Online Appendix A

Analytical path diagram of the conditional growth mixture model

PDS1

Xs

PDS3

PDS2

\*

1

1

1

1

1

2

1

1

1

1

1

1

1

1

1

1

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1

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1

1

1

1

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1

1

1

1

1

1

1

1

DV1

SE1

DP1

DV3

DV2

SE3

SE2

DP3

DP2

*Note*. PDS = Pubertal Developmental Scale. SE = self-esteem. DP = depressive symptoms. DV = deviant behavior. I = intercept. S = slope. C = latent class variable. Xs = sociodemographic factors and stressful life events. Solid arrows between Xs and C and between Xs and psychosocial variables represent statistical control for C and all psychosocial variables. The dotted arrow connecting C and psychosocial variables denotes that C moderates all cross-lagged paths in the *psychosocial variables* box.

Online Appendix B

*Summary of descriptive statistics of contextual variables*

|  |  |
| --- | --- |
| *Urbanization level of living area*  | *n* (%) |
| Aging township | 130 (9.5) |
| General township | 180 (13.2) |
| Small city | 397 (29) |
| Metropolis | 661 (48.3) |
| *Father’s level of education*  |  |
|  Uneducated | 4 (0.3) |
|  Elementary school | 181 (13.2) |
|  Junior high school | 347 (25.4) |
|  Senior or vocational high school | 238 (17.4) |
|  College | 425 (31.1) |
|  Graduate school | 49 (3.6) |
| *Mother’s level of education*  |  |
|  Uneducated | 16 (1.2) |
|  Elementary school | 215 (15.7) |
|  Junior high school | 354 (25.9) |
|  Senior or vocational high school | 456 (33.3) |
|  College | 186 (13.6) |
|  Graduate school | 17 (1.2) |
| *Monthly household income (in New Taiwan Dollar)* |  |
| < 30,000 (ca. US$965) | 228 (16.7) |
|  30,000-49,999 (ca. US$966-US$1,610) | 262 (19.2) |
|  50,000-69,999 (ca. US$1,611-US$2,250) | 363 (26.5) |
|  70,000-99,999 (ca. US$2,251-US$3,220) | 212 (15.5) |
|  100,000-149,999 (ca. US$3,221-US$4,830) | 127 (9.3) |
| > 150,000 (ca. US$4,831) | 49 (3.6) |
| *Stressful life events*  |  |
| My parents were divorced or separated | 130 (9.5)  |
| My parents ran out of money | 133 (9.7) |
| My parents were fighting each other | 122 (8.9) |
| My father or mother spent less and less time at home  | 272 (19.9) |
| My father or mother was unemployed | 42 (3.1) |
| I fought with my parents more frequently | 93 (6.8) |
| I grieved over the passing of close relative(s) | 167 (12.2) |
| I broke up with my good friends | 330 (24.1) |
| I ranked lower in my academic performances | 690 (50.4) |
|  I did not get along well with classmates | 355 (26) |
|  I transferred to another school  | 63 (4.6) |
| I got into trouble at school | 97 (7.1) |
|  I was excluded from being part in school activities | 136 (9.9) |
| I started to wear glasses or braces | 423 (30.9) |
| I was seriously ill or injured | 127 (9.3) |
| I started to smoke, drink, or use drugs | 50 (3.7) |
| I grieved over the loss of my pet(s) | 125 (9.1) |

*Note*. Cell entries are *n* (%). Variables were reported in W1.

