Dynamic Parent-Child Linkage Mechanism: Bidirectional Effects of Children' s Learning Behavior and Maternal Life Satisfaction

Authors: Zhai Shuyi, Zhai Shuyi, Shi Xingcheng, Xingcheng Shi, Liang Ying, Liang Ying, Xia Dingling, Xia Dingling, He Jie, He Jie, He Jie, He Jie

Date: 2025-10-04T23:15:23+00:00

Abstract

Against the backdrop of building a fertility-friendly society, family well-being and scientific parenting have attracted increasing attention. Based on 5-day intensive longitudinal data from 370 mothers of early school-age children in China, this study employs dynamic structural equation modeling to examine the bidirectional relationship between maternal life satisfaction and children' s learning behaviors. The results reveal that at the within-family level, maternal life satisfaction and children' s learning concentration, autonomy, types of extracurricular learning, and learning duration all exhibit significant bidirectional lagged effects; at the between-family level, only learning autonomy shows a positive correlation with maternal life satisfaction. The study reveals the dynamic mechanisms of mother-child interaction, providing theoretical support for family education practices.

Full Text

Parent-Child Dynamic Linkages: Bidirectional Relations Between Children' s Learning Behaviors and Maternal Life Satisfaction

ZHAI Shuyi[1], SHI Xingcheng[2], LIANG Ying[2], XIA Dingling[2], HE Jie[2]

[1] Institute of Applied Psychology, College of Education, Zhejiang University of Technology, Hangzhou 310023, China

[2] Department of Psychology and Behavioral Sciences, Zhejiang University, Hangzhou 310028, China

Children' s daily learning performance (including concentration, autonomy, learning scope, and study duration) and maternal life satisfaction exhibit

bidirectional influences. Better child learning performance on a given day predicts higher maternal well-being the following day; conversely, higher maternal life satisfaction today predicts better child learning performance tomorrow. These findings demonstrate that promoting children' s learning and enhancing maternal well-being are mutually reinforcing processes, and that only through the joint growth of both parent and child can a virtuous cycle be achieved within families.

Against the backdrop of building a family-friendly society, family well-being and scientific parenting have attracted increasing attention. Based on five days of intensive longitudinal data from 370 mothers of early school-age children in China, this study employed dynamic structural equation modeling to examine the bidirectional relationship between maternal life satisfaction and children' s learning behaviors. At the within-family level, significant bidirectional lagged effects emerged between maternal life satisfaction and children' s learning concentration, autonomy, extracurricular learning types, and study duration. At the between-family level, only learning autonomy showed a positive association with maternal life satisfaction. These findings reveal the dynamic mechanisms of mother–child interaction and provide theoretical support for family education practice.

Keywords: life satisfaction, learning behavior, dynamic structural equation modeling, within-family effect, bidirectional influence

---

Abstract

In the context of promoting a family-friendly society in China, increasing attention has been paid to how maternal well-being and children' s learning behaviors dynamically influence one another in everyday life. This study recruited 370 mothers of Grade 1–3 children and asked them to complete daily diaries across five consecutive weekdays during the early COVID-19 stay-at-home period, when both mothers and children were immersed in home-based work and learning. Each day, mothers reported their own life satisfaction and their child' s learning concentration, learning autonomy, extracurricular activity participation, and study duration.

Dynamic structural equation modeling (DSEM) was used to disentangle within-family (intraindividual) and between-family (interindividual) associations. At the within-family level, significant bidirectional lagged effects were found: children' s learning behaviors on one day positively predicted maternal life satisfaction the next day, and maternal life satisfaction similarly predicted children' s next-day learning behaviors. Notably, children' s learning concentration had the strongest predictive effect on mothers' subsequent life satisfaction, exceeding the reverse effect from mothers to children. At the between-family level, only children' s average learning autonomy was positively associated with mothers' overall life satisfaction across families; no significant cross-family associations

were observed for the other learning indicators. These findings reveal a reciprocal, dynamic link between children's learning behaviors and maternal well-being in daily life. They underscore the active role of children in shaping parenting experiences and provide valuable implications for designing supportive family interventions that simultaneously promote children's learning development and mothers' psychological well-being.

