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Bidirectional Processes between Interparental Conflict and Children's Negative Emotionality in Early Childhood: Predicting School-Age Problem Behavior

Sohee Park Hyungeun Oh Youngshin Ju Seungryul Lee Hyein Chang†

Department of Psychology, Sungkyunkwan University, Seoul, Korea

This study investigates the longitudinal bidirectional process between interparental conflict and children's negative emotionality, and examines whether they predict children's later problem behaviors. The participants were 2,150 children (1,091 boys; 1,059 girls) and their parents who participated in a large longitudinal panel study on Korean families, the Panel Survey on Korean Children of the Korea Institute of Child Care and Education. In this study, data from children aged 0–9 years were included in the analysis, and the bidirectional process between interparental conflict and children's negative emotionality was explored from 0 to 4 years of age. Statistical analysis was conducted using a non-recursive model within a structural equation modeling framework. Both interparental conflict and children's negative emotionality positively predicted problem behaviors at nine years of age. However, the bidirectional relationship between interparental conflict and children's negative emotionality appeared in the opposite direction to the hypothesis at age one and was not significant thereafter. In the Discussion section, suggestions for future studies along with the clinical significance of parental conflict as a target to consider in children's interventions are addressed.

Keywords: interparental conflict, negative emotionality, child adjustment, problem behavior, early childhood, panel survey on Korean children

Introduction

It is well-established that interparental conflict increases the risk of maladjustment among children, including externalizing and internalizing problems (Peterson & Zill, 1986; Stallman & Ohan, 2016; Vaez et al., 2015). The risk of children's psychopathology associated with repeated exposure to interparental hostility is nearly twice as high as that associated with parental divorce (Grych & Fincham, 2001). Moreover, early individual variability in children's negative emotionality is a salient predictor of later psychological problems (Kostyrka-Allchorne, Wass, & Sonuga-Barke, 2020; Pauli-Pott & Beckmann, 2007). However, the effects of interparental conflict and children's negative emotionality have mostly been examined in separate studies, and relatively little is known about how they may simultaneously determine children's adjustment over time. Thus, this study aimed to examine longitudinal reciprocal process between these two factors as a predictor of problem behaviors in middle childhood.

Interparental conflict is a multidimensional construct composed of various components of conflicts that occur in marital relationships, such as the frequency of conflicts, hostile, disengaged, and constructive behaviors, and child-related conflicts (van Eldik et

†Correspondence to Hyein Chang, Department of Psychology, Sungkyunkwan University, 25-2 Sungkyunkwan-ro, Jongno-gu, Seoul, Korea; E-mail: hichang@skku.edu

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al., 2020). As the concept of interparental conflict encompasses substantial hostility and aggression, it should be distinguished from marital quality (van Eldik et al., 2020). However, even though the term "interparental" assumes the couple has offspring(s), the concept has often been used interchangeably with "marital conflict" and "marital discord" in studies examining children's psychological functions (Davies & Cumming, 1994; Warmuth et al., 2018; Kopystynska et al., 2022; Rhoades, 2008). Therefore, in this study, interparental conflict was defined as a construct that taps the overall conflict within parents' marital relationship and is not limited to parenting-related conflicts.

Exposure to interparental conflict predicts child outcomes across multiple domains, including aggressive behavior (Doh et al., 2012), relationship problems (Kim et al., 2009), and internalizing and externalizing behaviors from early childhood to adolescence (Cui et al., 2007; Warmuth et al., 2018). Three theoretical explanations have been shown to explain the relationship between interparental conflict and children's adjustment problems. According to the spillover hypothesis, parents' negative interaction patterns can compromise optimal parenting behavior or parent-child relationships (Gao et al., 2019; Halford et al., 2018). Specifically, marital conflict may drain emotional resources and increase distress, which may make parents more irritable, and less patient and less warm toward their children (Grych, 2002). Studies on infancy and childhood have shown that couples in chronic conflict are less sensitive and responsive, or more negatively reactive toward their children (Gao et al., 2019; Owen & Cox, 1997; Stroud et al., 2011). According to the social learning theory, children may imitate negative and hostile behaviors by observing their parents in conflict (Bandura, 1973). For example, although the social learning theory may not be the only explanation, individuals who have been more exposed to interparental conflicts show higher risks of conflictual relationships with their romantic partners (Cui et al., 2010; Kim et al., 2009). Finally, emotional security theory proposes that repeated exposure to parents' negative behaviors may lead to children's emotional insecurity, which refers to the perceived threats to their social circumstances, and physical reactions against the perception of insecurity, which may contribute to their vulnerability to psychological problems (Davies & Martin, 2014). Emotional security is critical in children's acquisition of regulatory abilities and development of positive relationships (Davies & Cumming, 1994). Based on emotional security theory, studies have shown that compromised emotional security resulting from interparental conflict during toddlerhood and early childhood predicts children's later internalizing and externalizing problems (Brock & Kochanska, 2016; Cumming et al., 2012).