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| --- |
| Appendix C*Summary of odds ratio for the association between pubertal tempo class and sociodemographic backgrounds and stressful life events in 7th grade* |
| Variables | Class 1 |  | Class 2 |
| OR | *SE* | 95% CI |  | OR | *SE* | 95% CI |
| *Sociodemographic background* |  |  |  |  |  |  |  |
| Urbanization level of living area  | 1.00 | 0.08 | [0.85, 1.17] |  | 1.05 | 0.13 | [0.81, 1.35] |
| Father’s education level | 0.86 | 0.09 | [0.72, 1.03] |  | 1.06 | 0.14 | [0.81, 1.39] |
| Mother’s education level | 1.17 | 0.13 | [0.91, 1.51] |  | 1.00 | 0.15 | [0.75, 1.34] |
| Monthly household income  | 1.01 | 0.06 | [0.90, 1.14] |  | 0.86 | 0.08 | [0.74, 1.01] |
| *Stressful life events*  |  |  |  |  |  |  |  |
| My parents were divorced or separated | 0.67 | 0.23 | [0.43, 1.05] |  | 1.18 | 0.46 | [0.48, 2.91] |
| My parents ran out of money | 0.94 | 0.28 | [0.54, 1.63] |  | 0.58 | 0.28 | [0.34, 1.00] |
| My parents were fighting each other | 0.97 | 0.33 | [0.51, 1.85] |  | 1.59 | 0.65 | [0.44, 5.68] |
| My father or mother spent less and less time at home  | 0.96 | 0.21 | [0.64, 1.45] |  | 1.01 | 0.31 | [0.55, 1.85] |
| My father or mother were unemployed | 2.16 | 1.13 | [0.24, >15.00] |  | 0.30\* | 0.31 | [0.16, 0.55] |
| I fight with my parents more frequently | 0.34\*\* | 0.14 | [0.26, 0.45] |  | 0.28\*\* | 0.20 | [0.19, 0.41] |
| I grieved over the passing of close relative(s) | 1.08 | 0.28 | [0.62, 1.87] |  | 0.83 | 0.32 | [0.44, 1.55] |
| I broke up with my good friends | 1.09 | 0.22 | [0.71, 1.68] |  | 0.46\*\* | 0.15 | [0.34, 0.62] |
| I ranked lower in my academic performances | 0.75\* | 0.13 | [0.58, 0.97] |  | 1.11 | 0.26 | [0.67, 1.85] |
| I did not get along well with classmates | 1.23 | 0.25 | [0.75, 2.01] |  | 1.81 | 0.47 | [0.72, 4.55] |
| I transferred to another school  | 1.43 | 0.59 | [0.45, 4.55] |  | 0.15\*\* | 0.16 | [0.11, 0.21] |
| I got into trouble at school  | 0.52\* | 0.22 | [0.34, 0.80] |  | 1.55 | 0.75 | [0.36, 6.74] |
| I was excluded from being part in school activities | 1.50 | 0.41 | [0.67, 3.35] |  | 1.38 | 0.54 | [0.48, 3.98] |
| I started to wear glasses or braces | 0.82 | 0.15 | [0.61, 1.10] |  | 0.77 | 0.20 | [0.52, 1.14] |
| I was seriously ill or injured | 1.31 | 0.40 | [0.60, 2.87] |  | 1.85 | 0.66 | [0.51, 6.74] |
| I started to smoke, drink, or use drugs | 0.37\* | 0.27 | [0.22, 0.63] |  | 1.79 | 0.90 | [0.31, 10.45] |
| I grieved over the loss of my pet(s) | 1.24 | 0.38 | [0.59, 2.61] |  | 1.02 | 0.46 | [0.41, 2.51] |

*Note*. Class 1 = late-onset with rapid catch-up. Class 2 = late-onset with slow catch-up. Reference group: Class 3 (average pubertal growth). OR = odds ratio.

\* *p*< .05 \*\* *p*< .01

Online Appendix D

*Estimated marginal mean of self-esteem, depressive symptoms, and deviant behavior, by class of pubertal tempo*



(A) Self-esteem



(B) Depressive symptoms



(C) Deviant behavior

*Note*. Class 1 = late-onset with rapid catch-up. Class 2 = late-onset with slow catch-up. Class 3 = average pubertal growth. Cell entries are mean (95% confidence interval).

