


Regular Article

Relations among parenting, academic performance, and psychopathology: An investigation of developmental cascades and their interplay with maternal and paternal parenting

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Abstract

Little effort has been made to integrate developmental cascades with maternal/paternal parenting in a single investigation. The present study seeks to test cascading effects among academic and internalizing/externalizing symptoms and their associations with maternal/paternal parenting across three time points from 8 to 10 years. Data for this investigation came from a nationally representative prospective cohort study of children born in April through July of 2008 in South Korea who were followed up annually. The sample included 1,598 families (48.5% girls). Parents rated their parenting and teachers rated children's internalizing/externalizing problems and academic performance. Structural equation modeling showed that externalizing problems were negatively related to academic performance. Academic performance was negatively related to internalizing problems and positively related to maternal/paternal authoritative parenting, which in turn led to children's higher academic performance. Bidirectional relations were found between academic performance and externalizing problems and between paternal authoritative parenting and children's internalizing problems. Findings suggested cascading effects and their associations with parenting were not attributable to child gender, intelligence, or socioeconomic differences. These findings lend support to adjustment erosion and academic incompetence models and underscore the need for greater attention to the role that fathering may play in children's development and mothering.

Keywords: academic performance; authoritative parenting; developmental cascades; externalizing behavior; internalizing behavior

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It is of great interest whether and how one domain of child functioning influences or spreads to other domains of child functioning over time. Such longitudinal cross-domain pathways are referred as “developmental cascades” which are best tested by analyzing longitudinal data on three or more constructs over three or more time points (Masten et al., 2005). The current literature suggests that academic and psychopathology domains during childhood and adolescence spill over into each other (e.g., Moilanen et al., 2010). Child development does not however occur in a vacuum, but rather through parenting. Bronfenbrenner (1994) developed a concept of mesosystem where children's experiences in a particular microsystem, such as parenting at home, spill over to influence their behavior in another microsystem such as, teacher ratings of externalizing behavior at school, and vice versa. Thus, developmental cascades may arise from maternal/paternal parenting at home, which could shape children's behavior and academic performance at school, which in turn affect parenting. Of particular note, while theory and research still lag behind, some researchers suggest differential influences of maternal parenting and paternal parenting on child adjustment in middle childhood or later (Collins & Russell, 1991; Scott et al., 2018). Nevertheless, little effort has been made to integrate both mothers' and fathers' parenting processes with developmental cascades during

this developmental stage in a single investigation. This study is the first to examine associations of maternal and paternal parenting processes reported by parents with children's developmental cascades rated by teachers using a nationally representative sample of South Korean children in middle childhood.

Internalizing and externalizing behaviors and academic performance

Three hypotheses have been proposed for the mechanism of cascading processes among internalizing and externalizing problems and academic competence across time (Moilanen et al., 2010). The adjustment erosion hypothesis stipulates that internalizing and/or externalizing behavioral problems impede academic achievement by interfering with cognitive functioning and classroom learning (Moilanen et al., 2010). Supporting evidence demonstrated a developmental cascade progressing from externalizing symptoms to poorer academic achievement during childhood through adolescence (Deighton et al., 2018; Masten et al., 2005; McCarty et al., 2008; Moilanen et al., 2010; Obradović et al., 2010; Van der Ende et al., 2016; Zhang et al., 2019). Whereas some studies showed a negative longitudinal link from internalizing symptoms in childhood to academic performance in adolescence (Deighton et al., 2018; McCarty et al., 2008; Obradović et al., 2010; Zhang et al., 2019), others reported null findings (Moilanen et al., 2010; Van der Ende et al., 2016). There is speculation that negative cascading effects from internalizing symptoms to academic domains may be pronounced only for those who

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score in the clinical ranges on internalizing symptoms (Masten et al., 2005; Panayiotou & Humphrey, 2018). A meta-analysis showed small negative effects of emotional problems on academic outcomes among adolescents (Riglin et al., 2014), which may not be extended to children in middle childhood. Indeed, some findings indicated that internalizing symptoms interfered with later academic performance only for adolescents but not for children (Deighton et al., 2018). This thus remains an area in need of further investigation.

Internalizing symptoms may counteract the development of externalizing problems possibly because of inhibition of disruptive behavior and withdrawal from deviant peers (Masten et al., 2005; Panayiotou & Humphrey, 2018; Van der Ende et al., 2016). On the other hand, externalizing problems are likely to cause or exacerbate interpersonal difficulties, which in turn may increase risk for internalizing problems (Gromoske & Maguire-Jack, 2012; Moilanen et al., 2010). However, empirical findings regarding directional associations between internalizing and externalizing problems remain difficult to reconcile. Some studies reported no cascade from internalizing to subsequent externalizing problems (Burt & Roisman, 2010; Deighton et al., 2018; Moilanen et al., 2010; van Lier et al., 2012). There is likewise no evidence for reverse directionality (Burt & Roisman, 2010; Deighton et al., 2018; van Lier et al., 2012). Whereas some studies found positive pathways from externalizing to internalizing symptoms (Defoe et al., 2013; Gromoske & Maguire-Jack, 2012; Moilanen et al., 2010; Vaillancourt et al., 2013; Van der Ende et al., 2016), other studies reported negative pathways (Panayiotou & Humphrey, 2018). Thus, further research is deemed necessary.

The academic incompetence hypothesis, on the other hand, posits that academic performance problems can trigger or heighten internalizing and/or externalizing symptoms, given that academic achievement is such an important age-appropriate task of childhood (Moilanen et al., 2010). There is some support for this stance in the literature where poor academic performance had spillover effects on internalizing (Burt & Roisman, 2010; Deighton et al., 2018; Masten et al., 2005; Maughan et al., 2003; Moilanen et al., 2010; Obradović et al., 2010; Vaillancourt et al., 2013; Zhang et al., 2019; van Lier et al., 2012) and externalizing (Deighton et al., 2018; Vaillancourt et al., 2013; Van der Ende et al., 2016; Yu & Gamble, 2010; Zhang et al., 2019) symptoms.

The shared risk hypothesis proposes that cascading effects might be accounted for by third variables such as intelligence, parenting, and family socioeconomic status (SES) (Masten & Curtis, 2000; Moilanen et al., 2010). While these factors are a set of potential causes implicated in academic attainment and psychopathology in childhood, it has been suggested that their influences on developmental cascades could be less evident (Burt & Roisman, 2010; Deighton et al., 2018; Masten et al., 2005; Maughan et al., 2003; Moilanen et al., 2010; Panayiotou & Humphrey, 2018; Van der Ende et al., 2016; Zhang et al., 2019). Only a few studies so far have simultaneously controlled for all these variables. The present work addresses this gap by including intelligence and family SES as covariates and testing bidirectional effects between developmental cascades and maternal/paternal parenting.