Negative emotionality, the core component of the difficult temperament construct (Bates, 1980; Rothbart, 2011), can be defined as a disposition to easily experience negative emotions, such as fear, anger, sadness, and compromised soothability in response to negative experiences (Rothbart & Bates, 1998). Many studies have supported negative emotionality as a major risk factor for concurrent and long-term outcomes, including internalizing and externalizing problems (Eisenberg et al., 2009; Sanson et al., 2004; Zenman et al., 2002). Children with higher negative emotionality are likely to react more negatively to various environmental stimuli (Goldsmith et al., 1987). Therefore, they may be more easily aroused and distressed during interparental conflicts. Indeed, empirical studies have found that these children are more vulnerable to environments with high interparental conflict (Hentges et al., 2015; Pauli-Pott & Beckmann, 2007).

Although conceptualized as a temperamental factor on a biological basis, negative emotionality appears to be at least partly determined by environmental quality during development (Gordon-Hacker & Gueron-Sela, 2020; Lipscomb et al., 2011). Destructive behaviors and heightened negativity of parents during marital conflict may be a major environmental stressor for children and contribute to increased problem behavior through compromised emotional security and/or imitation (Cumming et al., 2002; Halford et al., 2018). For example, higher levels of interparental conflict during infancy predict children's negative emotionality and emotional regulation in toddlerhood (Frankel et al., 2015). In this study, children's negative emotionality was also related to maternal negative reactions to children's emotions, which may increase the risk of problematic behaviors (Frankel et al., 2015). Moreover, according to a previous study that traced diary marital conflicts, exposure to parents' negative emotions and destructive conflict tactics was associated with negative emotionality in children aged 4-11 years (Cumming et al., 2002).

Empirical evidence is scarce; however, there have been theoreti-

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cal suggestions that children's difficult temprament may also impact parents' marital relationships (e.g., Chang & Fine, 2007; Fan et al., 2020). Parents with temperamentally demanding children feel less pleasure and more burden, which may be associated with the quality of their relationship (Chang & Fine, 2007; Leve et al., 2001). For example, infants' difficult temperaments positively predict maternal conflict (Mehall et al., 2009; Papoušek & von Hofacker, 1998). In studies on preschoolers, children's negative emotionality undermined parents' co-parenting behavior, which is closely associated with marital quality (Cook et al., 2009; Fan et al., 2020). Taken together, previous studies have shown that the association between interparental conflict and children's negative emotionality may be bidirectional.

However, few studies have investigated the reciprocal processes between interparental conflict and children's negative emotionality, specifically from a longitudinal perspective (Davies et al., 2012; Frankel et al., 2015). An exception is a longitudinal study on preschoolers and their parents wherein parents' marital discord predict children's negative emotional reactions, which subsequently predict marital discord, a process mediated by children's behavioral dysregulation (Schermerhorn et al., 2007). As mentioned, prior studies have indicated that children's negative emotionality negatively influences parental relationships, and that interparental conflict is also associated with an increasing trace of children's negative emotionality in development. Therefore, based on the existing literature, it is possible that interparental conflict and children's negative emotionality reciprocally deteriorate over time. Thus, this study was designed to investigate bidirectional associations between interparental conflict and negative emotionality in early childhood (i.e., 0 to 4 years) and to examine whether they predict children's later problem behavior in middle childhood (i.e., nine years).

