**Fears of Positive and Negative Evaluation and their Within-Person Associations with Emotion Regulation in Adolescence: A Longitudinal Analysis**

Electronic Supplement

This electronic supplement contains detailed descriptions with respect to our data analytical procedures, including (1) building the main models, (2) imposing and comparing equality constraints over time, (3) a sensitivity analysis with a dataset from individuals that filled out our questionnaires at all time points, and (4) indirect comparisons of path coefficients across three models.

**Data Analysis**

***Building the RI-CLPM***

The building blocks of these models included: (1) the random intercepts, which were specified by creating a latent variable with the manifest scores at each measurement time point as its indicators and fixing the factor loadings to 1, and (2) the within-person components, which were created by specifying latent variables for each time point, fixing the factor loadings to 1 and constraining the error variance to 0. Through the inclusion of random intercepts, this model allowed for the decomposition of longitudinal data into stable, between-person differences and temporal, within-person dynamics. As trait-like differences were captured by the random intercepts, the estimated lagged effects related solely to fluctuations within persons. More specifically, correlations between random intercepts reflected associations between study variables at the between-person level, whereas cross-lagged paths indicated the extent to which within-person deviations from an individual’s mean score on a given variable led to subsequent within-person deviations from their mean score on another variable. Autoregressive paths across time points represented within-person carryover effects.

***Equality Constraints Over Time***

First, we imposed equality constraints over time for the autoregressive and the cross-lagged paths. Likelihood-ratio tests indicated a marginally worse model fit for the model with FPE. Nonetheless, due to the lack of precision in the unconstrained model’s estimations, as well as the fact that the constrained model demonstrated excellent fit, we opted to report the latter. It is important to note that the estimations in the unconstrained model produced effects similar to those in the constrained one, both in terms of significance and direction. This was further examined using robust maximum likelihood estimation. The constraints proved tenable for the models with FNE and social anxiety.

Additionally, the high attrition in our data led to problems concerning the estimation of the residual variance of FPE and social anxiety at T2, resulting in implausible values for the standard errors and the confidence intervals involving these variables. For instance, the standard error for the *R*2 of the variable social anxiety at T2 was calculated to be 88.110, and confidence intervals for correlations between this variable and others exceeded 1.3. Therefore, we imposed additional constraints on the estimates, for example by restricting the residual variance to be higher than 0. This constraint led to a more accurate estimation of confidence intervals while maintaining excellent model fit. The model comparisons are displayed in tables S1 and S2. The detailed output of these models can be found on <https://osf.io/hzmvc> in the folder entitles “Supplementary model comparisons – time constraints”.

**Results**

***Sensitivity Analysis***

Some noteworthy trends that were observed in the main models reached statistical significance within these analyses. Specifically, the within-person cross-lagged effect of FPE on acceptance was significant both from T1 to T2, β = -.318 [-.702, -.050], and from T2 to T3, β = -.336 [-.686, -.055].

Moreover, in the model with FNE, the cross-lagged effects of acceptance on suppression were significant from T1 to T2, β = -.184 [-.444, -.018], and from T2 to T3, β = -.233 [-.545, -.024], respectively. Additionally, there were significant effects of acceptance on rumination from T1 to T2, β = -.247 [-.613, -.019], and from T2 to T3, β = -.195 [-.450, -.013].

Lastly, in the model with social anxiety, while the pathways from suppression to social anxiety remained significant, the effects from social anxiety to rumination did not. It is worth noting that these models, while offering insights into the robustness of our results, have limited statistical power, which makes the estimates less reliable. However, all model fit indices met acceptable standards. The results of these analyses are summarized in Tables S3 to S5 at the end of this document.

