**Supplemental Table S1. Means, standard deviations, and correlations among numeric study variables**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | W2 | W3 | W4 | W5 | W6 | W7 |  | Bivariate correlations (W2) | | | | |
|  | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* | *M (SD)* |  | 1. | 2. | 3. | 4. | 5. |
| 1. Interparental conflict | 2.08 (.72) | 2.04 (.70) | 2.09 (.72) | 2.08 (.68) | 2.05 (.69) | 2.07 (.70) |  | - |  |  |  |  |
| 2. Emotional warmth | 4.32 (.56) | 4.36 (.60) | 4.33 (.60) | 4.22 (0.58) | 4.23 (.60) | 4.14 (.57) |  | -.03 | - |  |  |  |
| 3. Internalizing problems | .59 (.42) | .56 (.40) | .50 (.39) | .44 (.37) | .46 (.38) | .43 (.38) |  | .08\* | -.06 | - |  |  |
| 4. Externalizing problems | .34 (.28) | .35 (.30) | .31 (.27) | .30 (.26) | .29 (.27) | .28 (.26) |  | .12\*\* | -.07 | .35\*\*\* | - |  |
| 5. Child age | 10.03 (1.90) | - | - | - | - | - |  | -.02 | -.13\*\* | -.06 | -.09\* | - |
| 6. Household income | 9.75 (2.36) | - | - | - | - | - |  | -.03 | -.02 | -.08\* | .01 | -.05 |

*Note:* Interparental conflict and emotional warmth ranged from 1 to 5. Children’s internalizing and externalizing problems ranged from 0 to 2. Child age [covariate] was reported in years. Household income categories [covariate] ranged from 1 to 14. For the covariates, only the data from W2 were considered in this study. \**p* < .05; \*\**p* < .01; \*\*\**p* < .001 (two-tailed).

**Supplemental Table S2. Unconditional univariate growth model fit statistics and comparison results**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | χ2 | *df* | *p* | RMSEA | [90% CI] | CFI | TLI | SRMR | ∆χ2 | ∆*df* | *p* | ∆CFI |
| Interparental conflict |  |  |  |  |  |  |  |  |  |  |  |  |
| Intercept only (random) | 54.05 | 19 | < .001 | .05 | [.04, .07] | .98 | .99 | .04 |  |  |  |  |
| Linear slope (fixed) | 52.08 | 18 | < .001 | .05 | [.04, .07] | .98 | .99 | .04 | 1.97 | 1 | .161 | .00 |
| **Linear slope (random)** | **33.61** | **16** | **.006** | **.04** | **[.02, .06]** | **.99** | **.99** | **.03** | **18.47** | **2** | **< .001** | **.01** |
| Quadratic slope (fixed) | 32.84 | 15 | .005 | .04 | [.02, .06] | .99 | .99 | .03 | .78 | 1 | .378 | .00 |
| Quadratic slope (random) | 30.16 | 12 | .003 | .05 | [.03, .07] | .99 | .99 | .03 | 2.67 | 3 | .445 | .00 |
| Cubic slope (fixed) | 29.13 | 11 | .002 | .05 | [.03, .07] | .99 | .99 | .03 | 1.03 | 1 | .310 | .00 |
| Cubic slope (random) | Fail to converge | | | | | | | | | | | |
| Emotional warmth |  |  |  |  |  |  |  |  |  |  |  |  |
| Intercept only (random) | 145.18 | 19 | < .001 | .10 | [.08, .11] | .88 | .90 | .17 |  |  |  |  |
| Linear slope (fixed) | 83.07 | 18 | < .001 | .07 | [.06, .09] | .94 | .95 | .15 | 62.11 | 1 | < .001 | .06 |
| Linear slope (random) | 60.77 | 16 | < .001 | .06 | [.05, .08] | .96 | .96 | .11 | 22.30 | 2 | < .001 | .02 |
| Quadratic slope (fixed) | 49.09 | 15 | < .001 | .06 | [.04, .07] | .97 | .97 | .13 | 11.68 | 1 | .001 | .01 |
| Quadratic slope (random) | 25.87 | 12 | .011 | .04 | [.02, .06] | .99 | .98 | .05 | 23.23 | 3 | < .001 | .02 |
| **Cubic slope (fixed)** | **17.81** | **11** | **.086** | **.03** | **[.00, .05]** | **.99** | **.99** | **.07** | **8.06** | **1** | **.005** | **.01** |
| Cubic slope (random) | Fail to converge | | | | | | | | | | | |
| Internalizing problems |  |  |  |  |  |  |  |  |  |  |  |  |
| Intercept only (random) | 165.45 | 19 | < .001 | .10 | [.09, .12] | .82 | .86 | .10 |  |  |  |  |
| Linear slope (fixed) | 86.99 | 18 | < .001 | .07 | [.06, .09] | .92 | .93 | .08 | 78.46 | 1 | < .001 | .09 |
| Linear slope (random) | 42.00 | 16 | < .001 | .05 | [.03, .07] | .97 | .97 | .06 | 44.99 | 2 | < .001 | .05 |
| Quadratic slope (fixed) | 33.99 | 15 | .003 | .04 | [.02, .06] | .98 | .98 | .05 | 8.01 | 1 | .005 | .01 |
| **Quadratic slope (random)** | **19.36** | **12** | **.080** | **.03** | **[.00, .05]** | **.99** | **.99** | **.03** | **14.63** | **3** | **.002** | **.01** |
| Cubic slope (fixed) | 17.97 | 11 | .082 | .03 | [.00, .05] | .99 | .99 | .03 | 1.39 | 1 | .238 | .00 |
| Cubic slope (random) | 9.21 | 7 | .238 | .02 | [.00, .05] | 1.00 | .99 | .02 | 8.76 | 4 | .067 | .01 |
| Externalizing problems |  |  |  |  |  |  |  |  |  |  |  |  |
| Intercept only (random) | 95.30 | 19 | < .001 | .08 | [.06, .09] | .88 | .90 | .09 |  |  |  |  |
| Linear slope (fixed) | 64.15 | 18 | < .001 | .06 | [.04, .08] | .93 | .94 | .07 | 31.147 | 1 | < .001 | .05 |
| Linear slope (random) | 49.28 | 16 | < .001 | .05 | [.04, .07] | .95 | .95 | .06 | 14.864 | 2 | .001 | .02 |
| Quadratic slope (fixed) | 48.82 | 15 | < .001 | .06 | [.04, .07] | .95 | .95 | .07 | .461 | 1 | .497 | .00 |
| **Quadratic slope (random)** | **17.26** | **12** | **.140** | **.03** | **[.00, .05]** | **.99** | **.99** | **.03** | **31.565** | **3** | **< .001** | **.05** |
| Cubic slope (fixed) | 16.75 | 11 | .116 | .03 | [.00, .05] | .99 | .99 | .03 | .512 | 1 | .474 | .00 |
| Cubic slope (random) | Fail to converge | | | | | | | | | | | |

