.620555
```

```
## Get Means/SDs of SM time spent

sm_summary <- day %>%
  group_by %>%
  summarise(sm_time = (mean(sum_sm, na.rm=TRUE) * 60), sm_checks = mean(count_sm, na.rm=TRUE))
```

Negative Mood - ABCT Poster

```
## Negative mood - sumduration

NA_sm_sum <- lmer(NAf_pm ~ sum_sm + NAf_am + sm_average + day_in_study + (1 | pid), data = day)

summary(NA_sm_sum)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: NAf_pm ~ sum_sm + NAf_am + sm_average + day_in_study + (1 | pid)
##    Data: day
##
## REML criterion at convergence: 5486.6
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -1.8856 -0.4834 -0.1687  0.2312  3.8417
##
## Random effects:
##  Groups   Name        Variance Std.Dev.
##  pid      (Intercept)  42571   206.3
##  Residual             263484   513.3
## Number of obs: 358, groups:  pid, 19
##
## Fixed effects:
##             Estimate Std. Error       df t value Pr(>|t|)
```

```
## (Intercept)  226.0424   121.6110  23.2450   1.859 0.075773 .
## sum_sm         0.2133     0.2999 338.8366   0.711 0.477445
## NAf_am         4.1562     1.2404 240.4311   3.351 0.000936 ***
## sm_average    -0.3332     0.8869  16.8358  -0.376 0.711849
## day_in_study   3.0518     3.2020 352.9575   0.953 0.341187
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) sum_sm NAf_am sm_vrg
## sum_sm      -0.056
## NAf_am      -0.338 -0.002
## sm_average  -0.676 -0.308  0.062
## day_in_stdy -0.408  0.085  0.183 -0.075
```

```
## Negative mood - counts

NA_sm_count <- lmer(NAf_pm ~ count_sm + NAf_am + count_average + day_in_study + (1 | pid), data = day)

summary(NA_sm_count)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: NAf_pm ~ count_sm + NAf_am + count_average + day_in_study + (1 |
##     pid)
##    Data: day
##
## REML criterion at convergence: 5482.4
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -1.8787 -0.5085 -0.1737  0.2129  3.7814
##
## Random effects:
##  Groups   Name        Variance Std.Dev.
##  pid      (Intercept)  39274   198.2
##  Residual             260623   510.5
## Number of obs: 358, groups:  pid, 19
##
## Fixed effects:
##               Estimate Std. Error       df t value Pr(>|t|)
## (Intercept)   155.8862   107.2984  28.6725   1.453 0.157129
## count_sm        0.8868     0.4064 337.3555   2.182 0.029769 *
## NAf_am          4.2834     1.2256 221.6637   3.495 0.000572 ***
## count_average  -0.5909     0.6463  49.2336  -0.914 0.365051
## day_in_study    3.7320     3.1890 352.7657   1.170 0.242678
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) cnt_sm NAf_am cnt_vr
## count_sm    -0.052
## NAf_am      -0.325  0.014
## count_averg -0.457 -0.652 -0.015
```

```
## day_in_stdy -0.506  0.122  0.187 -0.076
```

ABCT Symposium Analyses

Positive Affect on SM - Within-Day Models

```
#-----------------------------------------Pos affect & same day SM----------------------------------

## Negative affect & minutes of SM

PA_on_SM_day <- lmer(sum_sm ~ SM_Pos + PA_sm_average + day_in_study + (1 + SM_Pos | pid), data = day)

