



Maternal Exposure to Family-of-Origin Conflict and Child Behavioral Problems: The Role of Two Generations of Maternal Care

Andrea L. Glenn¹ · Yiqing Guan² · Patrick W. L. Leung² · Olivia K. Thompson¹ · Naixue Cui³ · Jianghong Liu⁴

Accepted: 25 September 2023

© The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2023

Abstract

Purpose This study examines how intergenerational family dynamics, including conflict in a mother's family-of-origin and maternal warmth and affection across two generations, may be related to child behavior problems in late childhood.

Methods This longitudinal cohort study included 642 mother-child dyads (child mean age 11 years). Mothers reported on conflict tactics in their family-of-origin, on warmth and affection received from their own mother, and on their child's behavior problems. Children reported on the maternal warmth and affection received from their mothers.

Results We found a direct relationship between the levels of conflict present in the mother's family-of-origin and children's behavior problems. A serial mediation model revealed that family-of-origin conflict was associated with lower perceived maternal warmth and affection received by mothers from grandmothers, which was associated with lower perceived maternal warmth and affection received by children, which in turn was related to higher levels of both internalizing and externalizing behavior problems.

Conclusions Maternal experiences of family dynamics as children not only influence later parenting practices, but also have a legacy of impact on their children's behavioral health. Assessing features of parental developmental environments may help to identify families who could benefit from prevention and intervention programs aimed to reduce behavior problems in youth.

Keywords Externalizing · Behavior problems · Maternal sensitivity · Parent-child relations

Child behavior problems continue to be a public health concern, as they are linked to juvenile delinquency, adult violence, involvement in the criminal justice system and other negative life outcomes (Colman et al., 2009; Robson et al.,

2020). Risk factors include family, school, community, biological, and sociodemographic factors (Deater-Deckard et al., 1998; Nelson et al., 2007). A significant body of research has demonstrated links between parenting practices and child behavior problems. There is also a sizeable literature on the intergenerational transmission of violence, in which witnessing interpersonal or interparental violence as a child is associated with later perpetration of violence in adolescence or young adulthood (van de Weijer et al., 2014). These bodies of literature emphasize how early family dynamics and experiences influence children developmentally. However, few studies have examined how the family environment of the *parent* as they were growing up may have downstream effects on later parenting practices and, in turn, affect a child's behavior. The present study is novel in that extends to a previous generation to assess effects of the mother's developmental environment; we assess how the parenting and family conflict experienced by a mother during her childhood affects her parenting practices and her child's behavior problems in late childhood.

Andrea L. Glenn and Yiqing Guan are the Co-first authors.

✉ Patrick W. L. Leung
pleung@cuhk.edu.hk

✉ Jianghong Liu
jhliu@nursing.upenn.edu

¹ Center for Youth Development and Intervention, Department of Psychology, University of Alabama, Tuscaloosa, AL, USA

² Department of Psychology, Chinese University of Hong Kong, Sino Bldg, Rm 356, Shatin, N.T., Hong Kong, China

³ School of Nursing and Rehabilitation, Shandong University, Shandong Province, China

⁴ School of Nursing and School of Medicine, University of Pennsylvania, 418 Curie Blvd., Room 426, Claire M. Fagin Hall, Philadelphia, PA 19104-6096, USA

Research suggests that parenting practices and family conflict play a significant role in the development of child behavior problems (Formoso et al., 2000; Gryczkowski et al., 2010; Marcone et al., 2020). Lower levels of maternal warmth and affection have been consistently associated with behavior problems in children. For example, in a longitudinal study conducted in 8 countries of children in middle childhood, Lansford et al. (2014) found that maternal warmth was related to decreases in children's anxiety and aggression over time. In a sample of 227 monozygotic twin pairs in the U.S., Waller et al. (2018) found that children who were the recipients of warmer parenting were less likely to exhibit aggression and callous-unemotional (CU traits). Similarly, Rothenberg et al. (2020) found that higher parental warmth was associated with lower subsequent rule-breaking behavior throughout middle childhood in 12 different cultural groups. In U.S. samples, maternal warmth has also been found to buffer children from the effects of harsh physical discipline by fathers (McKee et al., 2007). Increasing parental warmth (i.e., acceptance, nurturing, and positive support) is one of the primary goals of evidence-based parenting interventions designed to reduce behavior problems in youth (e.g., Pasalich et al., 2016). To our knowledge, studies have not examined how maternal warmth and affection received by a mother during her childhood may have effects on the behavior of children in the next generation.