Online Appendix E

*Summary of path coefficients of psychosocial variables on contextual variables*

|  |  |
| --- | --- |
| Contextual factors (W1) | Psychosocial variables |
| SE-9th | DP-9th | DV-9th | SE-8th | DP-8th | DV-8th | SE-7th | DP-7th | DV-7th |
| Class 1: late onset with rapid catch-up |  |  |  |  |  |  |  |  |  |
| Urbanization level of living area | 0.03 | 0.02 | -0.03 | 0.03 | -0.02 | -0.02 | -0.03 | -0.02 | 0.02 |
| Father’s education level | 0.04 | -0.08\* | -0.01 | -0.01 | 0.03 | 0.004 | -0.06 | 0.06 | 0.02 |
| Mother’s education level | 0.02 | 0.05 | -0.003 | -0.04 | -0.02 | -0.04 | 0.11\*\* | -0.07 | -0.12\* |
| Monthly household income  | -0.02 | 0.003 | -0.01 | 0.05\* | -0.001 | 0.01 | -0.03 | 0.01 | -0.01 |
| *Stressful life events*  |  |  |  |  |  |  |  |  |  |
| My parents were divorced or separated | -0.06 | 0.05 | -0.02 | -0.01 | 0.09 | -0.02 | -0.13 | -0.17\* | 0.24 |
| My parents ran out of money | -0.23\* | -0.12\* | -0.17 | 0.06 | 0.05 | 0.01 | -0.11 | -0.10 | -0.21 |
| My parents were fighting each other | 0.09 | -0.18 | -0.09 | 0.03 | 0.06 | 0.09 | 0.16 | -0.02 | 0.11 |
| My father or mother spent less and less time at home  | 0.004 | 0.05 | 0.004 | 0.03 | 0.11 | 0.04 | 0.24\* | 0.01 | -0.09 |
| My father or mother were unemployed | 0.11 | 0.44 | 0.24 | 0.29 | -0.55\* | 0.04 | -0.32 | 0.42 | 0.51 |
| I fight with my parents more frequently | -0.31\* | -0.22 | 0.03 | -0.22 | 0.21 | -0.18 | -0.15 | -0.19 | -0.19 |
| I grieved over the passing of close relative(s) | -0.11 | 0.21\*\* | 0.05 | 0.09 | -0.03 | 0.05 | 0.11 | -0.10 | 0.02 |
| I broke up with my good friends | 0.05 | 0.21\* | 0.04 | -0.05 | -0.04 | -0.01 | -0.06 | 0.07 | 0.06 |
| I ranked lower in my academic performances | 0.05 | -0.10\* | -0.04 | -0.11 | 0.04 | -0.04 | -0.15\* | -0.02 | -0.05 |
| I did not get along well with classmates | 0.05 | 0.06 | -0.01 | 0.04 | 0.05 | 0.02 | -0.17\* | 0.24\*\* | 0.05 |
| I transferred to another school  | -0.07 | 0.25 | 0.16 | -0.01 | 0.07 | 0.31\* | 0.08 | -0.17 | 0.05 |
| I got into trouble at school | 0.02 | -0.24 | 0.19 | 0.004 | 0.31 | 0.24 | -0.19 | -0.10 | 0.36 |
| I was excluded from being part in school activities | -0.11 | 0.06 | 0.05 | 0.04 | -0.03 | 0.001 | 0.04 | 0.14 | 0.11 |
| I started to wear glasses or braces | -0.04 | 0.11 | 0.002 | -0.09 | 0.06 | -0.10\*\* | -0.07 | -0.04 | -0.001 |
| I was seriously ill or injured | 0.03 | 0.34\*\* | -0.09 | -0.26 | 0.08 | 0.02 | 0.12 | 0.27 | 0.12 |
| I started to smoke, drink, or use drugs | 0.07 | -0.16 | -0.36 | -0.31 | -0.88\*\* | 0.32 | 0.13 | 1.64\*\* | 1.44\* |