Association of parenting with internalizing/externalizing behaviors and academic performance

Authoritative parenting refers to a child-rearing style characterized by affectionate, responsive support, involvement, but firm behavioral control (Steinberg et al., 1992). Parental cognitive stimulation can be defined as the degree to which parents actively engage in supporting their children's learning (McGroder, 2000).

Thus, these two concepts are entangled with each other (McGroder, 2000; Steinberg et al., 1992). The results of meta-analyses showed that authoritative or positive parenting had beneficial effects on children's academic outcomes (Pinquart & Kauser, 2018) and internalizing (Pinquart, 2017b) and externalizing (Pinquart, 2017a) symptomatology. However, authoritative or positive parenting was found to be only weakly associated with subsequent internalizing and externalizing symptoms (Pinquart, 2017a, 2017b). Furthermore, the associations of internalizing or externalizing symptoms with positive dimensions of parenting were found to be bidirectional (Pinquart, 2017a, 2017b).

In the same manner, parenting and academic performance are most likely bidirectionally associated; yet, most existing research has exclusively focused on pathways from parenting to academic performance. In light of the limited evidence base, Xiong et al. (2021) suggested the evocative effect of adolescent children's academic achievement on parental involvement rather than the opposite direction. The present study represents an attempt to add further empirical evidence on bidirectional relationships between parenting and child adjustment such as academic performance and internalizing/externalizing problems. Of note, in the Northeast Asian countries where Confucian values are pervasive, parents put top priority on education as a fundamental pillar of development (Xiong et al., 2021; Yu, 2010, 2019; Zhang et al., 2019). It would therefore be worthwhile to investigate the nature of the relation of children's academic performance with parenting.

While there still remains a dearth of research on paternal parenting and children's academic performance and psychopathology, Zhu et al. (in press) showed that perceived support from fathers was more strongly related to adolescents' academic engagement than support from mothers. In addition, Möller et al. (2016)'s meta-analysis reported that paternal parenting was associated more strongly with children's anxiety symptoms than was maternal parenting. Because of the nurturing, caring, and affective aspects of maternal parenting and the instrumental, task-oriented, and disciplinary aspects of paternal parenting, some scholars suggest that maternal parenting is likely to be more pronounced until early childhood and paternal parenting tends to be more influential during middle childhood or later (Collins & Russell, 1991; Gamble & Yu, 2014; Scott et al., 2018). This study attempts to fill in parts of the puzzle by examining the association of paternal parenting with children's academic performance and internalizing/externalizing symptoms during middle childhood.

Parent and child gender

Developmental cascades may vary by gender in childhood. For example, Panayiotou and Humphrey (2018) reported that the adjustment erosion hypothesis was upheld for boys, whereas the academic incompetence hypothesis was supported for girls. However, others found no such gender-specific cascading processes (Burt & Roisman, 2010; Deighton et al., 2018; Van der Ende et al., 2016; Zhang et al., 2019). Just as there is limited evidence concerning if developmental cascade pathways vary significantly as a function of child gender, there is also a dearth of evidence concerning whether transactions between parenting and child adjustment over time vary by parent and child gender. The present study seeks to fill this void.

The present study

Effective interventions at preventing negative cascades and at promoting quality parenting necessitate accurate knowledge of cascading processes and their relations to parenting over time. Yet, no studies to date have investigated the longitudinal relations among the five constructs (i.e., academic performance, internalizing/externalizing problems, and maternal/paternal parenting) in a single analysis. In particular, middle childhood is a distinct developmental period marked by tremendous variations in internalizing/externalizing symptoms and academic performance (Gamble & Yu, 2008; Holopainen et al., 2020; Kjeldsen et al., 2021; Merikangas et al., 2010) as well as more diversified and complicated parenting of mothers and fathers (Collins & Russell, 1991; Scott et al., 2018; Yu & Ko, 2013; Yu, 2019), thus warranting further investigation into developmental cascades and their interactions with maternal and paternal parenting.

This study seeks to fill the gaps in the literature in several ways. First, the present investigation represents the first effort to bring together a developmental cascade model where (mal)adaptation rated by teachers in one developmental domain spreads over domains and time and its interplay with maternal and paternal parenting at home. Second, the present analysis controls for intelligence and family SES that have rarely been controlled for in a single cascade model. Third, given that prior work examining the above two types of relations in children has been predominantly conducted based on samples from Western countries, this study makes a contribution to the literature by using a nationally representative sample of South Korean children born between April and July, 2008. Finally, of the small number of studies that have tested gender differences in cascading or parenting processes, findings have proven inconclusive. Relatedly, there has been a lack of research on fathering. In an effort to address these issues, the current study explores whether maternal and paternal parenting behaviors are differentially associated with child adjustment (i.e., academic performance and internalizing/externalizing problems) and whether the cascading and maternal/paternal parenting processes vary by child gender. Taken together, the present study seeks to test cascading effects among academic and internalizing/externalizing symptoms and their reciprocity with maternal/paternal parenting across three time points from 8 to 10 years, while taking into account gender differences and controlling for potential covariates such as intelligence and family SES.

The following hypotheses are tested: (1) Externalizing problems will negatively predict academic performance, (2) Because of the inconsistent findings pertaining to the internalizing symptoms → academic performance link, no specific hypothesis will be proposed, (3) Academic performance will negatively predict both externalizing and internalizing problems, (4) No specific hypothesis will be formulated as to bidirectional relations between internalizing and externalizing problems given mixed findings, (5) Maternal and paternal parenting will be bidirectionally associated with children's internalizing/externalizing problems and academic performance, and (6) It will be examined whether interchanges between developmental cascades and maternal/paternal parenting differ by child gender without a specific hypothesis because of limited evidence.

Method

Participants

Data for this investigation came from the Panel Study on Korean Children (PSKC), a nationally representative ongoing prospective

cohort study of children born in April through July of 2008 in South Korea. The PSKC began collecting data based on multistage probability cluster sampling annually among 2,150 two-parent heterosexual families in 2008. Families were recruited through 30 hospitals with at least 500 deliveries in 2006 across six regions of the country to represent the population of South Korean two-parent families with newborns in the period from April to July 2008. The sample for the current analyses included 1,598 families (48.5% girls) who had at least one data point from 2016 to 2018 (hereafter T1, T2, and T3). The mean ages of mothers and fathers were respectively 38.8 ($SD = 3.65$) and 41.2 years ($SD = 3.95$) at baseline (child age 8 years). Almost all mothers (99.6%) and fathers (99.5%) had completed high school or equivalent. Average family income was \$4,197 ($SD = 1,948$) per month at T1. At T1, 2, and 3, 929, 633, and 709 school teachers, respectively, participated in the survey. The vast majority were females (84.7%, 81.8%, and 73.6%) with mean ages of 41.8 ($SD = 10.42$), 40.0 ($SD = 9.91$), and 38.2 ($SD = 9.18$) years, respectively. Neither gender nor age of the teachers was significantly related to children's academic performance or internalizing/externalizing problems. Of note, each school year brought new teachers who reported on one child only. Because of the anonymized public data (https://panel.kicce.re.kr/pskc/module/rawDataManage/index.do?menu_idx=56), ethical review was not required.