Introduction

In response to the contemporary demands of high-quality population development, China's 14th Five-Year Plan proposes "strengthening family construction," establishing the promotion of a family-friendly society as a key national strategic goal. Against this backdrop, scientific parenting and family well-being have become focal points of academic and public concern. As the core figure in family parenting, maternal psychological well-being not only affects individual health but also profoundly influences family upbringing practices and child development (Li et al., 2024). Meanwhile, under the dual pressures of family education responsibilities and social competition, mothers of school-age children universally bear the burden of academic supervision and continuously face parenting anxiety (Liu et al., 2022), making children's academic performance a significant factor influencing maternal psychological states (Tong et al., 2020). Therefore, clarifying the bidirectional dynamic influence mechanisms between maternal psychological states and children's learning behaviors will provide an important theoretical and practical foundation for promoting child development, implementing scientific parenting, and optimizing family education policies.

Life satisfaction, as a key indicator of subjective well-being, represents an individual's overall cognitive evaluation of multiple life domains (Cowan, 2019). It is considered an internal psychological resource that can enhance motivation, vitality, and positive engagement (Lyubomirsky et al., 2005), and parental psychological resources constitute important determinants of parenting behaviors (Belsky, 1984). Consequently, mothers with higher life satisfaction are more likely to demonstrate higher quality and frequency in daily interactions, thereby promoting children's language, motor, and social competence development (Berger & Spiess, 2011).

For mothers of school-age children, parenting is concentrated primarily on academic management (Wang et al., 2022), and their life satisfaction may influence children's learning behaviors through parenting practices and parent–child interactions. Although direct evidence regarding life satisfaction is lacking, existing research from the perspective of negative psychological states has revealed this mechanism: anxious mothers tend to become overly involved and controlling during children's learning or express emotions inappropriately, thereby inhibiting children's learning motivation and autonomy (Murray et al., 2012); depressed mothers struggle to provide emotional or material support for children'

s learning (Augustine & Crosnoe, 2020; Wu et al., 2019). However, these studies have mainly focused on clinical populations and have yet to examine the daily psychological states of typical mothers. In reality, life satisfaction represents a relatively stable yet daily-fluctuating psychological state (Diener et al., 2006) that may immediately affect children' s learning behaviors by altering parenting practices and parent–child interaction patterns. Therefore, it is necessary to conduct in-depth investigations at the micro-level within families.

Children' s learning behaviors may also directly influence maternal life satisfaction. According to bidirectional socialization theory, children are not merely passive recipients of socialization but actively influence their mothers' emotions and parenting behaviors (Belsky, 1984; Sameroff, 1975). In today' s highly competitive educational environment, Chinese mothers are typically deeply involved in their children' s academic processes, making children' s daily learning performance a significant source of maternal psychological states. Although previous studies have found positive correlations between adolescents' academic achievement and parental life satisfaction (Chen et al., 2021; Tong et al., 2020), systematic investigations of how children' s daily learning behaviors affect maternal well-being remain scarce.

Children' s learning behaviors encompass study habits, effort, and cooperative skills (Education HD of General Learner Outcome Scale, 2016; Harvey et al., 2018). This study focuses on study habits (learning concentration and autonomy) and effort (extracurricular learning types and study duration) to more authentically capture academic interactions in daily family life. On one hand, good study habits can reduce maternal supervision burden and mitigate stress and conflicts arising from high-density involvement (Li et al., 2024; Wingard & Forsberg, 2009). On the other hand, academic effort carries significant moral meaning in Chinese culture, where children are expected to continuously improve themselves (Li, 2002); thus, children' s learning effort can strengthen mothers' identification with their parenting effectiveness (Ng et al., 2014; Sun et al., 2021), thereby enhancing their life satisfaction.

Both maternal life satisfaction and children' s learning behaviors stem not only from stable between-family differences but also exhibit daily fluctuations within families, potentially interacting and generating lagged effects through ongoing parent–child interactions. Previous research has primarily relied on static data, focusing on relatively stable outcome indicators such as grades while neglecting learning behavioral processes, making it difficult to reveal bidirectional dynamic processes within families. Therefore, this study conducted intensive longitudinal measurements of early school-age children' s learning behaviors and maternal life satisfaction and constructed dynamic structural equation models (DSEM) to systematically examine lagged effects and dynamic association mechanisms between mothers and children at both intraindividual and interindividual levels.