| I grieved over the loss of my pet(s) | 0.22\* | -0.20\* | -0.13 | -0.11 | 0.07 | -0.13 | -0.08 | 0.18\* | 0.05 |
| Class 2: late onset and slow catch-up |  |  |  |  |  |  |  |  |  |
| Urbanization level of living area | 0.07 | 0.09 | 0.06 | 0.16\* | -0.001 | -0.03 | 0.14\*\* | -0.03 | -0.05 |
| Father’s education level | 0.11 | 0.03 | -0.08 | 0.08 | -0.15\* | -0.07 | -0.03 | 0.25\*\*\* | 0.05 |
| Mother’s education level | -0.12 | 0.01 | -0.13 | -0.02 | 0.14 | 0.07 | -0.03 | -0.22\*\*\* | -0.09 |
| Monthly household income  | 0.07 | 0.06 | 0.02 | -0.03 | -0.02 | 0.02 | -0.01 | -0.03 | 0.01 |
| *Stressful life events*  |  |  |  |  |  |  |  |  |  |
| My parents were divorced or separated | 0.04 | 0.12 | 0.56\* | -0.27 | -0.21 | -0.05 | 0.38\* | 0.004 | 0.33 |
| My parents ran out of money | 0.04 | -0.36 | -0.10 | -0.31 | 0.07 | -0.15 | -0.18 | -0.08 | 0.22 |
| My parents were fighting each other | -0.09 | 0.04 | 0.15 | 0.35 | -0.12 | 0.29 | -0.45 | 0.11 | 0.06 |
| My father or mother spent less and less time at home  | -0.12 | -0.17 | -0.13 | -0.15 | 0.27 | 0.30\* | 0.12 | -0.08 | -0.26 |
| My father or mother were unemployed | 0.58 | 0.22 | -0.50 | -0.69 | -0.08 | -1.04 | -0.99 | -1.17\* | -2.29\* |
| I fight with my parents more frequently | 0.55 | 0.14 | -0.32 | 0.17 | 0.25 | -0.19 | -0.10 | 0.51\* | 0.10 |
| I grieved over the passing of close relative(s) | 0.19 | 0.12 | 0.47 | 0.26 | -0.12 | -0.25\* | 0.38 | 0.25 | 0.01 |
| I broke up with my good friends | -0.02 | 0.003 | -0.20 | 0.17 | 0.15 | -0.20 | -0.16 | 0.02 | 0.20 |
| I ranked lower in my academic performances | -0.12 | 0.13 | -0.01 | 0.10 | -0.10 | -0.01 | -0.24\* | 0.14 | -0.03 |
| I did not get along well with classmates | -0.06 | 0.14 | -0.28\* | -0.10 | 0.05 | 0.01 | -0.27\* | 0.30\* | 0.11 |
| I transferred to another school  | 0.15 | 0.56 | -0.11 | -0.64 | 1.61 | -1.40 | -1.61\*\* | -1.97\*\* | -2.85\*\* |
| I got into trouble at school | 0.17 | -0.10 | 0.22 | -0.20 | -0.27 | 0.11 | 0.03 | 0.002 | 0.46 |
| I was excluded from being part in school activities | -0.02 | -0.18 | -0.01 | -0.04 | -0.10 | 0.06 | 0.13 | 0.30 | 0.10 |
| I started to wear glasses or braces | 0.12 | 0.18 | -0.15 | -0.04 | 0.02 | -0.08 | 0.15 | -0.09 | -0.16 |
| I was seriously ill or injured | 0.16 | 0.21 | 0.23 | -0.20 | 0.61\*\*\* | 0.09 | -0.57\*\*\* | 0.25 | -0.11 |
| I started to smoke, drink, or use drugs | 0.13 | -0.43 | 0.28 | 0.47 | -0.92\* | 0.66 | 0.65 | 0.59 | 1.57\* |
| I grieved over the loss of my pet(s) | -0.27 | -0.04 | -0.27 | -0.20 | 0.10 | 0.02 | 0.45\* | -0.31 | 0.13 |
| Class 3: average pubertal growth |  |  |  |  |  |  |  |  |  |
