Table S-1. *Results of multivariate logistic regressions for cross-influence of each isolation type and smoking status.*

| Variables | Model 1 | | | | Model 2 | | |  | Model 3 | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Cigarette |  | Avoided |  | Cigarette |  | Withdrawn |  | Cigarette |  | External |  |
| *Level 1: Within Person* | | |  |  |  |  |  |  |  |  |  |  |
| *Baseline effects* | |  |  |  |  |  |  |  |  |  |  |  |
| Cigarette Use t-1 (ρ) | 1.531  (0.100) | \*\*\* | -0.260  (0.168) |  | 1.744  (0.097) | \*\*\* | 0.243  (0.142) | + | 1.154  (0.074) | \*\*\* | -0.143  (0.050) | \*\* |
| Avoided t-1 (ρ) | -0.242  (0.129) | + | 1.319  (0.082) | \*\*\* |  |  |  |  |  |  |  |  |
| Withdrawn t-1 (ρ) |  |  |  |  | 0.080  (0.113) |  | 0.707  (0.099) | \*\*\* |  |  |  |  |
| External t-1 (ρ) |  |  |  |  |  |  |  |  | 0.080  (0.053) |  | -0.440  (0.041) | \*\*\* |
| Grade | 0.772  (0.037) | \*\*\* | 0.046  (0.033) |  | 0.678  (0.035) | \*\*\* | -0.025  (0.033) |  | 0.560  (0.023) | \*\*\* | -0.079  (0.013) | \*\*\* |
| *High School Effects (ref=Middle School)* | | | |  |  |  |  |  |  |  |  |  |
| HSxCigarette t-1 (ρ) | -0.076  (0.112) |  | 0.486  (0.178) | \*\* | -0.131  (0.108) |  | 0.068  (0.152) |  |  |  |  |  |
| HSxAvoided t-1 (ρ) | -0.006  (0.145) |  | -0.453  (0.093) | \*\*\* |  |  |  |  |  |  |  |  |
| HSxWithdrawn t-1 (ρ) |  |  |  |  | -0.122  (0.127) |  | -0.156  (0.112) |  |  |  |  |  |
| High School | 0.192  (0.062) | \*\* | 0.181  (0.064) | \*\* | 0.257  (0.060) | \*\*\* | 0.241  (0.065) | \*\*\* |  |  |  |  |
| HSxGrade | -0.307  (0.040) | \*\*\* | 0.302  (0.038) | \*\*\* | -0.244  (0.038) | \*\*\* | 0.494  (0.038) | \*\*\* |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| *Level 2: Between Person Effects* | | |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| Intercept | 2.153  (0.157) | \*\*\* | 2.531  (0.094) | \*\*\* | 0.801  (0.104) | \*\*\* | 2.318  (0.118) | \*\*\* | 2.211  (0.140) | \*\*\* | -0.149  (0.090) | \*\*\* |
| Initial Obs  Cigarette t=0 | 2.405  (0.092) | \*\*\* |  |  | 1.970  (0.083) | \*\*\* |  |  | 3.167  (0.112) | \*\*\* |  |  |
| Initial Obs  Avoided t=0 |  |  | 1.157  (0.060) | \*\*\* |  |  |  |  |  |  |  |  |