***Model Comparisons***

In order to compare the coefficients across our models, we proceeded as follows (taking the effect of acceptance on FPE as an example): Our objective was to determine whether the observed effect of acceptance on FPE (with *b* = -0.667 and β = -.291) could be transferred to the other two models involving FNE and social anxiety without compromising the fit of these two models. If this proved feasible, it would suggest that the effect of acceptance on the two types of fear of evaluation and on social anxiety might be considered interchangeable, indicating that it is not unique to FPE. As the involved variables of interest differed both in terms of their rating scales (FPE ranging from 0 to 9, FNE from 1 to 5, and social anxiety from 0 to 4) and their variance, we performed two calculations to adequately account for these differences. First, we calculated the ratios of standardized and unstandardized regression coefficients. For the observed effect of acceptance on FPE, this ratio was β/*b* = 0.043, for acceptance on FNE, it was β/*b* = 0.947, and for acceptance on social anxiety, it was β/b = 1.121. Given that β = *b* \* *SD*(X)/*SD*(Y), these numbers equaled the ratios of the model-estimated standard deviations of the predictors and outcomes for each of these associations. Calculating the pairwise ratios of these ratios in a second step provided us with weights to transfer the estimated unstandardized parameter in one model (e.g., for acceptance on FPE) to a parameter constraint in another model (e.g., for acceptance on FNE), while adequately controlling for differences in rating scale and variance between the different involved variables.

The β/*b* ratio of FPE to FNE was 0.043/0.947 = 0.460, and that of FPE to social anxiety was 0.043/1.121 = 0.389. To arrive at parameter constraints for the effects of acceptance on FNE and social anxiety, we multiplied the estimated unstandardized parameter of acceptance on FPE by these two values, yielding -0.667 \* 0.460 = -0.307 for the former model and -0.667 \* 0.389 = -0.259 for the latter. We then utilized likelihood-ratio tests to determine whether these restricted models exhibited a significantly worse fit than the original models. A worse fit indicated that the strength of the association of acceptance with FPE was unique to FPE and did not generalize to FNE or social anxiety.

Concerning the effect of acceptance on FPE, the restricted FNE model exhibited a significantly worse fit, χ2(1) = 9.114, *p* = .003, whereas the restricted social anxiety model did not, χ2(1) = 1.348, *p* = .246. Regarding the effect of social anxiety on rumination, the model with FPE did not display a significantly worse fit, χ2(1) = 3.21, *p* = .073, and neither did the model with FNE, χ2(1) = 0.87, *p*= .351. Finally, concerning the effect of suppression on social anxiety, the restricted model with FPE did not indicate a worse fit, χ2(1) = 2.04, *p* = .153, whereas the restricted model with FNE did, χ2(1) = 5.50, *p* = .019. Thus, there appeared to be differential associations of acceptance with FNE and FPE, and of suppression with social anxiety and FNE, respectively. For a table with all weighted coefficients, see <https://osf.io/hzmvc>. The file can be found in the folder entitled “model comparisons - equality constraints for path coefficients”.

**Table S1**

*Model Comparisons Testing the Tenability of Equality Constraints*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Model | LL | -2LL | DF | Δ*df* | -2LL(res)  - (-2LL[unres]) | critical value at 16 *df* | *p* |
| FPE | -5337.022 | 10674.04 | 6 | - | - | - | - |
| FPE\_res | -5353.361 | 10706.72 | 22 | 16 | 32.678 | 26.296 | .008 |
| FNE | -4406.258 | 8812.516 | 6 | - | - | - | - |
| FNE\_res | -4414.846 | 8829.692 | 22 | 16 | 17.176 | 26.296 | .374 |
| SA | -4239.969 | 8479.938 | 6 | - | - | - | - |
| SA\_res | -4252.866 | 8505.732 | 22 | 16 | 25.794 | 26.296 | .057 |

*Note.* FPE = Fear of positive evaluation; FNE = Fear of negative evaluation; SA = Social anxiety; res = Restricted (Model).

**Table S2**

*Model Comparisons Testing the Tenability of Equality Constraints Using Robust Maximum-Likelihood Estimation*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model | MLR χ2 | DF | SCF | Satorra-Bentler Scaled χ2 Difference Test *p* |
| FPE | 7.049 | 6 | 0.9562 |  |
| FPE\_res | 38.318 | 22 | 1.0287 | .0137 |
| FNE | 2.853 | 6 | 0.9846 |  |
| FNE\_res | 17.941 | 22 | 1.114 | .5411 |
| SA | 8.017 | 6 | 0.7583 |  |
| SA\_res | 32.728 | 22 | 0.9739 | .08 |

*Note*. FPE = Fear of positive evaluation; FNE = Fear of negative evaluation; SA = Social anxiety; res = Restricted; SCF = Scaling correction factor.