summary(PA_on_SM_day)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: sum_sm ~ SM_Pos + PA_sm_average + day_in_study + (1 + SM_Pos |
##     pid)
##    Data: day
##
## REML criterion at convergence: 4892.5
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.1408 -0.3324 -0.0899  0.2363  4.0781
##
## Random effects:
##  Groups   Name        Variance  Std.Dev. Corr
##  pid      (Intercept) 3.526e+03  59.3787
##           SM_Pos      5.551e-02   0.2356 1.00
##  Residual             1.012e+04 100.6008
## Number of obs: 403, groups:  pid, 19
##
## Fixed effects:
##               Estimate Std. Error       df t value Pr(>|t|)
## (Intercept)    89.2830    38.2243  12.4057   2.336    0.037 *
## SM_Pos          0.2313     0.2920 150.9341   0.792    0.430
## PA_sm_average   0.1783     0.7329  21.5794   0.243    0.810
## day_in_study   -0.2004     0.6096 396.0845  -0.329    0.742
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) SM_Pos PA_sm_
## SM_Pos       0.043
## PA_sm_averg -0.799 -0.421
## day_in_stdy -0.265  0.270 -0.069
## optimizer (nloptwrap) convergence code: 0 (OK)
## boundary (singular) fit: see ?isSingular
```

```r
## Negative affect & SM checks

PA_on_SM_count_day <- lmer(count_sm ~ SM_Pos + PA_sm_average + day_in_study + (1 + SM_Pos | pid), data =

summary(PA_on_SM_count_day)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: count_sm ~ SM_Pos + PA_sm_average + day_in_study + (1 + SM_Pos |
##     pid)
##    Data: day
##
## REML criterion at convergence: 4601.1
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.6971 -0.5490 -0.0870  0.3843  4.5542
##
## Random effects:
##  Groups   Name        Variance Std.Dev. Corr
##  pid      (Intercept) 7178.146 84.7239
##           SM_Pos         0.298  0.5459  1.00
##  Residual             4548.666 67.4438
## Number of obs: 403, groups:  pid, 19
##
## Fixed effects:
##               Estimate Std. Error       df t value Pr(>|t|)
## (Intercept)   157.0737    48.7237  11.2835   3.224  0.00786 **
## SM_Pos          0.7491     0.2316  31.9808   3.234  0.00283 **
## PA_sm_average  -1.0250     0.9199  15.4224  -1.114  0.28225
## day_in_study   -0.0460     0.4142 388.4018  -0.111  0.91162
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) SM_Pos PA_sm_
## SM_Pos       0.286
## PA_sm_averg -0.879 -0.280
## day_in_stdy -0.204  0.230  0.033
## optimizer (nloptwrap) convergence code: 0 (OK)
## boundary (singular) fit: see ?isSingular
```

```r
#-------------------------------------SM & same day Negative affect-----------------------------------


## Negative affect & minutes of SM

PA_on_SM_day_reverse <- lmer(SM_Pos ~ sum_sm + sm_average + day_in_study + (1 + sum_sm | pid), data = da

summary(PA_on_SM_day_reverse)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
```

```
## Formula: SM_Pos ~ sum_sm + sm_average + day_in_study + (1 + sum_sm | pid)
##    Data: day
##
## REML criterion at convergence: 3545.8
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.7024 -0.5914  0.0213  0.6081  3.8917
##
## Random effects:
##  Groups   Name        Variance  Std.Dev. Corr
##  pid      (Intercept) 6.822e+02 26.11819
##           sum_sm      2.590e-04  0.01609 -1.00
##  Residual             3.245e+02 18.01301
## Number of obs: 403, groups:  pid, 19
##
## Fixed effects:
##               Estimate Std. Error        df t value Pr(>|t|)
## (Intercept)   51.94552    9.91918  19.22826   5.237 4.52e-05 ***
## sum_sm         0.01938    0.01242   5.03097   1.561    0.179
## sm_average     0.06619    0.08071  17.62044   0.820    0.423
## day_in_study  -0.56982    0.10655 385.49188  -5.348 1.53e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) sum_sm sm_vrg
## sum_sm       0.279
## sm_average  -0.769 -0.683
## day_in_stdy -0.099  0.059 -0.068
## optimizer (nloptwrap) convergence code: 0 (OK)
## boundary (singular) fit: see ?isSingular
```

```
## Negative affect & SM checks

PA_on_SM_count_day_reverse <- lmer(SM_Pos ~ count_sm + count_average + day_in_study + (1 + count_sm | p

summary(PA_on_SM_count_day_reverse)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: SM_Pos ~ count_sm + count_average + day_in_study + (1 + count_sm |
##     pid)
##    Data: day
##
## REML criterion at convergence: 3534.6
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.7345 -0.5795  0.0376  0.6005  4.0210
##
## Random effects:
##  Groups   Name        Variance  Std.Dev.  Corr
##  pid      (Intercept) 6.648e+02 25.783787
```