Methods

Participants and procedures

Participants were 2,150 children (1,091 boys; 1,059 girls) and their families participated in the Panel Survey on Korean Children (PSKC) conducted by the Korea Institute of Child Care and Education (KICCE). The PSKC has followed a nationally-representative cohort of children since 2008 and included annual data collection from children, parents, and/or teachers. In this study, PSKC data from T1 (child age: 0 years) to T10 (child age: nine years) were analyzed. Regarding parent education, 33% of mothers and 37% of fathers were four-year college graduates, followed by high school (mothers: 29%; fathers: 25%), and two-year college graduates (mothers 27%; fathers 20%). The average monthly family income was KRW3,429,000. This study was approved by the Institutional Review Board (IRB) of Sungkyunkwan University (IRB File No. SKKU 2022-09-001).

Measures

Interparental conflict

Interparental conflict was measured using the Interparental Conflict Scale (Chung, 2004; Markman et al., 2001), which was adapted so that respondents were asked to rate each item on a 5-point scale (1 = not at all; 5 = very much) instead of a dichotomous scale (i.e., yes/no). The scale comprises eight items that measure parents' perceptions of interparental conflict individually (e.g., "When we fight, I usually evade the situation to cut off the discord", "Small arguments frequently turn into big fights, and we swear and condemn each other revealing partner's prior faults"), with higher scores indicating higher levels of interparental conflict. However, in this study, items 6 ("I seriously think about what it would be like to date or marry someone else") and 7 ("I feel lonely in my married life") were eliminated from the analysis based on our decision that they did not directly address conflictual interaction between parents. Interparental conflict variables from T1 (0 years) to T5 (four years) were included in the analysis. The Cronbach's α ranged from .92 to .94.

Children's negative emotionality

Information on negative emotionality was collected using the 20-item emotionality scale of Emotionality, Activity, and Sociability (EAS) Temperament Survey for Children-Parental Ratings (Buss & Plomin, 2014; Mathiesen & Tambs, 1999). This scale was measured using the mothers' reports on their children's negative emotionality levels from T1 (0 year) to T5 (four years). The scale comprises three subscales: negative emotionality (e.g., "My child cries easily", "My child is somewhat emotional"), activity (e.g., "My

child is very active", "My child is constantly on the move"), and shyness/sociability (e.g., "My child is very social", "My child likes to be with people"). Each item is rated on a scale of 1 to 5, with higher scores indicating higher levels of each subscale. In this study, only the questions of the negative emotionality subscale, total of five questions, were utilized. Cronbach's α for the negative emotionality ranged from .73–.76.

Children's problem behaviors

Children's problem behaviors at T10 (nine years) were measured using the Child Behavior Checklist (CBCL) 6–18 (Achenbach, 1991; Oh & Kim, 2010). Parents were asked to rate each item on a 3-point Likert scale (0 = not at all; 2 = absolutely) based on their perception of their children's problem behavior. In this study, the raw scores of the broadband externalizing and internalizing scales were used. Cronbach's αs for externalizing and internalizing scales were .66 and .59, respectively.

Instrumental variables

Parents' income at T1 was measured using an interval variable, which ranged across one million won (approximately 800 US dollars) intervals. Parents were asked to check the applicable box for their average monthly income level (M = 3,429 won, SD = 1.47). Children's sleep problem behavior at T1 was measured using the CBCL 1.5-5 (Child Behavior Checklist: Achenbach, 1991; Oh & Kim, 2010). Parents were asked to rate each item on a 3-point Likert scale (0 = not at all; 2 = absolutely) based on their perception of their children's sleep behavior. Raw scores on the sleep problem scale were used for this study. Cronbach's α was .53.

Statistical analysis

Following descriptive statistics, bivariate variables, and *t*-tests to explore sex differences, our goal was to analyze the mutual influence of matched-pairs dyadic (each person paired with another) variables over time within a structural equation modeling (SEM) framework using a non-recursive model (Griffin & Gonzalez, 1995; Kenny, 1996; Woody & Sadler, 2005). The non-recursive model includes reciprocal causal effects, and all disturbances are correlated. Specifically, through the mutual effect model, autoregressive and reciprocal effects, which represent the bidirectional effect between two variables at the same measurement occasion, can be estimated (Kline, 2005). In this study, the simultaneous and mutual influence between interparental conflict and children's negative emotionality at each time point over five years (i.e., T1–T5) was examined using the mutual influence model (Kenny, 1996; Woody & Sadler, 2005).