| Initial Obs  Withdrawn t=0 |  |  |  |  |  |  | 1.028  (0.064) | \*\*\* |  |  |  |  |
| Initial Obs  External t=0 |  |  |  |  |  |  |  |  |  |  | 1.281  (0.045) | \*\*\* |
| Initial Obs  High School t=0 | 0.335  (0.234) |  | 0.261  (0.203) |  | 0.741  (0.226) | \*\* | -0.437  (0.205) | \* |  |  |  |  |
| Proportion Obs  In HS | 0.621  (0.363) | + | -0.154  (0.309) |  | -1.453  (0.333) | \*\*\* | 0.255  (0.338) |  |  |  |  |  |
| Grade | 0.342  (0.038) | \*\*\* | 0.262  (0.033) | \*\*\* | 0.321  (0.036) | \*\*\* | 0.414  (0.033) | \*\*\* | 0.435  (0.065) | \*\*\* | -0.069  (0.042) | + |
| Mean Grade | -0.702  (0.090) | \*\*\* | -0.256  (0.083) | \*\* | -0.004  (0.085) |  | -0.426  (0.088) | \*\*\* | -1.185  (0.075) | \*\*\* | 0.100  (0.042) | \* |
| Initial  HSxGrade t=0 | 0.050  (0.141) |  | -0.067  (0.121) |  | -0.126  (0.135) |  | -0.055  (0.119) |  |  |  |  |  |
| Proportion  HSxGrade = 1 | -0.591  (0.148) | \*\*\* | -0.165  (0.140) |  | -0.976  (0.140) | \*\*\* | -0.080  (0.142) |  |  |  |  |  |
| Male | -0.050  (0.044) |  | 0.578  (0.038) | \*\*\* | -0.137  (0.042) | \*\* | 0.997  (0.039) | \*\*\* | 0.110  (0.055) | \* | 0.212  (0.036) | \*\*\* |
| White | 0.319  (0.062) | \*\*\* | -0.360  (0.049) | \*\*\* | 0.163  (0.056) | \*\* | -0.577  (0.051) | \*\*\* | 0.348  (0.078) | \*\*\* | 0.080  (0.046) |  |
| Cohort | -0.226  (0.044) | \*\*\* | -0.080  (0.038) | \* | -0.250  (0.042) | \*\*\* | -0.102  (0.039) | \*\* | -0.103  (0.056) | + | -0.146  (0.035) | \*\*\* |
| Treatment Group | -0.006  (0.044) |  | 0.005  (0.038) |  | -0.028  (0.042) |  | -0.134  (0.039) | \*\* | -0.014  (0.055) |  | -0.208  (0.035) | \*\*\* |
| *Variance of Between-Person Effects* | | | |  |  |  |  |  |  |  |  |  |
| Variance | 3.056  (0.104) | \*\*\* | 1.502  (0.052) | \*\*\* | 2.585  (0.077) | \*\*\* | 1.911  (0.065) | \*\*\* | 3.796  (0.216) | \*\*\* | 1.454  (0.077) | \*\*\* |
| Covariance  (with Cigarette) |  |  | 0.338  (0.052) | \*\*\* |  |  | 0.409  (0.049) | \*\*\* |  |  | 0.221  (0.060) | \*\*\* |
| Observations | 63410 | | |  | 63410 | | |  | 33353 | | |  |
| BIC | 961069 | | |  | 960957 | | |  | 364827 | | |  |
| LL | -480098 | | |  | -480053 | | |  | -182244 | | |  |