```
##           count_sm    8.052e-05  0.008973 -1.00
##  Residual             3.147e+02 17.739659
## Number of obs: 403, groups:  pid, 19
##
## Fixed effects:
##                Estimate Std. Error        df t value Pr(>|t|)
## (Intercept)    59.19256    8.75487  24.36693   6.761 5.00e-07 ***
## count_sm        0.05102    0.01336 172.94795   3.818 0.000187 ***
## count_average  -0.04176    0.04541  19.97786  -0.920 0.368751
## day_in_study   -0.54243    0.10482 384.97599  -5.175 3.67e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) cnt_sm cnt_vr
## count_sm    -0.045
## count_averg -0.675 -0.378
## day_in_stdy -0.174  0.055 -0.007
## optimizer (nloptwrap) convergence code: 0 (OK)
## boundary (singular) fit: see ?isSingular
```

Positive Affect on SM - Lagged Models

```
#-----------------------------------------Pos affect & same day SM----------------------------------

## Negative affect & minutes of SM

PA_on_SM_day_lag <- lmer(sum_sm_lag ~ SM_Pos + PA_sm_average + day_in_study + (1 + SM_Pos | pid), data =

summary(PA_on_SM_day_lag)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: sum_sm_lag ~ SM_Pos + PA_sm_average + day_in_study + (1 + SM_Pos |
##     pid)
##    Data: day
##
## REML criterion at convergence: 4898.6
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.0830 -0.3436 -0.0695  0.2716  4.0159
##
## Random effects:
##  Groups   Name        Variance  Std.Dev. Corr
##  pid      (Intercept) 1.299e+04 113.9739
##           SM_Pos      6.092e-02   0.2468 -1.00
##  Residual             1.032e+04 101.6101
## Number of obs: 402, groups:  pid, 19
##
## Fixed effects:
##                Estimate Std. Error        df t value Pr(>|t|)
```

```
## (Intercept)    73.73176   57.60922   4.85982   1.280    0.258
## SM_Pos          0.17080    0.29393  94.04047   0.581    0.563
## PA_sm_average   0.45122    0.95315   7.53723   0.473    0.649
## day_in_study    0.09287    0.62033 395.02735   0.150    0.881
##
## Correlation of Fixed Effects:
##             (Intr) SM_Pos PA_sm_
## SM_Pos      -0.173
## PA_sm_averg -0.820 -0.243
## day_in_stdy -0.135  0.241 -0.093
## optimizer (nloptwrap) convergence code: 0 (OK)
## boundary (singular) fit: see ?isSingular
```

```
## Negative affect & SM checks

PA_on_SM_count_day_lag <- lmer(count_sm_lag ~ SM_Pos + PA_sm_average + day_in_study + (1 + SM_Pos | pid)

summary(PA_on_SM_count_day_lag)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: count_sm_lag ~ SM_Pos + PA_sm_average + day_in_study + (1 + SM_Pos |
##     pid)
##    Data: day
##
## REML criterion at convergence: 4665.5
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -6.2130 -0.4830 -0.0849  0.3309  4.0494
##
## Random effects:
##  Groups   Name        Variance Std.Dev. Corr
##  pid      (Intercept) 5518.459 74.2863
##           SM_Pos         0.361  0.6008  1.00
##  Residual             5580.105 74.7001
## Number of obs: 402, groups:  pid, 19
##
## Fixed effects:
##                Estimate Std. Error        df t value Pr(>|t|)
## (Intercept)   151.49990   44.66506  10.40514   3.392  0.00649 **
## SM_Pos          0.38207    0.25662  33.08449   1.489  0.14599
## PA_sm_average  -0.67928    0.86408  15.24904  -0.786  0.44384
## day_in_study    0.08558    0.45902 388.69736   0.186  0.85220
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) SM_Pos PA_sm_
## SM_Pos       0.263
## PA_sm_averg -0.870 -0.304
## day_in_stdy -0.226  0.230  0.017
## optimizer (nloptwrap) convergence code: 0 (OK)
## boundary (singular) fit: see ?isSingular
```