| Urbanization level of living area  | 0.01 | 0.03 | 0.01 | -0.002 | -0.003 | -0.04\* | -0.004 | 0.03 | -0.01 |
| Father’s education level | 0.01 | -0.02 | 0.003 | 0.04 | -0.01 | -0.02 | -0.01 | 0.01 | -0.06\*\* |
| Mother’s education level | 0.001 | -0.001 | -0.02 | -0.01 | 0.02 | 0.01 | 0.02 | -0.03 | < 0.001 |
| Monthly household income  | 0.001 | 0.02 | 0.03\* | 0.01 | 0.01 | -0.01 | 0.01 | 0.01 | 0.01 |
| *Stressful life events*  |  |  |  |  |  |  |  |  |  |
| My parents were divorced or separated | -0.02 | -0.11\* | 0.12 | 0.03 | -0.06 | -0.003 | -0.14\* | -0.14\*\* | 0.04 |
| My parents ran out of money | 0.06 | 0.03 | -0.01 | 0.02 | -0.02 | -0.07 | -0.07 | 0.07 | 0.01 |
| My parents were fighting each other | -0.10 | 0.05 | -0.03 | 0.03 | -0.04 | 0.09 | -0.08 | 0.15\* | -0.01 |
| My father or mother spent less and less time at home  | -0.06 | 0.06 | -0.03 | -0.12\*\* | 0.08 | 0.04 | -0.11\* | 0.08\* | 0.04 |
| My father or mother were unemployed | 0.15 | 0.14 | 0.14 | 0.15 | -0.09 | 0.02 | 0.26\*\* | 0.14 | 0.08 |
| I fight with my parents more frequently | -0.01 | -0.01 | -0.02 | -0.06 | 0.03 | -0.11\* | -0.13 | 0.22\*\* | 0.11 |
| I grieved over the passing of close relative(s) | -0.01 | 0.10 | -0.02 | -0.06 | 0.03 | 0.01 | 0.01 | -0.05 | 0.07 |
| I broke up with my good friends | -0.04 | 0.05 | 0.04 | -0.05 | 0.002 | 0.06 | -0.10\* | 0.08\* | 0.02 |
| I ranked lower in my academic performances | < 0.001 | -0.04 | -0.02 | -0.02 | 0.02 | 0.01 | -0.04 | 0.04 | 0.05 |
| I did not get along well with classmates | -0.01 | 0.08\* | 0.02 | < 0.001 | 0.06 | 0.06 | -0.04 | 0.13\*\* | -0.01 |
| I transferred to another school  | 0.03 | -0.09 | -0.15\* | -0.003 | 0.04 | -0.17\*\* | 0.05 | -0.01 | 0.21 |
| I got into trouble at school  | -0.06 | -0.06 | 0.09 | 0.08 | -0.01 | 0.32\*\* | -0.08 | 0.32\*\* | 0.32\*\* |
| I was excluded from being part in school activities | 0.03 | 0.05 | 0.07 | -0.07 | -0.002 | -0.001 | -0.08 | -0.03 | -0.09 |
| I started to wear glasses or braces | -0.002 | -0.01 | -0.06 | -0.01 | 0.03 | -0.04 | 0.08 | 0.01 | -0.04 |
| I was seriously ill or injured | 0.09 | 0.05 | 0.001 | 0.02 | -0.01 | 0.01 | 0.03 | 0.08 | 0.05 |
| I started to smoke, drink, or use drugs | -0.01 | -0.05 | 0.13 | -0.13 | -0.01 | 0.30\* | -0.03 | 0.10 | 0.77\*\*\* |
| I grieved over the loss of my pet(s) | -0.04 | 0.11 | 0.10 | 0.07 | -0.02 | -0.10\* | 0.06 | 0.15 | 0.06 |

*Note*. Cell entries are regression coefficients. SE = self-esteem. DP = depressive symptoms. DV = deviant behavior. 7th = seventh-grade. 8th = eighth grade. 9th = ninth grade.

\* *p*< .05 \*\* *p*< .01 \*\*\* *p*<.001