Regarding the constructs included in the analysis, interparental conflict and children's problem behaviors were included in the model as latent variables. Specifically, interparental conflict was created based on the manifest variables in each parent's individual reports. A latent factor of children's problem behavior was constructed using externalizing and internalizing problems as manifest variables. Children's negative emotionality was included as a single manifest variable. Non-recursive models are prone to identification and technical estimation difficulties; therefore, the requirement for the models is strong (Kline, 2005). Instrumental variables were incorporated into the non-recursive model to aid in model identification for the mutual influence model. Instrumental variables allow us to estimate mutual influence at T1 (Kline, 1998). In other words, without instrumental variables, the model could be misidentified, and researchers could not estimate the mutual influence effect at the first time point (Heise, 1975). Unless there is strong conceptual justification, simply erasing a mutual influence effect path does not make an endogenous variable an instrument; eventually, it can lead to a misidentified model (Woody & Sadler, 2005). Thus, family income and children's sleep problems were used as instrumental variables for interparental conflict and children's negative emotionality, respectively.

The mutual influence model was analyzed using a maximum likelihood estimator with robust standard errors (MLR), using *lavaan* package in R 4.1.1 version (R Core Team, 2022). Full information maximum likelihood (FIML) was applied to handle missing data, meaning that all available data were used to estimate the model (Enders & Bandalos, 2001). Model fit was evaluated based on the criteria of comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and χ^2 likelihood ratio statistic. Sex differences were explored using conducting *t*-tests among all the variables.

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Table 1. *Descriptive Statistics and Bivariate Correlations.*

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Child's sex	-	-																			
2. Income	3.43	1.47	.050*																		
3. NE, age 0	2.72	.61	-.018	-.072**																	
4. NE, age 1	2.71	.63	.018	-.064**	.458***																
5. NE, age 2	2.84	.61	.018	-.075**	.295***	.486***															
6. NE, age 3	2.87	.62	.022	-.048	.243***	.412***	.529***														
7. NE, age 4	2.80	.64	.009	-.055*	.233***	.363***	.495***	.573***													
8. IC-M, age 0	2.00	.80	-.018	-.092***	.153***	.163***	.151***	.135***	.149***												
9. IC-M , age 1	2.05	.80	-.013	-.061**	.066**	.174***	.138***	.183***	.160***	.675***											
10. IC -M, age 2	2.11	.80	-.022	-.056*	.076**	.146***	.202***	.159***	.161***	.591***	.643**										
11. IC -M, age 3	2.13	.79	-.018	-.081**	.043	.168***	.148***	.217***	.158***	.566***	.616***	.657***									
12. IC -M, age 4	2.15	.81	-.005	-.032	.089***	.170***	.184***	.189***	.214***	.543***	.601***	.658***	.676***								
13. IC-F, age 0	1.99	.76	-.033	-.032	.057*	.106***	.111***	.086**	.095***	.565***	.493***	.444***	.416***	.420***							
14. IC-F, age 1	2.10	.77	.008	-.048	.081**	.141***	.131***	.165***	.116***	.449***	.611***	.468***	.448***	.444***	.536***						
15. IC-F, age 2	2.17	.80	.022	-.011	.021	.098***	.133***	.118***	.087***	.420***	.419***	.583***	.486***	.489***	.524***	.541***					
16. IC-F, age 3	2.22	.79	-.026	-.055*	.052*	.134***	.105***	.139***	.134***	.422***	.476***	.505***	.614***	.519***	.483***	.528***	.584***				
17. IC-F, age 4	2.18	.77	-.005	-.024	.068**	.117***	.110***	.111***	.138***	.428***	.446***	.496***	.511***	.625***	.497***	.499***	.580***	.610***			
18. INT, age 9	.11	.16	-.059*	-.065*	.077**	.146***	.182***	.217***	.264***	.076**	.098***	.103***	.144***	.113***	.085**	.059*	.078**	.115***	.117***		
19. EXT, age 9	.12	.18	-.122***	-.030	-.001	.101***	.144***	.183***	.202***	.102***	.136***	.093***	.130***	.133***	.090**	.067*	.051	.065*	.076**	.511***	

Note. M = mother's -report; F = father's report; NE = negative emotionality; IC = interparental conflict; INT = internalizing behavior; EXT = externalizing behavior.
*p < .05, **p < .01, ***p < .001.