Numerous studies have also demonstrated that children who witness marital discord or inter-parental violence, parent-child aggression, or both, are at significantly elevated risk of having behavioral problems, such as attention problems, anxiety/withdrawal, and externalizing problems (e.g., O'Keefe, 1994; Reid & Crisafulli, 1990; Sternberg et al., 2006). However, studies have not examined how these types of family conflict in the *parent's* family-of-origin (i.e., the conflict present when the parent was a child), may have downstream effects on children of the next generation. One study examined how the experience of ACES by a parent affects child behavior. In a sample of 2,529 children aged 3–17 in the U.S., Schickedanz and his colleagues (2018) found that children of parents who had multiple ACES expressed more behavior problems, emotional disturbance, and hyperactivity. However, some parental ACES (neglect and exposure to inter-parental violence) were not associated with their children's behaviors. Schickendanz et al. (2018) did not speculate about why these relationships were not found. In the present study, we examine the mother's childhood experience of conflict within her family to assess whether negative conflict tactics are associated with behavior problems in her child.

Schickendanz et al. (2018) further found that the relationship between parental ACES and child behavior problems

was mediated by parents' emotional distress as well as reported aggravation with parenting. This suggests that the effects of negative childhood experiences on the next generation may be mediated by parenting factors. Supporting this idea, in a sample of 490 Canadian mother-child dyads, Madigan et al. (2015) found that mothers who experienced physical abuse as children were at an increased risk of experiencing depressive symptoms and, in turn, engaged in less responsive parenting, which contributed to increases in their children's internalizing problems from ages 2–36 months. This suggests that the mother's childhood experiences may affect her parenting, which in turn, affects child mental health outcomes. The present study takes a similar approach in assessing the mother's family-of-origin environment, the mother's parenting, and child behavior problems. The present study extends the study by Madigan et al. (2015) by examining externalizing in addition to internalizing problems, examining these problems at a later time point (late childhood rather than before 36 months), and also assesses the mother's perception of the parenting she received from the grandmother.

An additional novel aspect of the current study is that it assesses the mother's perception of the parenting she received, as well as the child's perception of the parenting they receive from the mother to examine how both are related to behavior problems in the child. Many studies have examined how parenting styles and behaviors may be similar across generations but have not taken the next step in examining how parents received over two generations is related to child behavior problems. Parents' experience of negative parenting as a child, including control, aggression, or corporal punishment and other harsh discipline, has been associated with mothers' decreased engagement, fathers' increased control, and both parents' aggressive and harsh parenting (Madden et al., 2015; Miller et al., 1997; Simons et al., 1991, 1993; Wang et al., 2014). Tanaka et al. (2009) found that Japanese mothers and grandmothers had similar parenting styles, including on characteristics such as empathy, emotional warmth, coldness, indifference, reciprocity, and affection.

Studies have also examined how experiences of negative conflict tactics may affect parenting. A recent systematic review of 97 studies from various countries revealed that parents who were subjected to physical abuse or witnessed violence as children were more likely to report engaging in abusive or neglectful parenting strategies (Greene et al., 2020). Similarly, in a meta-analysis consisting of 32 studies from various countries and 17,932 participants, Savage et al. (2019) found that mothers who experienced childhood maltreatment were more likely to engage in poor parenting practices compared to mothers who did not experience childhood maltreatment (though see Sexton et al., 2017; Lounds

et al., 2006; Zvara et al., 2017). The present study extends these studies by examining how the family-of-origin conflict during the mother's childhood has downstream effects in the third generation on children's behavior problems. In the present study, family-of-origin conflict refers to tactics used in conflicts between the mother and her family member, and between the mother's mother and father, during the mother's childhood (e.g., verbal aggression, violence).