```
#-----------------------------------SM & same day Negative affect-----------------------------------


## Negative affect & minutes of SM

PA_on_SM_day_reverse_lag <- lmer(SM_Pos_lag ~ sum_sm + sm_average + day_in_study + (1 + sum_sm | pid), d

summary(PA_on_SM_day_reverse_lag)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: SM_Pos_lag ~ sum_sm + sm_average + day_in_study + (1 + sum_sm |
##     pid)
##    Data: day
##
## REML criterion at convergence: 3553.7
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.6722 -0.5716  0.0399  0.5984  3.9385
##
## Random effects:
##  Groups   Name        Variance  Std.Dev.  Corr
##  pid      (Intercept) 7.203e+02 26.838252
##           sum_sm      2.064e-05  0.004543 -1.00
##  Residual             3.292e+02 18.143961
## Number of obs: 403, groups:  pid, 19
##
## Fixed effects:
##                Estimate Std. Error         df t value Pr(>|t|)
## (Intercept)   53.554809  11.308408  16.220407   4.736 0.000216 ***
## sum_sm         0.003360   0.009539  11.881418   0.352 0.730840
## sm_average     0.080191   0.091982  16.650604   0.872 0.395710
## day_in_study  -0.603900   0.108312 383.975765  -5.576 4.66e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) sum_sm sm_vrg
## sum_sm       0.120
## sm_average  -0.815 -0.336
## day_in_stdy -0.107  0.120 -0.055
## optimizer (nloptwrap) convergence code: 0 (OK)
## boundary (singular) fit: see ?isSingular
```

```
## Negative affect & SM checks

PA_on_SM_count_day_reverse_lag <- lmer(SM_Pos_lag ~ count_sm + count_average + day_in_study + (1 + count

summary(PA_on_SM_count_day_reverse_lag)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
```

```
## Formula:
## SM_Pos_lag ~ count_sm + count_average + day_in_study + (1 + count_sm |
##     pid)
##    Data: day
##
## REML criterion at convergence: 3553.5
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.6882 -0.5732  0.0495  0.5846  3.9256
##
## Random effects:
##  Groups   Name        Variance  Std.Dev. Corr
##  pid      (Intercept) 6.768e+02 26.01446
##           count_sm    3.164e-04  0.01779 -0.01
##  Residual             3.272e+02 18.08975
## Number of obs: 403, groups:  pid, 19
##
## Fixed effects:
##                Estimate Std. Error        df t value Pr(>|t|)
## (Intercept)    62.05865    9.47565  17.74075   6.549 4.01e-06 ***
## count_sm        0.01710    0.01365   3.51559   1.252    0.287
## count_average  -0.01813    0.05165  19.50414  -0.351    0.729
## day_in_study   -0.58000    0.10861 384.72325  -5.340 1.59e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) cnt_sm cnt_vr
## count_sm    -0.051
## count_averg -0.720 -0.192
## day_in_stdy -0.182  0.136 -0.021
## optimizer (nloptwrap) convergence code: 0 (OK)
## Model failed to converge with max|grad| = 0.602579 (tol = 0.002, component 1)
## Model is nearly unidentifiable: very large eigenvalue
##  - Rescale variables?
```

Negative Affect on SM - Within-Day Models

```
#-----------------------------------------Neg affect & same day SM----------------------------------

## Negative affect & minutes of SM

NA_on_SM_day <- lmer(sum_sm ~ SM_Neg + NA_sm_average + day_in_study + (1 + SM_Neg | pid), data = day)

summary(NA_on_SM_day)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: sum_sm ~ SM_Neg + NA_sm_average + day_in_study + (1 + SM_Neg |
##     pid)
##    Data: day
```