*Note.* Time was coded as: Wave 2 = 0, Wave 3 = 1, Wave 4 = 2, Wave 5 = 3, Wave 6 = 4, Wave 7 = 5. Models retained are in bold.

Following Petras and Masyn (2010), we systematically tested models with different variance-covariance specifications with increasing complexity to explore family patterns of codevelopmental trajectories of IPC and EW (for a complete list of specifications we considered, see Supplemental Table S3). We began with the most restricted specification, in which we estimated class-varying growth factor means, and fixed growth factor variances and covariances to zero. Building on the basic specification, we estimated class-invariant or class-varying growth factor variances in the next sets of specifications. Then, we further estimated class-invariant or class-varying growth factor covariances in the final sets of specifications. Under each specification, we started with a one-class model and increased the number of classes estimated until models were not well-identified. To facilitate model identification, we fixed EW quadratic and cubic slopes’ variances to zero in all models.

We considered both statistical and substantive aspects, including identification, fit, classification quality, and interpretability, in determining which models under what specifications proceeded to final model comparison and selection (for details, see Supplemental Table S3). For instance, models under specifications with class-varying growth factor variances or covariances were not well-identified when more than one or two classes were estimated; thus, these models were dismissed. Moreover, the final unconditional bivariate growth model could be considered as a 1-class growth mixture model in which one IPC trajectory and one EW trajectory were used to represent the entire sample; if models with more than one class fit no better than the benchmark, these multi-class solutions may not characterize the data well (Petras & Masyn, 2010). Thus, models with BIC values higher than the benchmark were dismissed. In addition, as entropy is an indicator of class dispersion and classification precision (Petras & Masyn, 2010), models with lower entropy values (< .70) were dismissed.