Table 2. *Results of Independent t-test by Child's Sex*

Variable	Mean (*SD*)		*t*	*df*
	Boys	Girls		
Negative Emotionality, age 0	2.73 (.60)	2.70 (.63)	.84	2,042
Negative Emotionality, age 1	2.70 (.61)	2.72 (.64)	-.77	1,890
Negative Emotionality, age 2	2.83 (.62)	2.86 (.61)	-.75	1,764
Negative Emotionality, age 3	2.86 (.61)	2.89 (.62)	-.91	1,696
Negative Emotionality, age 4	2.79 (.63)	2.80 (.66)	-.36	1,668
Interparental Conflict-M, age 0	2.02 (.80)	1.99 (.80)	.79	1,856
Interparental Conflict-M , age 1	2.06 (.82)	2.04 (.78)	.54	1,829
Interparental Conflict-M , age 2	2.12 (.81)	2.09 (.78)	.91	1,720
Interparental Conflict-M , age 3	2.14 (.80)	2.11 (.79)	.76	1,695
Interparental Conflict-M , age 4	2.15 (.80)	2.15 (.82)	.19	1,662
Interparental Conflict-F, age 0	2.01 (.74)	1.96 (.78)	1.33	1,648
Interparental Conflict-F , age 1	2.10 (.77)	2.11 (.77)	-.33	1,747
Interparental Conflict-F , age 2	2.15 (.78)	2.19 (.81)	-.90	1,638
Interparental Conflict-F , age 3	2.24 (.80)	2.20 (.78)	1.03	1,619
Interparental Conflict-F , age 4	2.18 (.77)	2.18 (.77)	.19	1,605
Internalizing Behavior, age 9	.12 (.16)	.10 (.16)	2.22*	1,430.55
Externalizing Behavior, age 9	.14 (.19)	.10 (.16)	4.68***	1,420.97
Total Problem Behaviors, age 9	.13 (.14)	.10 (.14)	3.65***	1,430.54

Note. M = mother's report; F = father's report.
*$p < .05$, ***$p < .001$.

Results

Preliminary analysis

Table 1 presents the descriptive statistics and bivariate correlations for all the study variables. Interparental conflict and children's negative emotionality were mostly positively and significantly associated ($r = .02–.22$). This means that the strength of the relationship between interparental conflict and children's negative emotionality is modest (Cohen, 1988). Moreover, interparental conflict and children's negative emotionality are significantly correlated with children's later externalizing and internalizing behaviors ($r = .05–.22$), which means that the strength of the relationship is moderate. Specifically, the intensity of the relationship between children's negative emotionality and externalizing and internalizing behavior is modest ($r = .10–.26$) and statistically significant, except for negative emotionality at age three and externalizing behavior at age nine. In addition, the relationship between interparental conflict and externalizing and internalizing behaviors is modest ($r = .06–.14$), and statistically significant, except for interparental conflict at age two and externalizing behavior at age nine (Cohen, 1988). As shown in Table 2, the results of *t*-tests to examine sex differences indicated that boys demonstrated significantly higher levels of externalizing and internalizing problems at T10 (age nine).

Mutual influence model

Using a non-recursive path model, we examined the mutual processes between interparental conflict and children's negative emotionality from T1 to T5 and their association with children's problem behavior at T10. The results are shown in Figure 1. Model fit indices were as follows: $\chi^2(147) = 1234.83$, $p < .001$; CFI = .907; TLI = .882; RMSEA = .064(.060, .067). As chi-square was statistically significant, it could be interpreted as a model and the data did not fit well. Thus, we evaluated approximate model fit indices such as CFI, TLI, and RMSEA. According to the model fit, it had an acceptable fit because CFI, TLI > 0.8 (Bagozzi & Yi, 1988), and RMSEA $\leq$ 0.08 (Steiger, 1990; Browne & Cudeck, 1992). All autoregressive paths of children's negative emotionality and interparental conflict were significant and positive from T1 to T5, which support the temporal stability in those constructs over time. Regarding mutu-