```
##
## REML criterion at convergence: 3353
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.8792 -0.4671 -0.1161  0.3793  6.8861
##
## Random effects:
##  Groups   Name        Variance  Std.Dev. Corr
##  pid      (Intercept) 4960.9923 70.434
##           SM_Neg         0.1529  0.391   -1.00
##  Residual             4709.9550 68.629
## Number of obs: 294, groups:  pid, 18
##
## Fixed effects:
##                 Estimate Std. Error         df t value Pr(>|t|)
## (Intercept)   114.753767  25.218027  19.492142   4.550 0.000206 ***
## SM_Neg          0.211283   0.301501  12.808998   0.701 0.495980
## NA_sm_average   0.009843   1.358969  15.054490   0.007 0.994316
## day_in_study   -0.912261   0.491314 281.818181  -1.857 0.064386 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) SM_Neg NA_sm_
## SM_Neg      -0.010
## NA_sm_averg -0.641 -0.517
## day_in_stdy -0.242  0.125 -0.088
## optimizer (nloptwrap) convergence code: 0 (OK)
## boundary (singular) fit: see ?isSingular
```

```
## Negative affect & SM checks

NA_on_SM_count_day <- lmer(count_sm ~ SM_Neg + NA_sm_average + day_in_study + (1 + SM_Neg | pid), data =

summary(NA_on_SM_count_day)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: count_sm ~ SM_Neg + NA_sm_average + day_in_study + (1 + SM_Neg |
##     pid)
##    Data: day
##
## REML criterion at convergence: 3374.5
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.5237 -0.6307 -0.1094  0.4294  4.4378
##
## Random effects:
##  Groups   Name        Variance  Std.Dev. Corr
##  pid      (Intercept) 1.835e+04 135.4799
##           SM_Neg      2.045e-01   0.4523 1.00
##  Residual             4.685e+03  68.4472
```

```
## Number of obs: 294, groups:  pid, 18
##
## Fixed effects:
##               Estimate Std. Error       df t value Pr(>|t|)
## (Intercept)   207.1813    47.1815  15.3546   4.391 0.000499 ***
## SM_Neg          0.3277     0.3101   5.6842   1.057 0.333365
## NA_sm_average  -3.8785     2.6110  11.1201  -1.485 0.165211
## day_in_study   -0.7489     0.4933 274.5579  -1.518 0.130139
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) SM_Neg NA_sm_
## SM_Neg      -0.053
## NA_sm_averg -0.704  0.285
## day_in_stdy -0.156  0.158 -0.013
## optimizer (nloptwrap) convergence code: 0 (OK)
## boundary (singular) fit: see ?isSingular
```

```
#-----------------------------------SM & same day Negative affect-------------------------------------


## Negative affect & minutes of SM

NA_on_SM_day_reverse <- lmer(SM_Neg ~ sum_sm + sm_average + day_in_study + (1 + sum_sm | pid), data = da

summary(NA_on_SM_day_reverse)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: SM_Neg ~ sum_sm + sm_average + day_in_study + (1 + sum_sm | pid)
##    Data: day
##
## REML criterion at convergence: 2494.3
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.6151 -0.4527 -0.0980  0.1991  4.5713
##
## Random effects:
##  Groups   Name        Variance  Std.Dev. Corr
##  pid      (Intercept) 2.913e+02 17.06780
##           sum_sm      7.295e-04  0.02701 1.00
##  Residual             2.308e+02 15.19296
## Number of obs: 294, groups:  pid, 18
##
## Fixed effects:
##                Estimate Std. Error         df t value Pr(>|t|)
## (Intercept)   10.036045   7.931171   1.537024   1.265   0.3642
## sum_sm         0.009463   0.016083   8.791879   0.588   0.5711
## sm_average     0.058679   0.059458   1.469223   0.987   0.4581
## day_in_study  -0.268930   0.108275 280.701527  -2.484   0.0136 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
## Correlation of Fixed Effects:
##             (Intr) sum_sm sm_vrg
## sum_sm      -0.172
## sm_average  -0.800  0.245
## day_in_stdy -0.229  0.120  0.009
## optimizer (nloptwrap) convergence code: 0 (OK)
## boundary (singular) fit: see ?isSingular
```