Percentages of missing data ranged from 0% (child gender) to 60.4% (academic performance and internalizing and externalizing problems at T2), with the average at 20.8%. Similarly, the missing rate for academic performance and internalizing and externalizing problems at T3 was 55.6%. Children with missing data on academic performance and internalizing and externalizing problems at T2 ($F(1, 966) = 5.26, p < .05, Ms = 1.75$ vs 1.69) or at T3 ($F(1, 966) = 9.16, p < .01, Ms = 1.77$ vs 1.68) had more positive fathering at T1 than those with non-missing data, with a negligible effect size ($\eta_p^2 = .01$). Children with any missing data over time scored lower on paternal authoritative parenting at T3 ($F(1, 966) = 13.45, p < .001, Ms = 3.66$ vs 3.80) than those with complete data, with a negligible effect size ($\eta_p^2 = .01$). No other significant differences were found in any other variables.

Measures

Academic performance (child age 8–10)

Teachers rated children's academic performance with 7, 10, and 11 items (e.g., reading, writing, math) at T1, T2, and T3, respectively, on a five-point scale (1 = *bottom 20%* to 5 = *top 20%*). A sample item includes "Compared to the other students, how well does this student write?" Cronbach alphas were .96, .98, and .97 for girls and .97, .97, .98 for boys at T1, T2, and T3, respectively.

Internalizing behaviors (child age 8–10)

Teacher ratings on the emotional (five items; "often unhappy, down-hearted or tearful") and peer (five items; "rather solitary, tends to play alone") problems subscales of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) were used to index internalizing behavior problems (Di Riso et al., 2010; Dickey & Blumberg, 2004; Goodman et al., 2010). A validated Korean version of the SDQ was administered in this study (Ahn et al., 2003). Each SDQ item was rated from 0 (*not true*) to 2 (*certainly true*). Summed scores for each subscale can be classified as normal (0–4 for emotional and 0–3 for peer problems), borderline (5 for emotional and 4 for peer problems), and abnormal (6–10 for emotional and 5–10 for peer problems). In

community samples, approximately 80% of children are classified as normal, 10% borderline, and 10% abnormal (Goodman, 1997). Cronbach's alphas at T1, T2, and T3 were .71, .71, .64 for girls and .75, .72, .71 for boys.

Externalizing behaviors (child age 8–10)

Children's externalizing problems were measured with teacher ratings of the Korean version SDQ's conduct problems (five items; "often lies or cheats") and hyperactivity subscales (five items; "constantly fidgeting or squirming"). All items were rated on a three-point scale (0 = *not true*, 2 = *certainly true*). Summed scores for each subscale can fall into three categories: normal (0–2 for conduct problems and 0–5 for hyperactivity), borderline (3 for conduct problems and 6 for hyperactivity), and abnormal (4–10 for conduct problems and 7–10 for hyperactivity). Cronbach alphas were .83, .79, and .74 for girls and .85, .85, and .86 for boys at T1, T2, and T3, respectively. The broader Internalizing/Externalizing scales are deemed appropriate for use among a community sample of children (Di Riso et al., 2010; Dickey & Blumberg, 2004; Goodman et al., 2010).

Parenting (child age 8–10)

At T1, parenting behaviors regarding cognitively stimulating activities at home were assessed with eight items adapted from the Home Observation for Measurement of the Environment scale (Caldwell et al., 1984). It was translated and validated by PSKC researcher team members and has also been used in South Korean parents (e.g., Yim et al., 2022). A sample item includes "In a typical week how often do you read to your child?" Mothers and fathers rated all items on a four-point scale (1 = *never* to 4 = *everyday*). Cronbach alphas of maternal and paternal cognitive stimulation were .81 and .83 for girls and .79 and .83 for boys.

At T2 and 3, mothers and fathers completed the 27-item authoritative parental behavior from the Parenting Practices Questionnaire (Robinson et al., 1995), which was translated and validated by PSKC researcher team members. The Korean version of the questionnaire has been widely used (e.g., Yang & Kim, 2021). A sample item is "I am responsive to our child's feelings or needs." All items were rated on a five-point scale ranging from 1 (*never*) to 5 (*always*). Cronbach alphas of maternal authoritative parenting at T2 and T3 were .91 and .91 for girls and .91 and .90 for boys and those of paternal authoritative parenting at T2 and T3 were .93 and .91 for girls and .92 and .92 for boys.

Intelligence (child age 8)

Multi-Factorial Intelligence Test (M-FIT; Lee et al., 2014) was used by trained examiners to test children's intellectual learning abilities at T1. The test contains 20 multiple-choice questions from each subtest, totaling 120 questions: word fluency, verbal analogy, graphical representation, numerical ability, spatial perception, and reasoning ability. T scores on each of the six subtests were used. Mean T-scores ≥ 56 correspond to a percentile rank of 73 or higher, between 45 and 55 percentile ranks from 30 to 70, and ≤ 44 a percentile rank of 27 or lower.

A total of 374 children were administered the Korean version of the Wechsler Preschool and Primary Scale of Intelligence-Revised (K-WPPSI-R; Park et al., 1996; Wechsler, 1989) at age five and the M-FIT at age eight. Verbal IQ of the K-WPPSI-R was significantly correlated with word fluency ($r = .42$), verbal analogy ($r = .46$), graphical representation ($r = .37$), and numerical ability ($r = .38$) of the M-FIT all at $p < .001$. Performance IQ of the K-WPPSI-R also significantly correlated with spatial perception ($r = .36$) and

with reasoning ability ($r = .34$) of the M-FIT both at $p < .001$. Correlation coefficients of Full-Scale IQ scores on the K-WPPSI-R with the subtest scores on the M-FIT ranged from .34 to .46 (all significant at $p < .001$).

Family SES (child age 8)

Family SES was assessed from three components: family income, mother's education, and father's education.

Analytic strategy

A multigroup confirmatory factor analysis (MGCFA) was run to verify hypothesized relationships between observed variables and their underlying latent constructs (i.e., family SES and child intelligence) and to assess the measurement equivalence of the constructs across child gender. A multigroup structural equation model (MGSEM) was then conducted to examine temporal relationships between the study variables and their equivalence across gender. Missing data were addressed with multiple imputation (MI). A sensitivity analysis using a pattern-mixture approach was performed to determine robustness of results between children with and without complete data (Hedeker & Gibbons, 1997; Little, 1993).