Method

Participants

We recruited 399 mothers of Grade 1–3 children from Hangzhou to participate in a five-day (weekday) diary study, with sample recruitment expanded as much as possible to meet DSEM analysis requirements. After excluding 29 participants who failed to complete the study, the final sample comprised 370 mothers. Mothers' mean age was 36.5 ± 3.6 years; 78.4% held college degrees or higher. Children' s mean age was 7.8 ± 0.9 years; 201 were boys, and 53.5% were only children. Grade distribution was 44.6% in first grade, 28.9% in second grade, and 26.5% in third grade. Regarding family monthly income, 9.7% earned less than ¥10,000, 57.0% earned ¥10,000–30,000, 20.5% earned more than ¥30,000, and 12.7% did not provide income information.

Procedure

Data collection occurred during the early COVID-19 stay-at-home period, when children were engaged in home-based learning and mothers in home-based work. This unique context provided mothers with comprehensive knowledge of their children' s learning behaviors, offering an exceptional opportunity to examine dynamic associations between maternal life satisfaction and children' s learning behaviors. Schools implemented a "suspended classes, ongoing learning" policy, delivering core curriculum subjects (Chinese, mathematics, English) via live streaming and assigning homework, while also scheduling 1–2 daily video-based quality courses (music, physical education, art) to encourage autonomous learning.

Mothers completed demographic information forms and then completed daily diary surveys for five consecutive days, assessing their own life satisfaction and their children' s learning behaviors each day. The study was approved by the Medical Ethics Committee of the Department of Psychology and Behavioral Sciences at Zhejiang University, and all participants provided informed consent.

Measures

Children' s Learning Behaviors Following Harvey et al. (2018), children' s learning behaviors were assessed across four dimensions: learning concentration, learning autonomy, extracurricular learning types, and study duration. Specific definitions were as follows: (1) **Learning concentration**: assessed using a 5-point Likert scale (1 = completely unable to concentrate, 5 = fully engaged throughout) to evaluate concentration during learning; (2) **Learning autonomy**: assessed using a 5-point Likert scale (1 = requires full supervision, 5 = completes tasks completely independently) to evaluate the degree of independent learning; (3) **Extracurricular learning types**: recorded participation in four categories of extracurricular activities (academic, arts, sports, life skills), with 1 point assigned for each category participated in, yielding a total score

of 0–4; (4) **Study duration**: categorized into four levels based on total daily study time (1 = <2 hours, 2 = 2–4 hours, 3 = 4–6 hours, 4 = >6 hours).

Maternal Life Satisfaction Following Super et al. (2018), mothers were asked to rate seven aspects of their daily lives on a scale from 1 (very dissatisfied) to 5 (very satisfied): physical health, work status, household chores, emotional state, parent–child interaction, paternal involvement in parenting, and marital relationship. Multilevel McDonald' s coefficients were calculated to assess internal consistency, yielding = 0.72 at the within-person level and = 0.94 at the between-person level. All items were significantly positively correlated (rs = .23–.38), indicating good reliability. The mean of the seven items was used as the daily maternal life satisfaction indicator.

Data Analysis

Preliminary analyses were conducted on the five days of maternal life satisfaction and the four children' s learning behavior variables. First, intraclass correlation coefficients (ICC) were calculated to estimate variation at the between-person and within-person levels, determining the appropriateness of multilevel modeling. Harman' s single-factor test was used to assess common method bias; fit indices did not meet acceptable criteria (^{2}/df = 26.71, df = 35, RMSEA = .121, CFI = .849, TLI = .806), indicating no serious common method bias in the data.

Building on this foundation, we used Mplus 8.3 software to construct four dynamic structural equation models (DSEM), each examining one learning behavior dimension (concentration, autonomy, extracurricular types, study duration) in relation to maternal life satisfaction. Data analysis code is provided in the Appendix. All models employed a two-level structure: the within-person level captured daily variation trends and lagged effects, while the between-person level estimated stable individual differences. Within-person modeling adopted a cross-lagged structure, where each variable was influenced by its own prior state (autoregressive effect) and by the prior state of the other variable (cross-lagged effect), thereby revealing temporal relationships between variables. At the individual level, a common factor was specified to control for same-day covariation between maternal life satisfaction and children' s learning behaviors, preventing synchronous fluctuations from confounding lagged effects.