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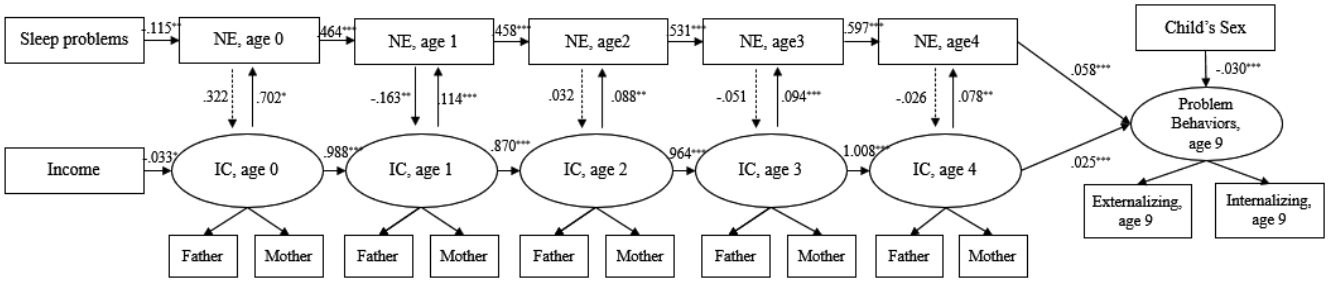

Figure 1. *Results of the proposed path model.*
Note. NE = Negative emotionality; IC = Interparental conflicts.

al influence effects, interparental conflict significantly predicted children's negative emotionality at each time point from T1 to T5 ($b = .702$, $p < .05$; $b = .114$, $p < .001$; $b = .088$, $p < .01$; and $b = .094$, $p < .001$; $b = .078$, $p < .01$, respectively); whereas it was vice versa at T2 ($b = -.163$, $p < .01$) in the unexpected direction such that higher levels of children's negative emotionality predicted lower levels of interparental conflict. Thus, a bidirectional process between interparental conflict and children's negative emotionality was only observed at T2 (children aged one year). Finally, interparental conflict and children's negative emotionality at T5 were significantly predictive of children's problem behavior at T10 ($b = .025$, $p < .001$; and $b = .058$, $p < .001$, respectively).

Discussion

This study aimed to examine longitudinal bidirectional processes between interparental conflict and children's negative emotionality in early childhood as predictors of later problem behaviors in middle childhood within a nationally-representative sample of Korean children and families in the community. Our findings suggest that the reciprocal relationship between interparental conflict and children's negative emotionality is mostly not identified and only the direction of influence from interparental conflict on children's negative emotionality is predominant. However, at age one, a reciprocal relationship between the two factors emerged, but the effect of children's negative emotionality was in the opposite direction that was initially hypothesized. Moreover, these two were significant predictors of later problem behaviors in children.

First, both predicted increased problem behaviors at the age of nine. The finding that interparental conflict predicts later problem behaviors aligns with that of previous studies, and many related factors, such as parenting (Kaczynski et al., 2006), attachment security (Brock & Kochanska, 2016), and children's engagement (Davies & Martine, 2014), have been presented to explain the mechanisms. Moreover, negative emotionality is a critical predictor for later internalizing and externalizing behaviors (Eisenberg et al., 2009; Sanson et al., 2004; Zenman et al., 2002). However, we explored the longitudinal reciprocal relationship between interparental conflict and negative emotionality postulating that both amplify each other for the first time.

These findings indicate that interparental conflict may negatively affect children's negative emotionality during early childhood. This is consistent with emotional security theory (Davies & Cummings, 1994), which proposes that repeated exposure to interparental conflicts may compromise children's sense of emotional security by amplifying their distress and reactivity to subsequent interpersonal conflict. Moreover, deficits in emotional security may contribute to the development of various problem behaviors. However, previous studies that explored the relationship between negative emotionality and interparental conflict are rare, and existing studies have examined the association between these two factors and have postulated and identified children's temperamental factors, such as irritability and negative emotionality, as moderators of the relationship between interparental conflict and children's malfunctions (e.g., Pauli-Pott & Beckmann, 2007; Hentges et al., 2015). The results of these studies suggest that children with high negative emotionality are more susceptible to subsequent problems when exposed to interparental conflict than those with an inherently low level of negative emotionality. Therefore, this study complements previous research by showing that negative

emotionality can be elevated by frequent exposure to interparental conflict. In other words, negative emotionality differentiates the consequences of exposure to chronic interparental conflict and deteriorates during the process. Congruently, the vicious cycle of interparental conflict increases negative emotionality, and an augmented level of negative emotionality makes children more susceptible to chronic interparental conflict. The accumulated negative emotionality contributes to children's current and later adjustment problems.