Model fit was evaluated by the chi-square value, the comparative fit indexes (CFI), and the root mean square error approximation (RMSEA). CFI and RMSEA values approximating .95 and .06 respectively indicate good fit (Hu & Bentler, 1999). A nonsignificant χ^2 change and changes in CFI of less than .01 and RMSEA of less than .01 were used to test measurement equivalence and a nonsignificant χ^2 change was used to investigate structural parameter equivalence (Cheung & Rensvold, 2002; Rutkowski & Svetina, 2014). AMOS 26 was used to test all models.

Results

Table 1 shows descriptive statistics and child-gender differences using multivariate analysis of variance (MANOVA). While MANOVA revealed no significant gender differences in family SES, maternal/paternal parenting, or internalizing problems (i.e., emotional and peer problems), significant gender differences were found in intelligence, externalizing problems (i.e., conduct problems and hyperactivity), and academic performance. Follow-up univariate analyses of variance (ANOVAs) showed that girls had significantly higher scores on word fluency ($F(1, 1491) = 48.51$, $p < .001$, $\eta_p^2 = .03$), verbal analogy ($F(1, 1491) = 19.44$, $p < .001$, $\eta_p^2 = .01$), and graphical representation ($F(1, 1491) = 20.86$, $p < .001$, $\eta_p^2 = .01$), but lower scores on numerical ability ($F(1, 1491) = 11.59$, $p < .01$, $\eta_p^2 = .01$) than boys. Regarding externalizing problems, ANOVAs found that teachers rated boys significantly higher than girls on conduct problems (T1, $F(1, 289) = 7.03$, $p < .01$, $\eta_p^2 = .02$; T2, $F(1, 289) = 4.98$, $p < .05$, $\eta_p^2 = .02$; T3, $F(1, 289) = 7.84$, $p < .01$, $\eta_p^2 = .03$) and hyperactivity (T1, $F(1, 289) = 51.94$, $p < .001$, $\eta_p^2 = .15$; T2, $F(1, 289) = 28.80$, $p < .001$, $\eta_p^2 = .09$; T3, $F(1, 289) = 14.89$, $p < .001$, $\eta_p^2 = .05$) across the three time points. ANOVAs also revealed that teachers rated girls' academic performance significantly higher than that of boys across the three time points (T1, $F(1, 289) = 5.84$, $p < .05$, $\eta_p^2 = .02$; T2, $F(1, 289) = 4.92$, $p < .05$, $\eta_p^2 = .02$; T3, $F(1, 289) = 6.98$, $p < .01$, $\eta_p^2 = .02$).

The vast majority of the children were classified as normal based on the SDQ across the three time points: emotional problems, 92.5%, 93.6%, and 96.7% for boys and 94.9%, 94.1%, and 95.6% for girls; peer problems, 81.3%, 85.6%, and 88.8% for boys

Table 1. Means and standard deviations, and multivariate analysis of variance in the study variables

Measure	Boy		Girl		η_p^2	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Monthly household income ^a	4.81	2.20	4.94	2.33	Hotelling's $T^2 = .00$, $F(3, 1470) = 1.08$, <i>ns</i>	.00
M. education ^b	3.21	.90	3.19	.96		
F. education ^b	3.38	.97	3.37	1.03		
Word	54.70	10.53	58.46	10.34	Hotelling's $T^2 = .09$, $F(6, 1486) = 21.00$, $p < .001$.08
Verbal	56.21	9.90	58.38	9.05		
Graphic	53.18	9.75	55.40	9.05		
Numerical	54.78	10.21	53.08	9.09		
Spatial	56.98	10.72	56.65	10.33		
Reasoning	55.90	11.34	56.01	10.49		
M. cognitive stimulation T1	2.09	.49	2.09	.50	Hotelling's $T^2 = .00$, $F(6, 961) = .70$, <i>ns</i>	.00
F. cognitive stimulation T1	1.71	.45	1.74	.46		
M. authoritative parenting T2	3.84	.38	3.85	.39		
F. authoritative parenting T2	3.66	.44	3.70	.45		
M. authoritative parenting T3	3.84	.39	3.86	.40		
F. authoritative parenting T3	3.66	.45	3.69	.43		
Emotional problems T1	1.39	1.78	1.27	1.64	Hotelling's $T^2 = .43$, $F(6, 284) = 2.04$, $p < .10$.04
Emotional problems T2	1.28	1.78	1.22	1.62		
Emotional problems T3	1.04	1.51	1.10	1.50		
Peer problems T1	2.10	1.85	1.74	1.63		
Peer problems T2	1.73	1.60	1.63	1.74		
Peer problems T3	1.53	1.50	1.47	1.46		
Conduct problems T1	1.71	1.63	1.06	1.32	Hotelling's $T^2 = .22$, $F(6, 284) = 10.30$, $p < .001$.18
Conduct problems T2	1.64	1.71	1.04	1.24		
Conduct problems T3	1.55	1.52	1.00	1.07		
Hyperactivity T1	3.37	2.77	1.47	1.93		
Hyperactivity T2	2.78	2.69	1.30	1.78		
Hyperactivity T3	2.56	2.59	1.20	1.78		
Academic performance T1	4.05	.96	4.35	.81	Hotelling's $T^2 = .04$, $F(3, 287) = 3.38$, $p < .05$.03
Academic performance T2	4.28	.86	4.36	.90		
Academic performance T3	4.14	.90	4.41	.73		

Note. ^aThe unit is 1,000,000 won. ^bParental educational attainment was coded 1 = middle school degree or below to 5 = post-graduate degree. M. = Mother. F. = Father.

and 86.8%, 86.6%, and 90.7% for girls; conduct problems, 76.3%, 78.2%, and 81.9% for boys and 90.1%, 89.6%, and 91.9% for girls; and hyperactivity, 77.8%, 83.1%, and 86.0% for boys and 94.7%, 96.1%, and 95.3% for girls.

Table 2 shows correlations among the study variables. While correlations were in generally expected directions, there were some gender differences and interactions between parents' gender and children's gender. For example, word fluency and academic performance at age eight were positively correlated with paternal authoritative parenting at age 10, while internalizing behavior was negatively correlated in boys; however, there were no such correlations in girls. While some inverse correlations were observed between intelligence and later internalizing/externalizing behavior in boys, no such clear correlations were observed in girls. Academic performance tended to be positively correlated with both maternal and paternal authoritative parenting, whereas externalizing

behavior tended to be negatively correlated in boys; however, such correlations were less evident in girls.