After careful considerations, models under two specifications were further examined and compared: (1) models estimating class-invariant growth factor variances, and (2) models estimating class-invariant growth factor variances and covariances (for details, see Supplemental Table S4). There were a number of similarities between the two specifications. We were able to obtain a maximum of five classes under both specifications. The solutions were similar between the two specifications. Within each specification, a nonsignificant VLMR-LRT result was reached when comparing a 3-class solution to a 2-class solution, whereas the BLRT results were always significant. For both specifications, the 4-class solution resulted in the smallest BIC relative to other solutions under the same specification; but the smallest class in the 4-class solutions was very small (< 5%). Moreover, based on our literature review, trajectories that emerged from the 2-class models better reflected family patterns of changes in IPC and EW observed in previous studies. Although models without growth factor covariances had smaller BIC than models with growth factor covariances, the latter demonstrated higher classification quality as indicated by slightly higher entropy and average posterior class probability. As a result, we retained the 2-class model with class-varying growth factor means and class-invariant growth factor variances and covariances as our final unconditional growth mixture model.

**Supplemental Table S3. Unconditional growth mixture model specifications**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model specification | Intercept variances | Slope variances | Within-construct growth factors covariances | Between-construct growth factors covariances |
| 1 Class-varying growth factor meansa | Zero | Zero | Zero | Zero |
| 2.1a Class-invariant intercept variancesa | Invariant | Zero | Zero | Zero |
| 2.2a Class-invariant slope variancesa | Zero | Invariant | Zero | Zero |
| **2.3a Class-invariant growth factor variances** | **Invariant** | **Invariant** | **Zero** | **Zero** |
| 2.1b Class-varying intercept variancesb | Varying | Invariant | Zero | Zero |
| 2.2b Class-varying slope variancesc | Invariant | Varying | Zero | Zero |
| 2.3b Class-varying growth factor variancesc | Varying | Varying | Zero | Zero |
| 3.1a Class-invariant within-construct growth factor covariancesd | Invariant | Invariant | Invariant | Zero |
| 3.2a Class-invariant between-construct growth factor covariancesd | Invariant | Invariant | Zero | Invariant |
| **3.3a Class-invariant growth factor covariances** | **Invariant** | **Invariant** | **Invariant** | **Invariant** |
| 3.1b Class-invariant within-construct growth factor covariancesc | Varying | Varying | Invariant | Zero |
| 3.2b Class-invariant between-construct growth factor covariancesc | Varying | Varying | Zero | Invariant |
| 3.3b Class-invariant growth factor covariancesc | Varying | Varying | Invariant | Invariant |
| 4.1a Class-varying within-construct growth factor covariancesc | Invariant | Invariant | Varying | Invariant |
| 4.2a Class-varying between-construct growth factor covariancesc | Invariant | Invariant | Invariant | Varying |
| 4.3a Class-varying growth factor covariancesc | Invariant | Invariant | Varying | Varying |
| 4.1b Class-varying within-construct growth factor covariancesc | Varying | Varying | Varying | Invariant |
| 4.2b Class-varying between-construct growth factor covariancesc | Varying | Varying | Invariant | Varying |
| 4.3b Class-varying growth factor covariancesc | Varying | Varying | Varying | Varying |

*Note.* Varying = class-varying; Invariant = class-invariant. In all models, means of growth factors (i.e., intercepts and linear slopes) were allowed to vary across classes, residual variances of observed variables were set to be class-invariant and equal across time, and between-construct residual covariances were fixed to zero. To facilitate model identification, variances of quadratic and cubic slopes were fixed to zero in all models. aModels under these specifications resulted in BIC values higher than the benchmark (unconditional bivariate latent growth model) or other candidate models, thus were not considered further. bModels under these specifications produced low entropy values, thus were not considered further. cModels under these specifications were not well-identified when more than one or two classes were estimated, thus were not considered further. dModels under these specifications resulted in similar classes obtained from specification 3.3a with smaller entropy values, thus were not considered further. Models under specifications in bold were considered as candidate models and proceeded to final model comparison and selection.

