**Supplemental Materials**

**Analytic Approach**

To determine the extent to which changes in NSSI behavior related to suicidal ideation and suicide planning, bivariate latent growth modeling (Bollen & Curran, 2006; see Littlefield et al., 2009, for an applied example) was used. Occurrences of NSSI, suicidal ideation, and suicide planning frequency were modeled as count variables based on frequencies at each of the three

waves (see supplemental materials for more details). Given baseline measures assessed constructs over a prior year (rather than a 6-month interval), the baseline frequencies were divided by two (to be consistent with the 6-month time frames covered in the second and third waves of the study) and rounded to the nearest integer (since an assumption of count models is each observation is an integer value). Given the sparseness of the suicide attempt data (e.g., only 10 participants had a non-zero response at the 12-month follow-up), it was not feasible to model attempt in this analytic framework.

All latent growth models were estimated in Mplus version 8.0 (Muthén & Muthén, 1998-2017). Poisson, negative binomial, zero-inflated Poisson, and zero-inflated negative binomial

distributions were considered for the latent growth models. Selection of final models were based on feasibility (i.e., ability to obtain model convergence with no major warnings), model fit

comparisons (i.e., comparing AIC and BIC across models; contemporary fit indices such as CFI and RMSEA are not available for latent growth models based on count indicators), and the

statistical significance of dispersion parameters (which are estimated when assuming negative binomial distributions and relax the assumption that mean = variance inherent in a Poisson

distribution). Missing data were estimated using the robust maximum likelihood estimator (MLR) in all models. Mplus provides a chi-square test (for both the Pearson chi-square and the

likelihood ratio chi-square) against the null that the missing data mechanism is missing completely at random (MCAR; Graham, 2009). Notably, estimating missing data in these models

is still advised when certain assumptions (e.g., the data are MAR) are not met (see Graham, 2009).

After determining the distribution for the repeated count outcomes, random-intercept models were estimated for NSSI, suicidal ideation, and suicide planning, respectively.

Significant variance for the random intercepts suggests meaningful variability between participants in overall (i.e., across the three waves of assessment) frequencies of NSSI, suicidal

ideation, and suicide planning, respectively (Bollen & Curran, 2006; Curran et al., 2014). The fit of these models was then compared to models that included a random slope using chi-square

difference tests, AIC, and BIC. Linear change was assumed for all outcomes (i.e., slope loadings = 0, 1, 2 for baseline, 6-month, and 12-month assessments, respectively), since latent growth

modeling with three waves of count indicators cannot accommodate non-linear change (e.g., the inclusion of a random quadratic growth factor). The variance of the slope parameters was also

examined, since significant slope variance indicates meaningful between-person differences in within-person change (Bollen & Curran, 2006; Curran et al., 2014). After determining the number of growth factors to retain for each construct, two bivariate latent growth models (i.e., NSSI with suicidal ideation, NSSI with suicide planning) were estimated. The focus on these models involved the correlations between the growth factors across constructs (e.g., NSSI slope with suicidal ideation slope). Sensitivity analyses examined the impact of adjusting for a binary history of counseling variable and lifetime NSSI frequency (based on a reviewer request) on model estimates.

**Model Comparisons**

The maximum likelihood n for the respective univariate latent growth models of NSSI and suicide planning was 403; n = 401 for suicidal ideation. All latent growth models were estimated in Mplus version 8.0 (Muthén & Muthén, 1998-2017). Poisson, negative binomial, zero-inflated Poisson, and zero-inflated negative binomial distributions were considered for the latent growth models. Attempts to model zero-inflated latent growth models suggested this modeling approach was not feasible in these data (when assuming a Poisson distribution or a negative binomial distribution). That is, these models did not converge or presented serious warnings (e.g., noting non-positive definite solutions, indicating negative matrix determinant values of key matrices involved in these models). Given this, Poisson latent growth models (including intercept-only and intercept-slope models) were compared to negative binomial latent growth models, resulting in twelve comparisons (two fit indices [AIC and BIC] by three constructs [NSSI, suicidal ideation, suicide planning] by two models [intercept-only and intercept-slope]).