Models were estimated using Bayesian Markov Chain Monte Carlo (MCMC) methods, with the FBITERATIONS command used to gradually increase iterations for improved precision. Model convergence was assessed using the Potential Scale Reduction (PSR) factor; convergence was considered adequate when PSR 1.10 and trace plots showed adequate mixing with no systematic drift. Parameter significance was determined using 95% Bayesian credible intervals, with effects considered significant when the interval did not contain zero.

Results

Descriptive Statistics and Correlation Analysis

Descriptive statistics and correlations for the main variables are presented in Table 1 . Intraclass correlation coefficients (ICCs) ranged from 0.53 to 0.75, indicating that 25%–47% of variance came from daily-level fluctuations, reflecting substantial within-person variation alongside stable between-person differences. This pattern demonstrates both trait-like and state-like characteristics, necessitating examination at both levels.

Correlation analyses revealed that the four dimensions of children' s learning behaviors were significantly correlated at the within-person level. At the between-person level, learning concentration was significantly correlated with learning autonomy and extracurricular learning types. Maternal life satisfaction was significantly positively correlated with all learning behavior dimensions except study duration at the within-person level, and with all learning behavior dimensions at the between-person level.

To identify control variables, we examined the effects of demographic factors on the five-day mean of the main variables. Results showed that mothers of girls reported significantly higher life satisfaction than mothers of boys ($t(368) = 2.349$, $p = .019$, Cohen' s $d = .60$). Child age was significantly correlated with learning concentration ($r = .112$, $p = .001$), learning autonomy ($r = .105$, $p = .002$), and study duration ($r = .051$, $p = .010$). Therefore, child sex and age were included in subsequent models.

Dynamic Structural Equation Models

We constructed four dynamic structural equation models using five days of children' s learning behaviors and maternal life satisfaction as outcome variables to examine their dynamic relationships (Figure 1 [Figure 1: see original paper]). In each model, maternal life satisfaction and one children' s learning behavior dimension served as outcome variables, with child sex and age initially included as covariates. Based on the Deviance Information Criterion (DIC), four baseline models without demographic variables showed better fit; therefore, final results are reported based on these models. Models were run with 50,000 iterations, 2 MCMC chains, and a thinning strategy of 10 (i.e., retaining every 10th iteration). All four models achieved PSR values 1.086, and trace plots indicated successful convergence. Detailed model results are presented in Table 2 .

Between-Person Level Analysis At the between-person level, only children' s learning autonomy showed a significant positive correlation with maternal life satisfaction. This indicates that across families, mothers in households where children maintained higher stable levels of autonomy reported higher overall life satisfaction. Relationships between other learning behavior dimensions and maternal life satisfaction did not reach significance.

Within-Person Level Analysis At the within-person level, all four models revealed reciprocal day-level relationships between children' s learning behaviors and maternal life satisfaction. Children' s learning behaviors on the previous day (concentration, autonomy, extracurricular learning types, and study duration) all significantly positively predicted maternal life satisfaction on the following day. Simultaneously, maternal life satisfaction on the previous day significantly predicted children' s next-day learning behaviors. Comparing the relative strength of effects, we examined standardized path coefficients. Results showed that the standardized lagged effect of children' s learning concentration on maternal life satisfaction was 0.364 (95% CI [0.303, 0.421]), while the standardized lagged effect of maternal life satisfaction on children's learning concentration was 0.220 (95% CI [0.172, 0.284]). The non-overlapping confidence intervals indicate that children' s learning concentration predicted maternal life satisfaction significantly more strongly than the reverse effect. For other learning behaviors, confidence intervals for standardized lagged effects overlapped, indicating no significant differences in effect sizes between the two directional paths.