Theoretical Background

It is hypothesized that maternal family-of-origin conflict should be linked with third-generation offspring psychopathology both directly and indirectly. This assumption is largely rooted in the Social Development Model (SDM; Catalano & Hawkins, 1996; Hawkins & Weis, 1985). This model highlights the socialization processes involved in the development of both prosocial and antisocial behaviors. The SDM incorporates several prevailing theories such as control theory (Hirschi, 1969; Reiss, 1951), social learning theory (Bandura & Walters, 1977) and others. According to the SDM, children learn behavioral patterns through consistent exposure and interaction with social groups to include friends, family, and community members. A child is more likely to bond with social groups, such as the family unit, when the child is actively involved and develops skills within the unit. Through these bonding experiences, a child begins to develop behaviors, values and belief systems of the group in which they are bonded to. As a result, a child is more likely to adopt behavior that has been modeled, and thus transmitted across generations.

While there is mounting evidence demonstrating that family conflict and maternal warmth contribute to child behavior problems, the present study is novel in that it examines how family dynamics the *mother's* family-of-origin has downstream effects on her parenting practices and

the child's behavior in late childhood, thus spanning three generations. This study is also novel in that it involves a direct assessment of the child's perspective of the warmth and affection received from their mother, rather than asking the mother to rate herself on warmth and affection. This helps to avoid potential methods bias involved in having the mothers rate both themselves and their own mothers on warmth and affection. In the present study, both mothers and their children completed assessments of the warmth and affection they received, and mothers also reported on family conflict during their upbringing. The purpose of this study was to examine child behavioral problems as a function of maternal family-of-origin conflict, via maternal warmth and affection received by mothers (Generation 2, G2) from grandmothers (Generation 1, G1), the first mediator, and then maternal warmth and affection received by children (Generation 3, G3) from their mothers (G2), the second mediator (see Fig. 1). This serial mediation with two mediators is novel and allows us to examine this potential inter-generational pathway from the mother's family-of-origin to the child's behavior.

Method

Procedures and Participants

The present study used secondary data collected from the Jintan Child Cohort Study, an ongoing longitudinal child health project in China. Initially, the cohort study recruited 1656 preschoolers ages 3–5 years old (55.5% male, 44.5% female, and 99.8% Han ethnicity) in 2004 from four preschools situated in central urban, suburban, and rural areas representing the geographic, demographic, and socioeconomic profile of Jintan city (Liu et al., 2010). Two waves of data were included in this study: Wave 1 was in 2004–2007

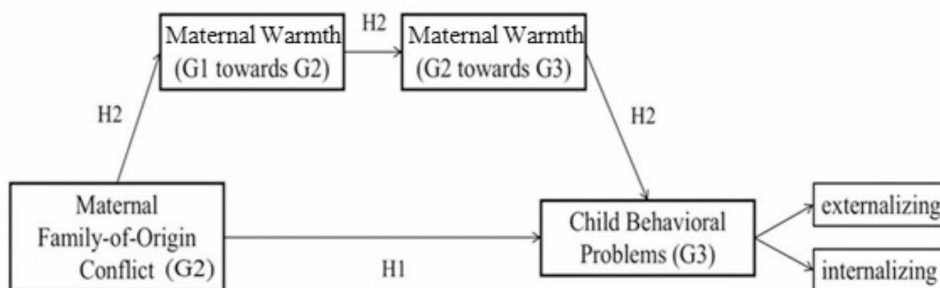


Fig. 1 The Proposed Serial Mediation Model. *Note.* G1: Generation1, grandparents; G2: Generation2, parents; G3: Generation3. Information about the mother's developmental environment may help clinicians identify children who may be at higher risk for behavior problems and provide opportunities to prevent the downstream consequences associ-

ated with them, such as poor academic outcomes, substance use, and involvement in the criminal justice system (Colman et al., 2009). In particular, parent training programs may be particularly helpful in disrupting the continuation of parenting practices that are associated with higher rates of child behavior problems (Piquero et al., 2016)

when the preschoolers were 3–6 years old and Wave 2 was in 2008–2013 when the children were 7–13 and attended elementary school (Liu et al., 2015). Between Wave 1 and Wave 2, 546 children dropped out due to sample handling error, moving away, or declining to participate in the next wave, resulting in a sample size of 1,110.