An MGCFA was undertaken to assess measurement invariance of the latent constructs (i.e., family SES and M-FIT) across boys and girls and yielded a good fit to the data, $\chi^2(52) = 159.69$, $p < .001$; CFI = .97; RMSEA = .036, 90% CI = .030, .042. All standardized factor loadings were significant at $p < .001$ and above .36. Given that the same factor structure was found for each gender, configural invariance was supported. All the factor loadings were then constrained to be equivalent across groups to test for full metric invariance, $\chi^2(59) = 172.05$, $p < .001$; CFI = .97; RMSEA = .035, 90% CI = .029, .041. Because the fit indexes did not deteriorate, full metric invariance was retained, $\Delta\chi^2(7) = 12.36$, $p < .10$; Δ CFI = .002; Δ RMSEA = .001. Equality constraints were subsequently placed on factor loadings and item intercepts across groups to test full scalar invariance, but the model fit was

Table 2. Bivariate correlations for the study variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Monthly household income ^a	—	.34***	.29***	.11**	.12**	.16***	.12**	0.03	.06†	0.06	-.09†	-.05
2. M. education ^b	.27***	—	.62***	.28***	.22***	.19***	.17***	.15***	.09*	.10*	-.05	-.05
3. F. education ^b	.27***	.59***	—	.25***	.19***	.23***	.16***	.17***	.11**	0.05	-.04	-.10*
4. Word	.14***	.19***	.23***	—	.47***	.38***	.33***	.21***	.22***	-.01	-.12*	-.19***
5. Verbal	.10***	.21***	.18***	.56***	—	.38***	.35***	.22***	.20***	-.04	-.09†	-.19***
6. Graphic	.16***	.19***	.17***	.49***	.45***	—	.40***	.21***	.30***	-.01	-.07	-.13*
7. Numerical	.16***	.19***	.19***	.51***	.49***	.52***	—	.15***	.28***	0	-.08	-.06
8. Spatial	.12**	.14***	.11**	.26***	.29***	.37***	.35***	—	.27***	0.06	-.02	-.01
9. Reasoning	.09*	.15***	.13***	.32***	.32***	.42***	.40***	.37***	—	-.05	-.11*	-.11*
10. M. cognitive stimulation T1	.06†	.12**	.09*	-.04	-.05	-.03	0.01	0.03	-.01	—	-.03	-.09†
11. Internalizing T1	-.05	-.08†	-.10*	-.16***	-.21***	-.16***	-.17***	-.06	-.06	0.07	—	.47***
12. Externalizing T1	-.04	-.16***	-.20***	-.19***	-.24***	-.23***	-.19***	-.20***	-.16***	0.03	.40***	—
13. Academic performance T1	.16***	.16***	.17***	.43***	.44***	.36***	.42***	.33***	.24***	-.04	-.39***	-.46***
14. F. cognitive stimulation T1	.09*	.13**	.11**	.07†	.07†	0.03	0.06	0.06	0.01	.29***	0.07	-.01
15. M. authoritative parenting T2	.13**	.15***	.15***	.07†	.11**	0.04	.12**	0.05	0.05	.37***	0.04	-.11*
16. Internalizing T2	0.02	-.03	-.06	-.06	-.04	-.06	-.13*	-.02	-.01	-.00	.25***	.13*
17. Externalizing T2	0.06	-.11†	-.12*	0	-.10†	-.12*	-.16**	-.07	-.03	-.02	.17***	.53***
18. Academic performance T2	0.05	0.07	.11†	.27***	.26***	.23***	.30***	.16**	.15**	.10†	-.16*	-.20**
19. F. authoritative parenting T2	.08†	.13**	.16***	.14**	.11**	.08†	.08†	-.01	0.06	0.02	-.07	-.04
20. M. authoritative parenting T3	.12**	.15***	.14***	.09*	.10*	0.06	.13**	0.06	.09*	.32***	-.03	-.11*
21. Internalizing T3	-.05	-.05	-.16**	-.15**	-.14**	-.15**	-.11*	-.19***	-.11*	0	.33***	.21**
22. Externalizing T3	0.01	-.11*	-.11†	-.10†	-.20***	-.19***	-.14**	-.19***	-.19***	-.11*	.11†	.53***
23. Academic performance T3	.10†	.20***	.21***	.46***	.42***	.30***	.38***	.31***	.28***	.15**	-.18**	-.44***
24. F. authoritative parenting T3	.10*	.09*	.18***	.15***	.10*	.08*	.10*	0.02	0.01	0.03	-.17**	-.07
Variable	13	14	15	16	17	18	19	20	21	22	23	24
1. Monthly household income ^a	.09†	0.03	.14***	-.04	0	.11†	.07†	.10**	0.06	-.04	0.09	0.02
2. M. education ^b	.13**	.09*	.15***	-.02	-.06	.23***	.15***	.14***	-.03	-.11†	.19***	.11**
3. F. education ^b	.19***	.12**	.11**	-.02	-.06	.26***	.18***	.14**	0.01	-.12*	.24***	.10*
4. Word	.42***	-.03	.14***	-.11†	-.10†	.33***	.09*	.11**	-.09	-.10†	.33***	0.03
5. Verbal	.37***	-.03	0.04	-.12*	-.08	.24***	.08*	.09*	-.07	-.07	.21***	.07†
6. Graphic	.32***	0.03	0.05	-.13*	-.14*	.20***	.10*	.08*	-.07	-.14*	.31***	0.06
7. Numerical	.28***	-.06†	-.01	-.10†	-.12*	.21***	0	-.01	-.15**	-.12*	.28***	0.01
8. Spatial	.10*	0	0.05	0.02	0.07	0.04	0.03	.09*	-.04	-.11*	.17**	0
9. Reasoning	.23***	-.01	-.07†	0.06	-.10†	.15*	0.03	-.08*	-.09	-.12*	.19**	-.04

10. M. cognitive stimulation T1	0.02	.29***	.33***	0	-0.06	-0.01	.13**	.29***	0.03	-0.03	0.03	.11**
11. Internalizing T1	-.33***	-.02	-.10†	.31***	.15*	-.13*	-.01	-.05	.33***	.15*	-.23***	0.02
12. Externalizing T1	-.48***	-.11*	-.11*	.23***	.33***	-.27***	-.10†	-.09†	.22***	.36***	-.33***	-.06
13. Academic performance T1	—	-.01	0.03	-.22**	-.21**	.41***	0.06	0.05	-.17**	-.28***	.51***	-.02
14. F. cognitive stimulation T1	-.02	—	.18***	0.01	-.02	-.01	.32***	.11**	-.01	-.03	0.02	.31***
15. M. authoritative parenting T2	.11*	.16***	—	-.07	-.02	0.01	.39***	.69***	0.06	-.02	0.02	.29***
16. Internalizing T2	-.22**	-.07	-.01	—	.42***	-.27***	-.01	-.02	.30***	.20**	-.18*	-.02
17. Externalizing T2	-.16*	-.07	-.06	.40***	—	-.41***	-.04	-.04	.19*	.44***	-.33***	-.02
18. Academic performance T2	.40***	.11†	0.06	-.33***	-.34***	—	0.02	0.04	-.24**	-.33***	.38***	-.07
19. F. authoritative parenting T2	.13**	.31***	.27***	-.03	-.03	0.11	—	.35***	-.01	-.08	.11†	.68***
20. M. authoritative parenting T3	.18***	.12**	.72***	-.06	-.06	0.02	.23***	—	.10†	-.09†	0.03	.32***
21. Internalizing T3	-.23***	0.02	-.08	.28***	0.12	-.15†	-.12*	-.09†	—	.33***	-.38***	-.09
22. Externalizing T3	-.26***	-.06	-.18**	.16*	.47***	-.23**	-.07	-.12*	.43***	—	-.56***	-.09
23. Academic performance T3	.59***	.14*	.17**	-.18*	-.27***	.41***	.14*	.19***	-.39***	-.48***	—	0.09
24. F. authoritative parenting T3	.19***	.37***	.16***	-.12*	-.04	.10†	.69***	.25***	-.16**	-.13*	.14*	—