Discussion

Under the dual pressures of educational competition and family responsibilities, the association between maternal life satisfaction and children' s learning behaviors has become increasingly salient. Focusing on families with early school-age children and using a micro-temporal scale, this study is the first to reveal the dynamic bidirectional mechanisms between maternal life satisfaction and children' s learning behaviors at the within-person level. Findings indicate that at the within-family level, significant bidirectional lagged effects exist between maternal life satisfaction and children' s learning concentration, autonomy, extracurricular activity types, and study duration. At the between-family level, only children' s learning autonomy shows a positive association with maternal life satisfaction. These findings provide theoretical support and practical implications for the collaborative optimization of maternal well-being and child development.

The bidirectional lagged effects at the within-family level demonstrate that maternal life satisfaction and children's learning behaviors interact and dynamically co-shape each other through daily interactions. On one hand, maternal life satisfaction on a given day significantly positively predicted children' s learning behaviors the next day, extending previous findings on how maternal psychological states influence child development and broadening the research perspective beyond extreme emotions such as anxiety and depression (Murray et al., 2012; Wu et al., 2019). This highlights the direct impact of mothers' daily subjective psychological experiences on children' s behaviors. Although life satisfaction is not specific to parenting contexts, its low levels are accompanied by negative emotions that may be transmitted to children through parent–child interactions

(Chiang, 2025; Woody et al., 2022), affecting their learning behaviors. Additionally, mothers' negative states alter their cognitive and behavioral patterns, such as weakening emotional and behavioral control, reducing sensitivity to children' s needs, and reinforcing negative information processing (Edwards & Hans, 2016), which leads to decreased warm support and increased hostile control in parenting behaviors (Teetsel et al., 2014), ultimately affecting children' s learning behaviors across time.

On the other hand, children' s learning behaviors on a given day also significantly positively predicted maternal life satisfaction the next day, confirming children' s agency in mother-child interactions. This result aligns with existing research linking adolescents' academic achievement to parental subjective well-being (Chen et al., 2021; Tong et al., 2020) and highlights the critical role of children' s specific, daily learning behaviors in constructing maternal psychological resources. In mothers' role perception, children' s performance is internalized as an indicator of parenting effectiveness and even self-worth (Ng et al., 2014), making children' s positive learning behaviors an important signal of successful parenting. Particularly in a context of intense educational competition and high parental expectations, early school-age children' s learning behaviors not only reflect current academic adaptation but are also viewed as predictors of future academic and even career success (Simpkins et al., 2020). Therefore, when children demonstrate concentrated, autonomous, persistent, and diverse learning behaviors, mothers experience reduced anxiety and supervisory burden, leading to enhanced life satisfaction. Notably, among the four learning behaviors, learning concentration showed the strongest predictive effect on maternal life satisfaction, significantly stronger than the reverse path. In an era of high digital media penetration, attention deficits have become a widespread parental concern (McArthur et al., 2022). Children' s concentrated learning behaviors can directly reduce mothers' energy investment in academic supervision, avoid parent-child conflicts, and more easily elicit positive emotions and subjective well-being. In contrast, maternal life satisfaction, as a more distal subjective indicator, may influence children' s behaviors indirectly through parenting practices or parent-child interactions, resulting in asymmetrical bidirectional mechanisms at the daily fluctuation level. Additionally, data collection occurred during the pandemic stay-at-home period, a context that intensified mothers' involvement in and awareness of children' s learning, potentially amplifying the strength of bidirectional effects. Caution is needed when generalizing to normal contexts, though similar conditions are common during winter and summer vacations, so this study remains informative for understanding parent-child interaction mechanisms in home learning settings.

Unlike the broad bidirectional effects at the within-person level, between-person analysis revealed only a positive correlation between learning autonomy and maternal life satisfaction. This discrepancy suggests that mother-child interaction mechanisms may exhibit different characteristics across different time scales. According to the broaden-and-build theory of positive emotions, while daily fluctuations in maternal life satisfaction can immediately affect children' s behaviors,

their transformation into stable between-person differences requires time accumulation and resource construction (Fredrickson, 2001). Among the learning behaviors examined in this study, autonomy represents a relatively stable behavioral trait (Weinstein et al., 2012), making it more likely to show cross-family associations with maternal subjective well-being. This result reflects a covariation trend and cannot infer specific causal direction, but it nonetheless suggests that cultivating children' s autonomy may be a critical node for achieving parenting effectiveness and maternal well-being.