AICs and BICs were better (i.e., lower) in the negative binomial models across all twelve comparisons (see Supplemental Table 1). Further, of the 18 tests of dispersion parameters (three indicators [baseline, 6-month, 12-month] by three constructs by two models), 14 (~78%) were statistically significant (estimates not shown), which also suggested a negative binomial distribution is a better choice for these frequency data compared to a Poisson distribution. Thus, negative binomial latent growth models were estimated for NSSI, suicidal ideation, and suicide planning, respectively. Notably, the MCAR for all analyzed variables failed to reject the null of MCAR (based on both the Pearson Chi-Square and the Likelihood Ratio Chi-Square; all *p* values > .999). Missing data were estimated using the robust maximum likelihood estimator (MLR) in all models.

Intercept-only models were then compared to intercept-slope models for each construct. Across constructs, there was significant intercept variances (not shown) of the three respective intercept factors, indicating meaningful individual variability in overall (i.e., across the three waves of assessment) frequencies of NSSI, suicidal ideation, and suicide planning.

**Supplemental Table 1**

*AICs and BICs for Poisson vs. Negative Binomial Models*

|  |  |  |
| --- | --- | --- |
|  | AIC:  Poisson/Negative Binomial | BIC:  Poisson/Negative Binomial |
| NSSI: Intercept Only | 6824.62/4771.66 | 6832.62/4791.66 |
| NSSI: Intercept/Slope | 5907.35/4758.87 | 5927.35/4790.86 |
| SI: Intercept Only | 7451.38/4465.66 | 7459.37/4485.63 |
| SI: Intercept/Slope | 5542.18/4396.33 | 5562.15/4428.28 |
| SP: Intercept Only | 1451.91/1351.99 | 1459.91/1371.99 |
| SP: Intercept/Slope | 1380.08/1351.12 | 1400.08/1383.11 |

*Note.* NSSI = non-suicidal self-injury; SI = suicidal ideation; SP = suicidal planning.

A random slope was added to these three respective models. For NSSI and suicidal ideation, the models exhibited better fit in terms of lower AIC and BIC (see Supplemental Table 1 for the negative binomial models). Chi-square difference tests for NSSI (c2 Δ = 58.73, *df* = 3, *p* < .0001) and suicidal ideation (c 2 Δ = 121.02, *df* = 3, *p* < .0001) also suggested statistically significant better fit of the models that included a random slope (Pearson chi-squares are shown though the likelihood ratio chi-square comparisons yielded identical conclusions). Further, the respective slope variances (not shown) were significant for NSSI and suicidal ideation, indicating significant between-person differences in within-person changes in these constructs across time. Given these findings, models that included random intercepts and random slopes were retained for NSSI and suicidal ideation.

For suicide planning, the model that included the random slope had a nearly identical AIC as the intercept-only model (1351.12 vs. 1351.99) and a worse BIC (1383.11 vs. 1371.99; see Supplemental Table 1 for the negative binomial models). Further, the chi-square did not significantly improve compared to the intercept-only model. Indicative of issues with this model for this outcome, both the Pearson chi-square and likelihood ratio chi-square *increased* in the model that included the random slope (i.e., 271.86 vs. 369.87 for the Pearson chi-square; 123.81 vs. 124.11 for the likelihood ratio chi-square), despite this model having three fewer degrees of freedom compared to the intercept-only model (given three additional parameters were estimated to model the slope mean, slope variance, and the covariance between the random intercept and slope). Further, the latent slope failed to exhibit significant variance (i.e., .31, *p* = .46). Of additional concern, the standardized correlation between the random intercept and the random slope was high in magnitude (*r* = .60) but was not statistically significant (*p* = .23), which again reflects a lack of meaningful variance in the random slope. Thus, consistent with prior studies that failed to find significant improvement when including a random slope (e.g., see Curran et al., 2014, and their modeling of repeated assessments of depression), the intercept-only model was retained for suicide planning.

The mean of the latent slope of NSSI was negative and statistically significant (-.41, *p* < .0001), suggesting the frequency of NSSI declined across the study period. The mean of the latent slope of ideation was not significant.

**References**

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