Negative Affect and SM Use - SMASH Study

Melissa Dreier

3/1/2022

Negative Mood - ABCT Poster

```
## Negative mood - sumduration

NA_sm_sum <- lmer(NAf_pm ~ sum_sm + NAf_am + day_in_study + (1 + sum_sm | 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 + day_in_study + (1 + sum_sm | pid)
##    Data: day
##
## REML criterion at convergence: 8787.3
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.5145 -0.4502 -0.1220  0.0586  4.3126
##
## Random effects:
##  Groups   Name        Variance  Std.Dev. Corr
##  pid      (Intercept) 2.156e+04 146.8397
##           sum_sm      5.716e-01   0.7561 1.00
##  Residual             2.063e+05 454.1533
## Number of obs: 581, groups:  pid, 19
##
## Fixed effects:
##                Estimate Std. Error         df t value Pr(>|t|)
## (Intercept)  198.032243  60.097732  67.871321   3.295 0.001566 **
## sum_sm         0.363588   0.337937  11.334612   1.076 0.304337
## NAf_am         0.140122   0.039872 554.546919   3.514 0.000477 ***
## day_in_study  -0.001461   2.053268 567.032108  -0.001 0.999432
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) sum_sm NAf_am
## sum_sm      -0.102
## NAf_am      -0.266 -0.064
```

```
## day_in_stdy -0.607  0.062  0.163
## optimizer (nloptwrap) convergence code: 0 (OK)
## boundary (singular) fit: see ?isSingular
```

```
## Negative mood - counts

NA_sm_count <- lmer(NAf_pm ~ count_sm + NAf_am + day_in_study + (1 + count_sm | 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 + day_in_study + (1 + count_sm | pid)
##    Data: day
##
## REML criterion at convergence: 8772.6
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.7286 -0.4367 -0.1127  0.0422  4.2738
##
## Random effects:
##  Groups   Name        Variance  Std.Dev. Corr
##  pid      (Intercept) 2.138e+04 146.2132
##           count_sm    5.620e-01   0.7497 1.00
##  Residual             2.000e+05 447.2214
## Number of obs: 581, groups:  pid, 19
##
## Fixed effects:
##               Estimate Std. Error        df t value Pr(>|t|)
## (Intercept)  119.09439   63.80821  25.21503   1.866  0.07365 .
## count_sm       0.87118    0.33983  14.75694   2.564  0.02182 *
## NAf_am         0.12169    0.03948 536.28446   3.082  0.00216 **
## day_in_study   0.19735    2.03802 561.18092   0.097  0.92289
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) cnt_sm NAf_am
## count_sm    -0.213
## NAf_am      -0.242 -0.044
## day_in_stdy -0.603  0.108  0.170
## optimizer (nloptwrap) convergence code: 0 (OK)
## boundary (singular) fit: see ?isSingular
```

ABCT Symposium Analyses

Negative Affect on SM - Within-Day Models

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

```r
## 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
```

```
#-------------------------------------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
```

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 ~ SM_Neg_lag + NA_sm_average + day_in_study + (1 + SM_Neg_lag | pid), data = da

summary(NA_on_SM)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula:
## sum_sm ~ SM_Neg_lag + NA_sm_average + day_in_study + (1 + SM_Neg_lag |
##     pid)
##    Data: day
##
## REML criterion at convergence: 3367.2
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.7767 -0.4339 -0.0651  0.3165  5.8492
##
## Random effects:
##  Groups   Name        Variance  Std.Dev. Corr
##  pid      (Intercept) 5.230e+03 72.32078
##           SM_Neg_lag  3.939e-03  0.06276 -1.00
```

```
##  Residual             4.918e+03 70.12611
## Number of obs: 294, groups:  pid, 18
##
## Fixed effects:
##               Estimate Std. Error       df t value Pr(>|t|)
## (Intercept)   129.3437    27.5220  18.2738   4.700 0.000172 ***
## SM_Neg_lag     -0.1689     0.2725 139.2044  -0.620 0.536330
## NA_sm_average   0.2980     1.5247  15.8796   0.195 0.847511
## day_in_study   -1.5168     0.5027 281.3905  -3.017 0.002782 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) SM_Ng_ NA_sm_
## SM_Neg_lag  -0.031
## NA_sm_averg -0.683 -0.245
## day_in_stdy -0.263  0.155 -0.059
## optimizer (nloptwrap) convergence code: 0 (OK)
## boundary (singular) fit: see ?isSingular
```