Moreover, children's negative emotionality at the age of one significantly predicted interparental conflict, although in an unexpected direction, such that higher children's negative emotionality led to lower levels of interparental conflict. An explanation for this counterintuitive finding can be speculated based on previous studies that demonstrated the association between children's difficult temperament, fearfulness, and negative emotionality and parents' positive behavior in infancy (Lengua & Kovacs, 2005; Rubin et al., 2002). Parents may initially try harder to deal with children's difficult behavior by increasing their support and positive behavior (Lengua & Kovacs, 2005). Similarly, those who raise children with high negative emotionality may reduce their levels of interparental conflict, and instead focus more on their children, at least in the early years. However, after the age of one, negative emotionality seemed to have no statistically significant effect on interparental conflict. Therefore, our results suggest that bidirectional processes between interparental conflict and children's negative emotionality may exist in infancy, and the pathway from interparental conflict to children's negative emotionality becomes more salient over time than vice versa. However, our findings should be replicated, as few studies have examined the effect of children's negative emotionality on parental discord. As negative emotionality represents 'internal reactivity to environmental stimuli', it does not directly reflect children's behavioral reactions to the environment (Sallquist et al., 2009). In a previous study, researchers found that children's negative reactivity and behavioral dysregulation accounted for parents' current and later marital discord from approximately six to nine years of age (Schermerhorn et al., 2007). Moreover, if we included variables more directly related to children's temperament, such as parenting behaviors (Lengua & Kovacs, 2005; Lipscomb et al., 2011) to explain the pathway, we might find more indication for children's effect on the parental relationship. Moreover, as only the period from zero to four years old was examined in this study, different patterns may exist in later childhood and adolescence. Therefore, future studies on eclectic facets are required to explore this aspect.

This study has several limitations. First, although we used a large dataset, most participants were non-patients; thus, we need to be cautious in generalizing the current findings to children and adolescents who are experiencing clinical levels of problem behavior. Second, despite our efforts to us multiple informants, except for paternal reports of interparental conflict, all data were obtained using maternal reports, leading to a risk of inflated correlation among variables. In future studies, it would be beneficial to incorporate multiple methods and informants such as teachers' reports, laboratory tasks, and observations. Third, although we were primarily interested in the role of children's negative emotionality and its relationship to interparental conflict and later problem behavior, existing studies suggest the potential roles of other dimensions of temperament (e.g., effortful control; Thompson et al., 2020; Valiente et al., 2007). Finally, based on previous studies that have highlighted early childhood as a critical period of psychological development (Gilliom & Shaw, 2004; Lipscomb et al., 2011), we could only follow the longitudinal bidirectional effect between interparental conflict and children's negative emotionality in the first four years of life. Our study yielded meaningful findings; However, it is necessary to track these processes beyond early childhood to explore their changes over time.

Despite these limitations, as an initial effort to clarify the bidirectional processes between interparental conflict and child temperament, this study offers several methodological and practical implications. Specifically, using a non-recursive model, we illustrated that mutual effects may be examined by simultaneously estimating the influence of two matched-pair (dyadic) variables and correlated disturbances at each time point. Moreover, we use a large nationally representative sample of Korean children who were followed across multiple years of childhood which allowed us to investigate how interparental conflict and child temperament may exchange effects in developmental periods. Regarding practical implications, our findings highlight the need to focus on interparental conflict as a possible contributor to children's negative

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emotionality along with parenting behavior, which has typically received more clinical attention in child treatment. There is evidence that interventions targeting interparental conflict and co-parenting relationships have positive effects on parents' marital relationship and mental health, as well as on children's regulatory abilities and psychological functioning (Cowan et al., 2011; Cumming et al., 2008; Feinberg & Kan, 2008). Our study suggests that early childhood may be a promising window for facilitating children's development by helping parents handle interparental conflict better.

Author contributions statement

SP was responsible for literature review, research model construction, and writing. HO and YJ were responsible for data screening, analysis, and writing. SL was responsible for the writing. HC advised on all parts of the study and wrote the manuscript. All authors have contributed to the manuscript and approved the submitted version.

Acknowledgments

The authors declare that the study was conducted in the absence of any commercial or financial relationships that could be construed as potential conflicts of interest. The datasets analyzed in this study are publicly available (Panel Survey on Korean Children, https://panel.kicce.re.kr/pskc/index.do).

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