Although both mothers and fathers participated in the overall longitudinal study, only mothers completed the measure of maternal warmth and affection received from their mothers. This is because this questionnaire was completed at a parent-teacher meeting at the end of the school year, which was attended largely by mothers (Liu et al., 2011b). Children completed the measure of warmth and affection received from their mothers but did not complete it about their fathers. Therefore, the study involved only mother-child dyads. Participants were included if mother and child reports were available on the relevant measures obtained during Waves 1 and 2. Mother and child reports were available from a total of 642 mother-child dyads with the three measures (child behavior problems, family-of-origin conflict, and maternal warmth and affection) fully completed in either Wave 1 or Wave 2. This sub-sample of children consisted of 332 males (51.7%) and 310 females (48.3%), with a mean age of 11.02 (standard deviation (SD)=0.89) during Wave 2, when the children completed a questionnaire on maternal warmth and affection. Mothers' mean age was 31.43 (SD=2.92) during Wave 1 (Liu et al., 2011b) which was when the mothers completed assessments of family dynamics, conflict, and maternal warmth and affection received from their mothers. In this sample, 36.6% of mothers had only middle school or lower level of education, 23.5% obtained a high school diploma, 39.1% attended college or university, and 0.8% attended graduate school. Regarding occupation, 71.6% were skilled laborers and professional workers, 16.4% performed unskilled labor, and 12% were unemployed. Regarding location, 14.8% of the families lived in rural areas, 41.6% in suburban areas, and 43.6% in the city.

Written consent was obtained from the mothers at Waves 1 and 2 and verbal consent from the children was obtained during Wave 2. IRB approval was acquired from the University of Pennsylvania and the Ethical Committee for Research of Jintan Hospital in China. Mothers completed the Conflict Tactics Scale (CTS) and Parental Bonding Instrument (PBI) in Wave 1 (Liu et al., 2011b). During Wave 2, children (fifth or sixth grade) completed the PBI and mothers completed the Child Behavior Checklist (CBCL). Two trained research assistants distributed and collected the questionnaires, explained the objectives and confidentiality of the study and the principle of voluntary participation and participants' right of withdrawing the study at any time point, and answered any of the respondents' questions.

Measures

Demographic Information

Demographic information, including age, gender, family structure, parents' occupation, educational level, and income, was collected during enrollment to Wave 1 and updated in later surveys if necessary. An indicator of socioeconomic status (SES) was calculated by computing the standardized z score of the sum of z scores of fathers' and mothers' monthly wages and number of years of education (Cui et al., 2018).

Child Behavior Checklist

As a part of the Achenbach System of Empirically Based Assessment (ASEBA), the Child Behavior Checklist (CBCL) measures childhood behavior problems using parents as informants (Liu et al., 2011a). Five of its eight individual Syndrome scales (i.e., Rule-Breaking Problems, Aggressive Behavior, Withdrawn, Somatic Complaints, and Anxious/Depressed), rated from 0 ("not true") to 2 ("very true"), were used for the current study. Parents were asked to report on their child's behavior over the past six months. The first two scales constitute an Externalizing Problems scale and the last three an Internalizing Problems scale (Achenbach & Rescorla, 2001). A Total Behavior Problems score summing up the scores of Externalizing and Internalizing Problems was also used in the statistical analysis. The Chinese version of CBCL has shown good-to-excellent test-retest reliability ($r = .66-0.87$) and criterion validity (Leung et al., 2006). In this sample, the internal consistency was 0.86 for Internalizing Problems, 0.86 for Externalizing Problems, and 0.91 for Total Behavior Problems.

Family Conflict

The mothers' family-of-origin conflict during childhood was assessed using the Conflict Tactics Scale (CTS1 Form R, Straus et al., 1996), which was designed to measure intra-family conflict handling. The CTS1 assesses overt actions, or "conflicts tactics" which a family member might take in a conflict with another member. The original CTS1 contains three factors indicating three modes of tactics: Reasoning (3 items), Verbal Aggression (6 items), and Violence (9 items), and has 19 items. In this study, one item, "Burned or scalded you" was added to capture more forms of violence, resulting in 10 items. The CTS1 was used to measure the tactics of intrafamily conflict between family members and the mothers, and between the mothers' mothers and fathers up to the mothers finishing up elementary education were measured separately. The two scales had the same items and

rating scales, but different instructions to differentiate the two types of relationships.