```
## Negative affect & SM checks

NA_on_SM_count_day_reverse <- lmer(SM_Neg ~ count_sm + count_average + day_in_study + (1 + count_sm | p

summary(NA_on_SM_count_day_reverse)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: SM_Neg ~ count_sm + count_average + day_in_study + (1 + count_sm |
##     pid)
##    Data: day
##
## REML criterion at convergence: 2488.2
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.5332 -0.4538 -0.1126  0.2159  4.7512
##
## Random effects:
##  Groups   Name        Variance  Std.Dev. Corr
##  pid      (Intercept) 1.462e+02 12.09155
##           count_sm    4.554e-04  0.02134 1.00
##  Residual             2.318e+02 15.22598
## Number of obs: 294, groups:  pid, 18
##
## Fixed effects:
##                Estimate Std. Error        df t value Pr(>|t|)
## (Intercept)    18.33354    5.68239   9.87653   3.226  0.00922 **
## count_sm        0.01614    0.01452  31.58628   1.111  0.27483
## count_average  -0.02595    0.03589  13.98373  -0.723  0.48154
## day_in_study   -0.26071    0.10781 279.79783  -2.418  0.01623 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) cnt_sm cnt_vr
## count_sm     0.018
## count_averg -0.719 -0.205
## day_in_stdy -0.244  0.120 -0.093
## optimizer (nloptwrap) convergence code: 0 (OK)
## Model failed to converge with max|grad| = 4.44534 (tol = 0.002, component 1)
## Model is nearly unidentifiable: very large eigenvalue
##  - Rescale variables?
```

Negative Affect on SM - Lagged Models

```
#-----------------------------------------Neg affect predicting next day SM-------------------------

## Negative affect & minutes of SM

NA_on_SM <- lmer(sum_sm_lag ~ SM_Neg + NA_sm_average + day_in_study + (1 + SM_Neg | pid), data = day)

summary(NA_on_SM)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: sum_sm_lag ~ SM_Neg + NA_sm_average + day_in_study + (1 + SM_Neg |
##     pid)
##    Data: day
##
## REML criterion at convergence: 3294.7
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.6479 -0.5500 -0.0980  0.4933  5.1650
##
## Random effects:
##  Groups   Name        Variance Std.Dev. Corr
##  pid      (Intercept) 8400.53  91.654
##           SM_Neg        15.49   3.936   -0.79
##  Residual             3407.84  58.377
## Number of obs: 294, groups:  pid, 18
##
## Fixed effects:
##                Estimate Std. Error        df t value Pr(>|t|)
## (Intercept)   127.20039   29.52258  19.57701   4.309 0.000357 ***
## SM_Neg         -0.42573    1.11659  13.45361  -0.381 0.708953
## NA_sm_average   0.07509    1.45803  17.91435   0.052 0.959495
## day_in_study   -1.26028    0.42648 268.16610  -2.955 0.003404 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) SM_Neg NA_sm_
## SM_Neg      -0.352
## NA_sm_averg -0.601 -0.301
## day_in_stdy -0.197  0.058 -0.058
## optimizer (nloptwrap) convergence code: 0 (OK)
## Model failed to converge with max|grad| = 0.00266897 (tol = 0.002, component 1)
```

```
## Negative affect & SM checks

NA_on_SM_count <- lmer(count_sm_lag ~ SM_Neg + NA_sm_average + day_in_study + (1 + SM_Neg | pid), data =