Note: + p < 0.1 \* p < 0.05; \*\* p < .01; \*\*\* p < .001.

| Table S-2. *Full Results of multivariate logistic regression (Model 4).* | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variables | Cigarette |  | Avoided |  | Withdrawn |  | External |  |
| *Within Person* | | |  |  |  |  |  |  |
| Cigarette t-1 (ρ) | 1.282  (0.072) | \*\*\* | 0.352  (0.070) | \*\*\* | 0.383  (0.068) | \*\*\* | -0.128  (0.051) | \* |
| Avoided t-1 (ρ) | -0.083  (0.078) |  | 0.607  (0.075) | \*\*\* | 0.041  (0.070) |  | -0.068  (0.056) |  |
| Withdrawn t-1 (ρ) | 0.036  (0.077) |  | 0.119  (0.069) | + | 0.355  (0.076) | \*\*\* | 0.145  (0.053) | \*\* |
| External t-1 (ρ) | -0.092  (0.053) | + | -0.067  (0.052) |  | -0.188  (0.050) | \*\*\* | -0.458  (0.041) | \*\*\* |
| Grade | 0.523  (0.021) | \*\*\* | 0.405  (0.021) | \*\*\* | 0.551  (0.025) | \*\*\* | -0.075  (0.014) | \*\*\* |
| *Between Person* | |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| Intercept | 2.181  (0.116) | \*\*\* | -0.288  (0.090) | \*\* | 2.415  (0.112) | \*\*\* | 1.893  (0.126) | \*\*\* |
| Initial Obs  Cigarette t=0 | 2.887  (0.105) | \*\*\* |  |  |  |  |  |  |
| Initial Obs  Avoided t=0 |  |  | 1.661  (0.081) | \*\*\* |  |  |  |  |
| Initial Obs  Withdrawn t=0 |  |  |  |  | 1.536  (0.083) | \*\*\* |  |  |
| Initial Obs  External t=0 |  |  |  |  |  |  | 1.176  (0.045) | \*\*\* |
| Initial Obs  Grade t=0 | 0.418  (0.059) | \*\*\* | 0.496  (0.056) | \*\*\* | 0.651  (0.060) | \*\*\* | -0.065  (0.043) |  |
| Mean Grade | -1.084  (0.060) | \*\*\* | -0.691  (0.055) | \*\*\* | -0.927  (0.081) | \*\*\* | 0.054  (0.042) |  |
| Male | 0.103  (0.053) | + | 0.576  (0.050) | \*\*\* | 0.988  (0.050) | \*\*\* | -0.227  (0.036) | \*\*\* |
| White | 0.330  (0.073) | \*\*\* | -0.518  (0.068) | \*\*\* | -0.605  (0.070) | \*\*\* | 0.086  (0.049) | + |
| Cohort | -0.103  (0.052) | \* | -0.024  (0.050) |  | -0.073  (0.048) |  | -0.151  (0.036) | \*\*\* |
| Treatment Group | -0.023  (0.052) |  | -0.034  (0.050) |  | -0.193  (0.050) | \*\*\* | -0.216  (0.035) | \*\*\* |
| *Between-Person Covariance* | | |  |  |  |  |  |  |
| Cigarette | 3.261  (0.192) | \*\*\* | 0.127  (0.057) |  | 0.466  (0.084) | \*\*\* | 0.199  (0.061) | \*\* |
| Avoided |  |  | 1.533  (0.075) | \*\*\* | 1.456  (0.082) | \*\*\* | -0.214  (0.052) | \*\*\* |
| Withdrawn |  |  |  |  | 2.253  (0.139) | \*\*\* | -1.226  (0.064) | \*\*\* |
| External |  |  |  |  |  |  | 2.522  (0.173) | \*\*\* |

Note: N=33,353; BIC=459,724. Gray shading indicates parameters not estimated in Models 1-3. + p < 0.1 \* p < 0.05; \*\* p < .01; \*\*\* p < .001.

Table S-3: Comparison of effects estimated by ALT & Siena

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Within Person** | | | |
|  | Smoking | Avoided | Withdrawn | External |
| Smoking |  |  |  |  |
| Avoided |  |  |  |  |
| Withdrawn |  |  |  |  |
| External |  |  |  |  |
|  |  |  |  |  |
|  | **Between Person** | | | |
|  | Smoking | Avoided | Withdrawn | External |
| Smoking |  |  |  |  |
| Avoided |  |  |  |  |
| Withdrawn |  |  |  |  |
| External |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Possible with SAOM. |  | Intractable with current SAOM software. |  | No estimates available in current SAOM software. |  |

Note: Table design is consistent with dynamic relationships: rows measure smoking or isolation dimensions at a given time, and columns represent a subsequent (future) measure. All effects are estimated in the ALT in Model 4. Within-person effects are reported in Table 2 and Table S-2, with between-person effects and the associated covariance matrix reported only in Table S-2. More particularly, the within-person effects are the ρ effects constituting the first 4x4 matrix of the ALT table. The between-person relationship is the combination of the between-person intercept and the covariance matrix (reported as the upper-right triangular portion of a symmetrical matrix at the bottom of Table S-2). This covariance is easily converted to a correlation matrix by pre- and post- multiplying by the inverse of the variance (which are the diagonals). These provide the between-person correlations for individual propensities to exhibit the behaviors. For purposes of this table, we also assume that external orientation will be treated as a behavior parameter in the SAOM.