This study focused on families with early school-age children to investigate the dynamic relationship between maternal life satisfaction and children' s learning behaviors and their stable between-family associations. Results revealed significant bidirectional lagged effects between maternal life satisfaction and children' s learning concentration, autonomy, extracurricular activity types, and study duration at the within-family level, and a positive correlation between children' s learning autonomy and maternal life satisfaction at the between-family level. These findings illuminate the mutual shaping process between mothers and children in daily learning interactions and provide new evidence for understanding dynamic parent–child mechanisms within family systems.

References

Li, Y., Wang, C., & Ren, L. (2024). Maternal parenting intensity and its relationship with preschool children' s social-emotional development: The masking effect of maternal mental health. *Preschool Education Research*, (1), 61–75.

Augustine, J. M., & Crosnoe, R. (2010). Mothers' depression and educational attainment and their children' s academic trajectories. *Journal of Health and Social Behavior*, 51(3), 274–290.

Belsky, J. (1984). The determinants of parenting: A process model. *Child Development*, 83–96.

Berger, E. M., & Spiess, C. K. (2011). Maternal life satisfaction and child outcomes: Are they related? *Journal of Economic Psychology*, 32(1), 142–158.

Chen, Y., Huang, R., Lu, Y., & Zhang, K. (2021). Education fever in China: Children' s academic performance and parents' life satisfaction. *Journal of Happiness Studies*, 22(2), 927–954.

Chiang, S. C. (2025). Daily association between parent–adolescent emotion contagion: The role of parent–adolescent connectedness. *Journal of Research on Adolescence*, 35(1), e13038.

Cowan, H. R. (2019). Can a good life be unsatisfying? Within-person dynamics of life satisfaction and psychological well-being in late midlife. *Psychological Science*, 30(5), 697–710.

Diener, E., Lucas, R. E., & Scollon, C. N. (2006). Beyond the hedonic treadmill: Revising the adaptation theory of well-being. *American Psychologist*, 61(4), 305–314.

Education HD of general learner outcome scale. (2016). Accessed September 22, 2016.

Edwards, R. C., & Hans, S. L. (2016). Prenatal depressive symptoms and toddler behavior problems: The role of maternal sensitivity and child sex. *Child Psychiatry & Human Development*, 47, 696–707.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, 56(3), 218–226.

Harvey, S. P., Lambourne, K., Greene, J. L., Gibson, C. A., Lee, J., & Donnelly, J. E. (2018). The effects of physical activity on learning behaviors in elementary school children: A randomized controlled trial. *Contemporary School Psychology*, 22(3), 303–312.

Li, J. (2002). A cultural model of learning: Chinese "heart and mind for wanting to learn" . *Journal of Cross-Cultural Psychology*, 33(3), 248–269.

Li, J., Liu, X., Zhu, D., & Jiang, H. (2024). Effects of parent involvement in homework on students' negative emotions in Chinese students: Moderating role of parent–child communication and mediating role of family responsibility. *Behavioral Sciences*, 14(12), 1139.

Liu, Q., Hong, X., & Wang, M. (2022). Parental educational anxiety during children' s transition to primary school in China. *International Journal of Environmental Research and Public Health*, 19(23), 15479.

Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin*, 131(6), 803–855.

McArthur, B. A., Tough, S., & Madigan, S. (2022). Screen time and developmental and behavioral outcomes for preschool children. *Pediatric Research*, 91(6), 1616–1621.

Murray, L., Lau, P. Y., Arteche, A., Creswell, C., Russ, S., Zoppa, L. D., Muggeo, M., Stein, A., & Cooper, P. (2012). Parenting by anxious mothers: Effects of disorder subtype, context and child characteristics. *Journal of Child Psychology and Psychiatry*, 53(2), 188–196.

Ng, F. F. Y., Pomerantz, E. M., & Deng, C. (2014). Why are Chinese mothers more controlling than American mothers? "My child is my report card" . *Child Development*, 85(1), 355–369.

Sameroff, A. J. (Ed.). (2009). The transactional model of development: How children and contexts shape each other. Washington, DC: American Psychological Association.