Note. Girls are displayed above the diagonal; boys are displayed below the diagonal. †The unit is 1,000,000 won. ‡Parental educational attainment was coded 1 = middle school degree or below to 5 = post-graduate degree. M. = Mother. F. = Father. †p < .10. *p < .05. **p < .01. ***p < .001.

significantly worse than that of the full metric invariance model, $\chi^2(68) = 298.97, p < .001$; CFI = .93; RMSEA = .046, 90% CI = .041, .052; $\Delta\chi^2(9) = 126.92, p < .001$; Δ CFI = .036; Δ RMSEA = .011. Therefore, partial scalar invariance was achieved after freeing the intercepts of word fluency, verbal analogy, graphical representation, and numerical ability across groups, $\chi^2(64) = 174.99, p < .001$; CFI = .97; RMSEA = .033, 90% CI = .027, .039; $\Delta\chi^2(5) = 2.95, ns$; Δ CFI = .001; Δ RMSEA = .002. Specifically, item intercepts of word fluency, verbal analogy, and graphical representation were higher for girls, while that of numerical ability was higher for boys. A latent mean of family SES in each group was also compared by constraining the mean of boys to be zero, $\chi^2(63) = 174.97, p < .001$; CFI = .97; RMSEA = .033, 90% CI = .028, .039. This model was not significantly different from the model with equal means of the latent factor, $\Delta\chi^2(1) = .02, ns$; Δ CFI = .001; Δ RMSEA = .000, supporting latent mean invariance. Given that full scalar invariance for the M-FIT was not supported, no test for factor mean invariance was carried out (Steenkamp & Baumgartner, 1998).

An MGSEM was next employed to test the structural path invariance across groups. An unrestricted model where all structural paths were allowed to vary, $\chi^2(342) = 813.96, p < .001$; CFI = .96; RMSEA = .029, 90% CI = .027, .032, was compared with a restricted model where all the paths were constrained to be equivalent across gender, $\chi^2(408) = 930.62, p < .001$; CFI = .96; RMSEA = .028, 90% CI = .026, .031. Because the difference between the two was significant, $\Delta\chi^2(66) = 116.66, p < .001$, the constrained paths were released one by one until a nonsignificant difference was observed (Keith, 2019; Little, 2013). Seven paths were found to vary by gender, $\chi^2(401) = 882.42, p < .001$; CFI = .96; RMSEA = .027, 90% CI = .025, .030 and this model was not significantly different from the fully unrestricted model, $\Delta\chi^2(59) = 68.46, ns$ (see Figure 1).

Family SES was positively associated with children’s intelligence and mothers’/fathers’ cognitive stimulation. Child intelligence was negatively associated with internalizing and externalizing behavior and maternal cognitive stimulation, whereas positively associated with academic performance. Among girls, but not boys, intelligence was negatively associated with paternal cognitive stimulation.

Internalizing behavior at T1 negatively predicted externalizing behavior at T2. Externalizing behavior at T1 negatively predicted both maternal authoritative parenting at T2 and academic performance at T2. Academic performance at T1 positively predicted both maternal and paternal authoritative parenting at T2 and negatively predicted internalizing behavior at T2. Among boys, but not girls, academic performance at T1 positively predicted externalizing behavior at T2. Paternal cognitive stimulation at T1 positively predicted maternal authoritative parenting at T2.

Internalizing behavior at T2 positively predicted academic performance at T3, but negatively predicted paternal authoritative parenting at T3. Academic performance at T2 negatively predicted both internalizing and externalizing behavior at T3 and externalizing behavior at T2 negatively predicted academic performance at T3. Maternal authoritative parenting at T2 positively predicted internalizing behavior at T3. Paternal authoritative parenting at T2 positively predicted both academic performance and maternal authoritative parenting at T3 and negatively predicted internalizing behavior at T3. Across-time stability effects were found for the same or similar variables (i.e., cognitive stimulation to authoritative parenting),

with boys showing more stable patterns of externalizing behavior from T1 to T2 and academic performance from T1 to T3.

A sensitivity analysis was conducted to determine whether the results remained the same across complete and incomplete data groups. The results of the MGCFA indicated that full configural ($\chi^2(52) = 178.87$, $p < .001$; CFI = .96; RMSEA = .039, 90% CI = .033, .045), metric ($\chi^2(59) = 183.05$, $p < .001$; CFI = .96; RMSEA = .036, 90% CI = .030, .042; $\Delta\chi^2(7) = 4.17$, *ns*; Δ CFI = .000; Δ RMSEA = .003), and scalar invariance ($\chi^2(68) = 195.81$, $p < .001$; CFI = .96; RMSEA = .034, 90% CI = .029, .040; $\Delta\chi^2(9) = 12.76$, *ns*; Δ CFI = .001; Δ RMSEA = .002) was established across the groups. Support was also found for the latent mean invariance of family SES ($\chi^2(67) = 194.68$, $p < .001$; CFI = .96; RMSEA = .035, 90% CI = .029, .040; $\Delta\chi^2(1) = 1.13$, *ns*; Δ CFI = .000; Δ RMSEA = .001) and M-FIT ($\chi^2(67) = 195.69$, $p < .001$; CFI = .96; RMSEA = .035, 90% CI = .029, .040; $\Delta\chi^2(1) = 1.13$, *ns*; Δ CFI = .000; Δ RMSEA = .001) across the groups. The MGSEM results showed that the difference between an unrestricted ($\chi^2(342) = 814.96$, $p < .001$; CFI = .97; RMSEA = .029, 90% CI = .027, .032) and a restricted models ($\chi^2(412) = 880.81$, $p < .001$; CFI = .97; RMSEA = .027, 90% CI = .024, .029) was not significant, either ($\Delta\chi^2(70) = 65.84$, *ns*). Thus, all the structural path coefficients were found to be equal across the groups. Overall, the sensitivity analysis suggested that the main analysis remained largely unaffected by missing data. The only difference was that externalizing behavior at T1 significantly negatively predicted paternal authoritative parenting at T2 in the sensitivity analysis, whereas this path was marginally significant in the original analysis.