**Table S3**

*Random Intercept Cross-Lagged Panel Modeling Results for Fear of Positive Evaluation, Acceptance, Suppression, and Rumination in the Completer Subsample (n = 157)*

|  |  |  |  |
| --- | --- | --- | --- |
|  | | Estimate [95% Bias-Corrected Confidence Intervals] | |
| Intercept Associations (r) | |  | |
| FPE ↔ ACC | | -.420 [-.584, .039] | |
| FPE ↔ SUP | | .304 [-.259, .609] | |
| FPE ↔ RUM | | **.604 [.389, .803]** | |
| ACC ↔ SUP | | **-.672 [-.925, -.260]** | |
| ACC ↔ RUM | | **-.388 [-.586, -.071]** | |
| SUP ↔ RUM | | **.363 [.002, .654]** | |
| Autoregressive Paths (β) | | T1–T2 | T2–T3 |
| FPE | | **.258 [.093, .483]** | **.274 [.092, .497]** |
| ACC | | .098 [-.222, .455] | .092 [-.177, .479] |
| SUP | | **.347 [.118, .708]** | **.435 [.160, .755]** |
| RUM | | .148 [-.061, .502] | .176 [-.077, .446] |
| Cross-Lagged Effects (β) | | T1–T2 | T2–T3 |
| FPE 🡪 ACC | | **-.318 [-.702, -.050]** | **-.336 [-.686, -.055]** |
| FPE 🡪 SUP | | .011 [-.166, .272] | .015 [-.220, .316] |
| FPE 🡪 RUM | | .182 [-.114, .544] | -.031 [-.260, .267] |
| ACC 🡪 FPE | | **-.294 [-.512, -.095]** | **-.277 [-.488, -.075]** |
| ACC 🡪 SUP | | -.159 [-.396, .042] | -.189 [-.464, .050] |
| ACC 🡪 RUM | | -.170 [-.466, .132] | -.119 [-.34, .108] |
| SUP 🡪 FPE | | .165 [-.089, .430] | .165 [-.092, .425] |
| SUP 🡪 ACC | | -.084 [-.433, .225] | -.083 [-.435, .208] |
| SUP 🡪 RUM | | .011 [-.366, .284] | .008 [-.28, .214] |
| RUM 🡪 FPE | | -.001 [-.211, .226] | -.001 [-.292, .299] |
| RUM 🡪 ACC | | .098 [-.044, .321] | .156 [-.073, .372] |
| RUM 🡪 SUP | | -.015 [-.187, .149] | -.031 [-.260, .267] |
| Model Fit Indices | RMSEA = .065 [.022, .101], CFI = .991, TLI = .974, SRMR = .045 | | |

*Note.* FPE = Fear of positive evaluation; ACC = Acceptance; SUP = Suppression; RUM = Rumination. Significant effects, as indicated by BCCIs not covering 0, are in bold.

**Table S4**

*Random Intercept Cross-Lagged Panel Modeling Results for Fear of Negative Evaluation, Acceptance, Suppression, and Rumination in the Completer Subsample (n = 157)*