Simpkins, S. D., Tulagan, N., Lee, G., Ma, T. L., Zarrett, N., & Vandell, D. L. (2020). Children' s developing work habits from middle childhood to early adolescence: Cascading effects for academic outcomes in adolescence and adulthood. *Developmental Psychology*, 56(12), 2281–2292.

Sun, L., Fu, Z., Li, P., & Gong, X. (2023). Chinese parenting beliefs in the intergenerational transmission of parental psychological control amongst Chinese families with adolescents. *Current Psychology*, 42, 1397–1406.

Super, C. M., Lee, J., Harkness, S., Bermudez, M. R., Bonichini, S., & Welles, B. (2018, May 23–25). How was your day? Mothers' satisfaction and child difficulty ratings. 22nd Occasional Temperament Conference, Murcia, Spain.

Teetsel, R. N., Ginsburg, G. S., & Drake, K. L. (2014). Anxiety-promoting parenting behaviors: A comparison of anxious mothers and fathers. *Child Psychiatry & Human Development*, 45, 133–142.

Tong, Y., Li, J. X., & Shu, B. (2020). Is children' s academic performance valuable to parents? Linking children's effort vs. results and fathers' vs. mothers' subjective well-being. *Child Indicators Research*, 14(2), 583–605.

Wang, C., Nie, Y., Ma, C., & Lan, X. (2022). More parental Guan, more academic engagement? Examining the moderating roles of adolescents' gender and reciprocal filial piety. *The Journal of Genetic Psychology*, 183(1), 78–90.

Weinstein, N., Przybylski, A. K., & Ryan, R. M. (2012). The index of autonomous functioning: Development of a scale of human autonomy. *Journal of Research in Personality*, 46(4), 397–413.

Wingard, L., & Forsberg, L. (2009). Parent involvement in children' s homework in American and Swedish dual-earner families. *Journal of Pragmatics*, 41(8), 1576–1595.

Woody, M. L., Kaurin, A., McKone, K. M., Ladouceur, C. D., & Silk, J. S. (2022). Displays of negative facial affect during parent–adolescent conflict and the bidirectional transmission of social anxiety. *Journal of Child Psychology and Psychiatry*, 63(8), 846–854.

Wu, V., East, P., Delker, E., Blanco, E., Caballero, G., Delva, J., Lozoff, B., & Gahagan, S. (2019). Associations among mothers' depression, emotional and learning-material support to their child, and children' s cognitive functioning: A 16-year longitudinal study. *Child Development*, 90(6), 1952–1968.

Appendix: Mplus Code for Dynamic Structural Equation Model (Example)

```
DATA: FILE = data.dat;
VARIABLE:
```

```
    NAMES = ID Order Time Conc Auto Type Sat Gender Age;
    CLUSTER = ID;
    USEVAR = Sat Auto;
    MISSING = all(-999);
    LAGGED = Sat(1) Auto(1);
    TINTERVAL = Order(1);
ANALYSIS:
    TYPE = TWOLEVEL RANDOM;
    ESTIMATOR = BAYES;
    PROCESSORS = 2; ! two chains
    FBITERATIONS = (50000); ! 50000 iterations per chain
    THIN = 10; ! only the results of every 10th iteration is saved to reduce autoregression
MODEL:
    %WITHIN%
    ss | Sat ON Sat&1; ! autoregressive effect, maternal life satisfaction
    sl | Sat ON Auto&1; ! cross-lagged effect, lagged children's learning autonomy predictir
    ls | Auto ON Sat&1; ! cross-lagged effect, lagged maternal life satisfaction predicting
    ll | Auto ON Auto&1; ! autoregressive effect, children's learning autonomy
    v1 | Sat; ! random variance of residuals for maternal life satisfaction
    v2 | Auto; ! random variance of residuals for children's learning autonomy
    f BY Sat@1 Auto@1; ! new factor, positive covariance between residuals
    vf | f; ! random covariance between residuals
    %BETWEEN%
    Sat Auto ss-vf WITH Sat Auto ss-vf; ! covariation among all effects
OUTPUT:
    TECH1 TECH8 STANDARDIZED (CLUSTER);
PLOT:
    TYPE = PLOT3;
```

Note: Figure translations are in progress. See original paper for figures.