Discussion

This study represents a first attempt at investigating the association of developmental cascades across internalizing/externalizing symptoms and academic performance rated by teachers with maternal/paternal parenting reported by parents from 8 to 10 years. The current work addressed this void by using the longitudinal data drawn from a nationally representative sample of children in South Korea and an MGSEM, while also including relevant covariates such as intelligence and family SES. The findings supported both adjustment erosion (particularly pathways from externalizing problems to academic performance) and academic incompetence (particularly pathways from academic performance to internalizing problems) hypotheses. Teacher ratings of children's academic performance were prospectively related to higher maternal and paternal authoritative parenting, which in turn led to children's higher academic performance. Children's externalizing problems rated by teachers subsequently negatively predicted maternal authoritative parenting rated by mothers. In addition, children's internalizing problems reported by teachers and paternal authoritative parenting rated by fathers were negatively and reciprocally related to each other, all highlighting the interdependent mesosystemic influences (Bronfenbrenner, 1994). Thus, the present study sheds light not only on developmental cascades but also their linkages with maternal and paternal parenting during this developmental period in the single analysis. Of note, the association of cascading effects with parenting in the model were largely invariant across child gender.

Externalizing problems were found to be consistently inversely related to subsequent academic performance over time, supporting the first hypothesis. These findings thus suggest that elementary

children with externalizing problems are at increased risk for exhibiting poor academic performance or those with less externalizing problems are likely to achieve greater academic performance (Deighton et al., 2018; Masten et al., 2005; McCarty et al., 2008; Moilanen et al., 2010; Obradović et al., 2010). Transactional effects were also observed between academic performance and externalizing symptoms during ages 9–10 years, meaning that children with better academic performance at age 9 were less likely to exhibit externalizing behaviors at age 10 and children with less externalizing behaviors at age 9 were more likely to perform better academically at age 10 (Defoe et al., 2013; McCarty et al., 2008; Zimmermann et al., 2013). Adding to limited evidence of the bidirectional relationship between academic performance and externalizing problems (e.g., Zhang et al., 2019; Zimmermann et al., 2013), the current findings suggest that children exhibiting externalizing behaviors are apt to distract themselves from school work through disruptive, non-compliant behaviors and low-achieving children may be prone to engage in problem behavior to escape from difficult academic activities. Conversely, it is likely that children who do not engage in hyperactive, disruptive, and aggressive behaviors may immerse themselves in task-focused learning activities and high-achieving children may behave in more socially acceptable ways not to undermine their relationships with others (i.e., classmates, teachers) (e.g., Yu & Gamble, 2010). Unexpectedly, contrary to the academic incompetence hypothesis and the extant literature, high academic performance at age 8 was found to lead to greater externalizing problems at age 9 among boys. Albeit difficult to interpret, given that the school culture in South Korea values academic performance highly (Yu, 2010, 2019), high academic achieving boys may feel privileged and inflated self-regard and thus may engage in externalizing behavior (Brummelman et al., 2015; Hughes et al., 1997; Westen et al., 2012). This finding, however, should be interpreted with caution until further evidence comes to light.

Results on the second hypothesis showed that internalizing symptoms at 9 years positively contributed to academic performance at 10 years, running counter to evidence suggesting that internalizing symptoms may undermine academic performance (Deighton et al., 2018; McCarty et al., 2008; Obradović et al., 2010; Riglin et al., 2014). This unexpected finding, however, aligns with previous research by Evans et al. (2020), who found that internalizing symptoms of the SDQ (the same as in the present study) at 11 years predicted mathematics attainment at 13–14 and 15–16 years. Similarly, a small body of literature reported positive longitudinal effects of anxiety on academic achievement outcomes in children, suggesting the possible role of anxiety as a spur to greater efforts (e.g., Voltas et al., 2014). Thus, the positive effect of internalizing symptoms \rightarrow academic performance may make it necessary to investigate effects of depression and anxiety on academic performance separately (Riglin et al., 2014).

Confirming the third hypothesis, academic performance exerted consistently negative cascading effects on internalizing symptoms (Burt & Roisman, 2010; Maughan et al., 2003; Obradović et al., 2010; Vaillancourt et al., 2013; van Lier et al., 2012). These findings suggest that academic difficulties that children experience are likely to lead to negative affect and negative self-evaluations and which in turn may put them at greater risk for subsequent internalizing problems during the early school years, supporting the academic incompetence hypothesis (Moilanen et al., 2010). In opposition, the confidence and competence that children experience in learning situations may carry over into emotional well-being.

In testing the fourth hypothesis, greater internalizing behavior at age 8 predicted less externalizing behavior at age 9, replicating earlier findings where internalizing behavior likely inhibits children from developing externalizing problems (Masten et al., 2005; Panayiotou & Humphrey, 2018; Van der Ende et al., 2016). However, internalizing behavior at age 9 was not predictive of externalizing behavior at age 10 probably because internalizing behavior might not have a strong deterrent effect on externalizing problems during middle childhood (Burt & Roisman, 2010; Deighton et al., 2018; Moilanen et al., 2010; van Lier et al., 2012). Likewise, the data did not support the predictive role of externalizing behavior on internalizing behavior, corroborating previous findings (Burt & Roisman, 2010; Deighton et al., 2018; van Lier et al., 2012). Together these findings suggest that, at least in middle childhood, cascades between internalizing and externalizing problems barely take place.

Given that little research has been done on whether a child's psychopathology or academic performance are prospectively associated with paternal parenting and vice versa, one of the unique contributions of this study was to leverage the prospective data collected on both mothers and fathers, which allowed for determination of the relative contributions of maternal and paternal parenting to their child's outcomes and vice versa. The findings suggest that children's academic performance may increase the use of both maternal and paternal authoritative parenting practices. That is, if a child exhibited better academic performance at age 8, both mothers and fathers were more apt to adopt authoritative parenting at age 9 (Xiong et al., 2021). Contrarily, when a child had poorer academic performance at age 8, mothers and fathers were less inclined to employ authoritative parenting at age 9. These results echo previous research suggesting the child-driven effects of academic achievement on parenting (Xiong et al., 2021). Further, these findings, along with the above evidence of academic performance → internalizing problem link, may reflect Confucian values of academic achievement and respect for education (Xiong et al., 2021; Yu, 2019). Other child-driven effects were observed, such that when children exhibited greater externalizing behaviors at age 8, mothers tended to parent less authoritatively at age 9. In other words, if children showed fewer externalizing behaviors at age 8, mothers were likely to parent more authoritatively at age 9. Similarly, when children showed greater internalizing problems at age 9, fathers were less likely to utilize authoritative parenting at age 10. That is, if children displayed less internalizing behavior at age 9, fathers were more likely to utilize authoritative parenting at age 10. These findings all point to the active role that children play in eliciting authoritative parenting and further the importance of recognizing children as capable agents in family life (Gromoske & Maguire-Jack, 2012; Pinquart, 2017a, 2017b; Yu, 2010).