|  |  |  |  |
| --- | --- | --- | --- |
|  | | Estimate [95% Bias-Corrected Confidence Intervals] | |
| Intercept Associations (r) | |  | |
| FNE ↔ ACC | | -.270 [-.789, .088] | |
| FNE ↔ SUP | | **.396 [.091, 2.403]** | |
| FNE ↔ RUM | | .561 [-.219, .725] | |
| ACC ↔ SUP | | **-.677 [-1.037, -.158]** | |
| ACC ↔ RUM | | **-.371 [-.677, -.047]** | |
| SUP ↔ RUM | | **.409 [.120, 1.360]** | |
| Autoregressive Paths (β) | | T1–T2 | T2–T3 |
| FNE | | **.402 [.009, .855]** | .325 [-.021, .668] |
| ACC | | .28 [-.033, .609] | .386 [-.036, .790] |
| SUP | | **.388 [.151, .730]** | .**479 [.213, .788]** |
| RUM | | .108 [-.201, .460] | .118 [-.160, .421] |
| Cross-Lagged Effects (β) | | T1–T2 | T2–T3 |
| FNE 🡪 ACC | | .080 [-.214, .422] | .094 [-.238, .419] |
| FNE 🡪 SUP | | -.069 [-.378, .130] | -.088 [-.406, .188] |
| FNE 🡪 RUM | | .289 [-.001, .771] | .230 [-.040, .590] |
| ACC 🡪 FNE | | -.016 [-.269, .187] | -.015 [-.241, .167] |
| ACC 🡪 SUP | | **-.184 [-.444, -.018]** | **-.233 [-.545, -.024]** |
| ACC 🡪 RUM | | **-.247 [-.613, -.019]** | **-.195 [-.450, -.013]** |
| SUP 🡪 FNE | | -.060 [-.415, .186] | -.056 [-.374, .154] |
| SUP 🡪 ACC | | -.119 [-.493, .149] | -.135 [-.504, .141] |
| SUP 🡪 RUM | | -.005 [-.406, .277] | -.004 [-.304, .220] |
| RUM 🡪 FNE | | .039 [-.153, .327] | .052 [-.159, .329] |
| RUM 🡪 ACC | | -.011 [-.226, .232] | -.018 [-.300, .240] |
| RUM 🡪 SUP | | -.001 [-.252, .153] | -.002 [-.287, .265] |
| Model Fit Indices | RMSEA = .041 [.000, .082], CFI = .996, TLI = .989, SRMR = .042 | | |

*Note*. FNE = Fear of negative evaluation; ACC = Acceptance; SUP = Suppression; RUM = Rumination. Significant effects, as indicated by BCCIs not covering 0, are in bold.

**Table S5**

*Random Intercept Cross-Lagged Panel Modeling Results for Social Anxiety, Acceptance, Suppression, and Rumination in the Completer Subsample (n = 157)*

|  |  |  |  |
| --- | --- | --- | --- |
|  | | Estimate [95% Bias-Corrected Confidence Intervals] | |
| Intercept Associations (r) | |  | |
| SA ↔ ACC | | -.357 [-.572, .516] | |
| SA ↔ SUP | | .240 [-1.218, .488] | |
| SA ↔ RUM | | **.707 [.305, .873]** | |
| ACC ↔ SUP | | -.640 [-.879, .314] | |
| ACC ↔ RUM | | -.384 [-.632, .234] | |
| SUP ↔ RUM | | .381 [-.139, .810] | |
| Autoregressive Paths (β) | | *T1–T2* | *T2–T3* |
| SA | | .303 [-.560, .763] | .260 [-.140, .787] |
| ACC | | .245 [-.095, .619] | .281 [-.071, .670] |
| SUP | | **.333 [.066, .651]** | **.375 [.052, .664]** |
| RUM | | .109 [-.116, .461] | .130 [-.113, .401] |
| Cross-Lagged Effects (β) | | *T1–T2* | *T2–T3* |
| SA 🡪 ACC | | -.187 [-.876, .190] | -.189 [-.867, .124] |
| SA 🡪 SUP | | .207 [-.024, .688] | .221 [-.009, .730] |
| SA 🡪 RUM | | .309 [-.123, .840] | .209 [-.076, .644] |
| ACC 🡪 SA | | -.212 [-.746, .083] | -.206 [-.583, .040] |
| ACC 🡪 SUP | | -.159 [-.430, .060] | -.193 [-.503, .053] |
| ACC 🡪 RUM | | -.187 [-.583, .060] | -.144 [-.446, .055] |
| SUP 🡪 SA | | **.291 [.002, .820]** | **.263 [.033, .726]** |
| SUP 🡪 ACC | | -.105 [-.489, .233] | -.112 [-.493, .236] |
| SUP 🡪 RUM | | -.077 [-.544, .199] | -.055 [-.424, .157] |
| RUM 🡪 SA | | .111 [-.082, .529] | .167 [-.065, .504] |
| RUM 🡪 ACC | | .061 [-.110, .315] | .108 [-.160, .347] |
| RUM 🡪 SUP | | -.059 [-.329, .084] | -.111 [-.398, .137] |
| Model Fit Indices | RMSEA = .070 [.031, .105], CFI = .991, TLI = .972, SRMR = .039 | | |

*Note*. SA = Social anxiety; ACC = Acceptance; SUP = Suppression; RUM = Rumination. Significant effects, as indicated by BCCIs not covering 0, are in bold.