**Supplemental Table S4. Unconditional growth mixture model fit and classification information**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model specification | # of classes | LL | BIC | VLMR-LRT  (*p* value) | BLRT  (*p* value) | Entropy | AvePP | Smallest class  (*n*, %) | |
| 0 Unconditional bivariate latent growth model (benchmark) | 1 | −3914.15 | 7979.69 |  |  |  |  |  |  |
| 2.3a Class-invariant growth factor variances | 1 | −3931.47 | 7941.92 |  |  |  |  |  |  |
| 2 | −3876.79 | 7878.64 | .002 | < .001 | .74 | .87–.94 | 146 | 20 |
| 3 | −3846.94 | 7865.01 | .230 | < .001 | .79 | .79–.93 | 23 | 3 |
| 4 | −3812.43 | 7842.06 | .132a | < .001a | .73 | .74–.88 | 23 | 3 |
| 5 | −3792.88 | 7849.04 | .694 | < .001 | .75 | .75–.90 | 27 | 4 |
| 3.3a Class-invariant within- and between-construct growth factor covariances | 1 | −3924.23 | 7966.93 |  |  |  |  |  |  |
| **2** | **−3872.26** | **7909.07** | **.006** | **< .001** | **.75** | **.87–.94** | **142** | **20** |
| 3 | −3839.37 | 7889.37 | .415 | < .001 | .79 | .78–.93 | 28 | 4 |
| 4 | −3801.23 | 7859.17 | .104 | < .001 | .74 | .77–.90 | 24 | 3 |
| 5 | −3783.75 | 7870.28 | .650 | < .001 | .76 | .75–.90 | 25 | 3 |

*Note.* LL = Log likelihood; BIC = Bayesian information criterion; VLMR-LRT = Vuong-Lo–Mendell–Rubin likelihood ratio test; BLRT = Bootstrapped likelihood ratio test; AvePP = Average posterior class probability. aLL value for *k*-1 model was −3847.03, which was close to but not an exact replicate of the LL value obtained from the 3-class model. Model retained is in bold.

**Supplemental Table S5. Parameter estimates based on the final conditional latent growth curve models for children’s internalizing and externalizing problems including average IPC and EW**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Internalizing  problems | | | |  | Externalizing  problems | | | |
|  | *b* | *SE* | *p* | β |  | *b* | *SE* | *p* | β |
| Intercept | **1.10** | **.18** | **< .001** |  |  | **.66** | **.12** | **< .001** |  |
| Child sex | **−.09** | **.03** | **.002** | **−.15** |  | .02 | .02 | .230 | .06 |
| Child age | **−.02** | **.01** | **.025** | **−.11** |  | **−.02** | **.01** | **.004** | **−.14** |
| Household income | **−.02** | **.01** | **.006** | **−.14** |  | −.01 | .00 | .277 | −.06 |
| Break-up couple | .15 | .11 | .149 | .07 |  | .05 | .07 | .497 | .03 |
| Family profilea | −.02 | .05 | .678 | −.03 |  | −.05 | .04 | .175 | −.10 |
| Average IPC | .03 | .03 | .330 | .07 |  | **.06** | **.02** | **.004** | **.21** |
| Average EW | −.04 | .03 | .125 | −.07 |  | **−.06** | **.02** | **.001** | **−.16** |
| Linear slope | **−.14** | **.06** | **.022** |  |  | −.00 | .04 | .937 |  |
| Child sex | **−.04** | **.01** | **< .001** | **−.16** |  | −.01 | .01 | .371 | −.02 |
| Child age | **.01** | **.00** | **.004** | **.14** |  | .01 | .00 | .052 | .08 |
| Household income | .00 | .00 | .806 | .01 |  | −.00 | .00 | .076 | −.05 |
| Break-up couple | .03 | .04 | .384 | .03 |  | **.05** | **.02** | **.025** | **.07** |
| Family profilea | .00 | .01 | .984 | −.00 |  | **.03** | **.01** | **.021** | **.09** |
| Average IPC | .00 | .01 | .931 | .00 |  | −.01 | .01 | .285 | −.04 |
| Average EW | −.00 | .01 | .936 | −.00 |  | −.01 | .01 | .313 | −.03 |
| Quadratic slope | **.00** | **.00** | **.016** |  |  | **.00** | **.00** | **.007** |  |

*Note.* Break-up couple = Variable indicating whether the couple separated (sometime between W2 and W7). IPC = Interparental conflict. EW = Emotional warmth. aClass 1 = 0, Class 2 = 1. Class 1 = Harmonious families (*n* = 580, 80%); Class 2 = Conflictual-warm families (*n* = 142, 20%). The two final conditional models with average IPC and EW fit the data well: children’s INT χ2(51) = 71.83, *p* = .029, RMSEA [90% CI] = .02 [.01, .04], CFI = .98, TLI = .97, SRMR = .04; children’s EXT χ2(51) = 84.84, *p* = .002, RMSEA [90% CI] = .03 [.02, .04], CFI = .95, TLI = .95, SRMR = .04. Significant values are in bold.