The fifth hypothesis concerned the bidirectional associations between maternal/paternal parenting and child academic performance and psychopathology. Surprisingly, when mothers parented more authoritatively at 9 years, daughters, but not sons, were likely to show more internalizing behavior at 10 years. Perhaps, South Korean mothers' authoritative parenting toward their primary school-aged daughter may somehow be intertwined with less optimal parenting including over-engagement or intrusive control, which may increase the risk of internalizing problems among girls (Holochwost et al., 2020; Lee et al., 2017). More scholarly attention deserves to be given to co-occurring dimensions of maternal parenting and how the influence of authoritative parenting may vary by parent gender and child gender, and sociocultural context in this developmental stage. In contrast, when fathers adopted more

authoritative parenting at age 9, children, regardless of gender, were less likely to exhibit internalizing behaviors at age 10. To put it differently, if fathers tended to parent less authoritatively at age 9, children (both genders) tended to show greater internalizing problems at age 10. These findings corroborate the results of the meta-analysis showing a stronger association of paternal than maternal parenting with offspring anxiety symptoms (Möller et al., 2016). These findings further appear to be in accord with the suggestion that paternal parenting characterized by rationality, practicality, and self-direction becomes more influential as children reach middle childhood (Collins & Russell, 1991; Scott et al., 2018; Yu & Ko, 2013). When mothers and fathers engaged in more authoritative parenting at age 9, children were likely to exhibit better academic performance at age 10. The findings not only concur with well-established studies demonstrating positive effects of maternal authoritative parenting on children's academic achievement (e.g., Masten & Curtis), but also complement the limited literature documenting that fathers play an integral role in their child's academic engagement above and beyond mothers (Zhu et al., in press). When fathers spent more time engaging in cognitively stimulating activities with their child at age 8, mothers were more likely to do so at age 9, but not vice versa. Similarly, if fathers parented with a more authoritative style at age 9, mothers tended to do so at age 10, but not vice versa. Considered together, the findings highlight the importance of collecting data from both parents and the understudied role that fathers may play in shaping their children's development and mother-child interactions (Collins & Russell, 1991; Gamble & Yu, 2014; Scott et al., 2018; Yu & Ko, 2013).

The last hypothesis was framed to test the moderating role of child gender in the pathways involving developmental cascades and maternal/paternal parenting. To recap, few child gender differences emerged in the parenting pathways. Adding to a small body of literature suggesting no child gender differences in cascading effects (Burt & Roisman, 2010; Deighton et al., 2018; Van der Ende et al., 2016; Zhang et al., 2019), the current data suggested that developmental cascades were not generally gender-specific. In addition, even after controlling for shared risk factors that could underlie cascading effects, the longitudinal cross-domain effects were still observed in accordance with the view that common risk factors play little role in cascading processes (Burt & Roisman, 2010; Deighton et al., 2018; Maughan et al., 2003; Moilanen et al., 2010; Vaillancourt et al., 2013; Zhang et al., 2019). In other words, these findings suggest that cascading effects among academic underperformance and internalizing/externalizing problems were not attributable to child gender, intelligence, or socioeconomic differences.

The negative effect of externalizing behavior at T1 → paternal authoritative parenting at T2 was marginal in the original analysis, whereas it was significant in the sensitivity analysis. No further differences were found in comparisons of the two models. Thus, the results from the sensitivity analysis suggested that the original model was seldom affected by missing data.

Given the prospective effect of externalizing problems on academic performance, school-wide, classroom-based, and/or family-centered interventions aiming to specifically identify and attenuate externalizing problems in early childhood may be effective in improving later academic performance. The current findings support the promotion of children's academic success that may help prevent or ameliorate externalizing problems and may help elicit more authoritative parenting from their mothers and fathers. The findings also fuel the need for fathering intervention programs that may contribute to more positive maternal parenting and child

functioning. Such interventions focus on promoting and strengthening coparenting, father-child relationships, and positive behavioral management strategies.

The findings need to be interpreted in light of some limitations. First, academic performance and internalizing/externalizing problems were measured solely by teacher ratings. Given that children worked with new teachers every year who each rated one child, the data did not come from a single source or have a hierarchical structure (i.e., children were not nested in classrooms or schools). In addition, academic performance and internalizing/externalizing problems showed strong cross-time stability and all longitudinal correlations among them were significant in the expected directions, thus providing some degree of consistency over time and across different raters. Nonetheless, there is some evidence that children may act differently at school than at home and teachers tend to report fewer problems with their students (e.g., Berg-Nielsen et al., 2012). Thus, future research would benefit from employing multiple sources (e.g., parent) and various assessment methods (e.g., standardized achievement test, observation). Second, because the data did not come from classroom- or school-based surveys, there were large proportions of missing values for academic performance and internalizing/externalizing problems which were all rated by teachers at T2 and T3. Although this limitation was alleviated by the use of MI for missing data along with the sensitivity analysis, caution should be exercised in interpreting the results. Third, although the measures of cognitive stimulation at T1 and authoritative parenting at T2 and T3 are conceptually overlapping and significantly correlated with each other, T1 levels of authoritative parenting were not controlled for. Thus, the paths from child adjustment at T1 to authoritative parenting at T2 may not be causal but simply correlational. Fourth, given that the data covered only a period of 8–10 years of one birth cohort, longer-term longitudinal research with multiple cohorts may paint a more complete picture of developmental cascades and their interplay with maternal and paternal parenting. Finally, because this study's sample included only children raised in different-sex two-parent families, further work needs to determine whether the current findings can be generalized to children from diverse families (e.g., same-sex, single parents).

Conclusion

This study enhances the body of literature by simultaneously modeling academic performance, internalizing/externalizing problems and maternal/paternal parenting spanning from ages 8 to 10. The study's findings clearly support the adjustment erosion model where externalizing problems lead to academic underperformance during middle childhood. In a parallel fashion, the findings suggest the importance of academic performance as an antecedent of subsequent internalizing/externalizing problems and maternal/paternal authoritative parenting in middle childhood, thus lending support to the academic incompetence model. These findings might be attributable to widespread aspiration for education in the Confucian culture, warranting replication and extension in future research. The findings also provided promising evidence that paternal parenting might contribute not only to children's academic development and internalizing problems but to maternal parenting, underscoring the need for greater attention to the role that fathering may play in children's development and mothering.

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