summary(NA_on_SM_count)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
```

```
## lmerModLmerTest]
## Formula: count_sm_lag ~ SM_Neg + NA_sm_average + day_in_study + (1 + SM_Neg |
##     pid)
##    Data: day
##
## REML criterion at convergence: 3382.4
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.4023 -0.5835 -0.0762  0.3885  4.1038
##
## Random effects:
##  Groups   Name        Variance  Std.Dev. Corr
##  pid      (Intercept) 2.572e+04 160.365
##           SM_Neg      7.022e-01   0.838  -0.34
##  Residual             4.676e+03  68.380
## Number of obs: 294, groups:  pid, 18
##
## Fixed effects:
##               Estimate Std. Error       df t value Pr(>|t|)
## (Intercept)   196.6680    55.8334  15.9230   3.522  0.00284 **
## SM_Neg         -0.2085     0.4025   5.8540  -0.518  0.62352
## NA_sm_average  -1.5788     3.1760  13.6792  -0.497  0.62700
## day_in_study   -1.6723     0.4962 273.7203  -3.370  0.00086 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) SM_Neg NA_sm_
## SM_Neg      -0.046
## NA_sm_averg -0.712 -0.187
## day_in_stdy -0.114  0.121 -0.034
```

```
#-----------------------------------SM predicting next day Negative affect-----------------------------


## SM minutes on Negative Affect

NA_on_SM_lag <- lmer(SM_Neg_lag ~ sum_sm + sm_average + day_in_study + (1 + sum_sm | pid), data = day)

summary(NA_on_SM_lag)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: SM_Neg_lag ~ sum_sm + sm_average + day_in_study + (1 + sum_sm |
##     pid)
##    Data: day
##
## REML criterion at convergence: 2495.2
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.8142 -0.4520 -0.1196  0.2033  4.6207
##
```

```
## Random effects:
##  Groups   Name        Variance  Std.Dev. Corr
##  pid      (Intercept) 2.838e+02 16.84578
##           sum_sm      8.808e-04  0.02968 -0.45
##  Residual             2.353e+02 15.33960
## Number of obs: 294, groups:  pid, 18
##
## Fixed effects:
##               Estimate Std. Error        df t value Pr(>|t|)
## (Intercept)   15.70288    7.41466   7.84499   2.118  0.06773 .
## sum_sm        -0.01033    0.01867   2.63157  -0.553  0.62361
## sm_average     0.03107    0.05905   8.42624   0.526  0.61226
## day_in_study  -0.31011    0.11185 274.73572  -2.773  0.00594 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) sum_sm sm_vrg
## sum_sm      -0.093
## sm_average  -0.748 -0.303
## day_in_stdy -0.216  0.178 -0.079
## optimizer (nloptwrap) convergence code: 0 (OK)
## Model failed to converge with max|grad| = 3.90708 (tol = 0.002, component 1)
## Model is nearly unidentifiable: very large eigenvalue
##  - Rescale variables?
```

```
## Negative affect & SM checks

NA_on_SM_count_lag <- lmer(SM_Neg_lag ~ count_sm + count_average + day_in_study + (1 + count_sm | pid),

summary(NA_on_SM_count_lag)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula:
## SM_Neg_lag ~ count_sm + count_average + day_in_study + (1 + count_sm |
##     pid)
##    Data: day
##
## REML criterion at convergence: 2487.7
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.4716 -0.4896 -0.1200  0.1920  4.7778
##
## Random effects:
##  Groups   Name        Variance  Std.Dev. Corr
##  pid      (Intercept) 2.939e+02 17.14349
##           count_sm    2.956e-03  0.05437 -0.43
##  Residual             2.222e+02 14.90625
## Number of obs: 294, groups:  pid, 18
##
## Fixed effects:
##                 Estimate Std. Error         df t value Pr(>|t|)
```

```
## (Intercept)    1.901e+01  7.025e+00  9.418e+00   2.707   0.0232 *
## count_sm      -5.923e-04  2.170e-02  1.054e+01  -0.027   0.9787
## count_average -1.104e-02  4.506e-02  1.321e+01  -0.245   0.8102
## day_in_study  -2.599e-01  1.094e-01  2.843e+02  -2.376   0.0182 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) cnt_sm cnt_vr
## count_sm    -0.100
## count_averg -0.692 -0.347
## day_in_stdy -0.228  0.099 -0.077
## optimizer (nloptwrap) convergence code: 0 (OK)
## Model failed to converge with max|grad| = 1.707 (tol = 0.002, component 1)
## Model is nearly unidentifiable: very large eigenvalue
##  - Rescale variables?
```