```
## Negative affect & SM checks

NA_on_SM_count <- lmer(count_sm ~ SM_Neg_lag + NA_sm_average + day_in_study + (1 + SM_Neg_lag | pid), da

summary(NA_on_SM_count)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula:
## count_sm ~ SM_Neg_lag + NA_sm_average + day_in_study + (1 + SM_Neg_lag |
##     pid)
##    Data: day
##
## REML criterion at convergence: 3390.2
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.8371 -0.5907 -0.1106  0.4494  3.7609
##
## Random effects:
##  Groups   Name        Variance  Std.Dev. Corr
##  pid      (Intercept) 44930.318 211.968
##           SM_Neg_lag      1.227   1.108  -0.29
##  Residual              4613.356  67.922
## Number of obs: 294, groups:  pid, 18
##
## Fixed effects:
##               Estimate Std. Error       df t value Pr(>|t|)
## (Intercept)   249.6557    73.2784  15.6266   3.407 0.003711 **
## SM_Neg_lag     -0.3065     0.4651   9.4848  -0.659 0.525494
## NA_sm_average  -3.8494     4.1850  13.8719  -0.920 0.373395
## day_in_study   -1.7532     0.4945 272.4695  -3.545 0.000462 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
## Correlation of Fixed Effects:
##             (Intr) SM_Ng_ NA_sm_
## SM_Neg_lag  -0.049
## NA_sm_averg -0.717 -0.152
## day_in_stdy -0.093  0.112 -0.026
## optimizer (nloptwrap) convergence code: 0 (OK)
## Model failed to converge with max|grad| = 0.0021609 (tol = 0.002, component 1)
```

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


## Negative affect & minutes of SM

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

summary(NA_on_SM_lag)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: SM_Neg ~ sum_sm_lag + sm_average + day_in_study + (1 + sum_sm_lag |
##     pid)
##    Data: day
##
## REML criterion at convergence: 2492.8
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.7626 -0.4427 -0.1177  0.1870  4.7252
##
## Random effects:
##  Groups   Name        Variance  Std.Dev. Corr
##  pid      (Intercept) 1.900e+02 13.785
##           sum_sm_lag  1.024e-03  0.032   -0.14
##  Residual             2.360e+02 15.362
## Number of obs: 294, groups:  pid, 18
##
## Fixed effects:
##                Estimate Std. Error         df t value Pr(>|t|)
## (Intercept)   1.477e+01  6.512e+00  1.194e+01   2.268   0.0427 *
## sum_sm_lag    4.477e-04  1.758e-02  9.391e+00   0.025   0.9802
## sm_average    2.469e-02  5.136e-02  1.193e+01   0.481   0.6394
## day_in_study -2.700e-01  1.103e-01  2.784e+02  -2.449   0.0149 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) sm_sm_ sm_vrg
## sum_sm_lag  -0.129
## sm_average  -0.768 -0.158
## day_in_stdy -0.232  0.095 -0.052
## optimizer (nloptwrap) convergence code: 0 (OK)
## Model failed to converge with max|grad| = 2.0971 (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 ~ count_sm_lag + count_average + day_in_study + (1 + count_sm_lag | p

summary(NA_on_SM_count_lag)
```

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula:
## SM_Neg ~ count_sm_lag + count_average + day_in_study + (1 + count_sm_lag |
##     pid)
##    Data: day
##
## REML criterion at convergence: 2492.6
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.9037 -0.4406 -0.1349  0.2359  4.6237
##
## Random effects:
##  Groups   Name         Variance  Std.Dev. Corr
##  pid      (Intercept)  1.087e+02 10.42730
##           count_sm_lag 2.188e-04  0.01479 1.00
##  Residual              2.402e+02 15.49735
## Number of obs: 294, groups:  pid, 18
##
## Fixed effects:
##                 Estimate Std. Error         df t value Pr(>|t|)
## (Intercept)    1.871e+01  5.043e+00  1.993e+01   3.710  0.00139 **
## count_sm_lag  -9.309e-03  1.403e-02  6.832e+01  -0.663  0.50928
## count_average -3.257e-04  3.252e-02  2.782e+01  -0.010  0.99208
## day_in_study  -2.677e-01  1.106e-01  2.810e+02  -2.421  0.01611 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) cnt_s_ cnt_vr
## count_sm_lg  0.010
## count_averg -0.678 -0.345
## day_in_stdy -0.292  0.195 -0.122
## optimizer (nloptwrap) convergence code: 0 (OK)
## boundary (singular) fit: see ?isSingular
```