The scales were rated on a 6-point scale ranging from 0 (“Never”) to 5 (“Most of the time”), which indicated conflict frequency. For the purpose of the study, a total score of the verbal aggression (6 items) and violence (10 items) factors of the two scales was computed to derive a summated score indicating maltreatment exposed by the mothers in their childhood (score range 0–80). Higher scores implied higher levels of family conflict. The current Chinese version was translated and back-translated by study researchers who were proficient in both English and Chinese. The internal consistency for the two subscales combined was high ($\alpha=0.88$, split-half Spearman-Brown coefficient=0.71).

Maternal Warmth and Affection

The Chinese version of the Parental Bonding Instrument (PBI; Parker et al., 1979), assessing the parental contribution to parent-child relationships, was translated and modified to be a four-factor model with 24 items (Liu et al., 2011b); the four factors are care, indifference, over-protection, and autonomy. Only the six-item Care subscale was used in the present study and was completed by both the children and their mothers to measure maternal warmth and affection received by these two generations respectively. Example items asked respondents to rate statements like “(My mom) spoke to me in a warm and friendly voice” and “Was affectionate to me” on a 4-point scale from 0 (“Very unlike”) to 3 (“Very like”) (Liu et al., 2011b). The Care subscale has been found to have satisfactory test-retest stability ($r=.76$, $p<.001$) and split-half internal consistency ($r=.88$, $p<.001$), and concurrent validity has been demonstrated in correlations with interview assessments (Parker, 1979). The revised Chinese version was a fitter model ($X^2/df<3.0$, $RMSEA<0.06$, $SRMR<0.08$) for Chinese samples (Liu et al., 2011b). In the present sample, the Care subscale displayed acceptable internal consistency: $\alpha=0.72$ for mothers and $\alpha=0.82$ for children. The range of possible scores was 0 to 18.

For some children, the second-wave PBI was assessed one year later than the behavior measure CBCL. To compensate for this, our version of the PBI inquired about warmth and affection received from their mothers over their entire life, which would cover the time when the problem behaviors were measured. However, it has been shown that parental bonding is relatively stable and this is not expected to change in one year.

Statistical Analysis

Sample characteristics were described using mean and standard deviation or frequency and percentage. Student *t* tests, ANOVAs, and Pearson correlations were used to examine the bivariate association between sociodemographic characteristics and behavior problems, and the characteristics with a *p* value <0.05 were adjusted in the multivariate model as covariates. Pearson correlations were used to examine the bivariate associations among behavior problems, family-of-origin conflict, and two-generation maternal warmth and affection.

Then, a series of regression and serial multiple mediation analyses were conducted to examine the indirect effect of the two-generation maternal warmth and affection in the relationship between family-of-origin conflict and behavior problems adjusting for the covariates using the SPSS macro PROCESS function (model 6; Hayes, 2013). It was hypothesized that mothers’ childhood experience of family conflict (*X*) would be linked with lower levels of maternal care received by them (*M1*), and in turn, less maternal warmth and affection that these mothers could provide for their own child (*M2*), and thus higher levels of child problem behavior (*Y*). A multiple serial mediator model with two mediators (maternal warmth and affection received by mothers and by children) provides three specific indirect effects that sum to a total indirect effect. The specific indirect effects in this model were (1) through maternal care (G1-G2); (2) through maternal care (G2-G3); and (3) through maternal care (G1-G2) and maternal care (G2-G3). If significant, the final indirect effect is the specific indirect effect that supports serial multiple mediation (Hayes 2013). All paths in the model were estimated, including those not depicted in Fig. 1 (i.e., between family-of-origin conflict to G2-G3 maternal warmth and affection, or between G1-G2 maternal warmth and affection and child behavior problems). In addition, the percentage of the total effect explained by each of the specific indirect pathways was calculated through division.

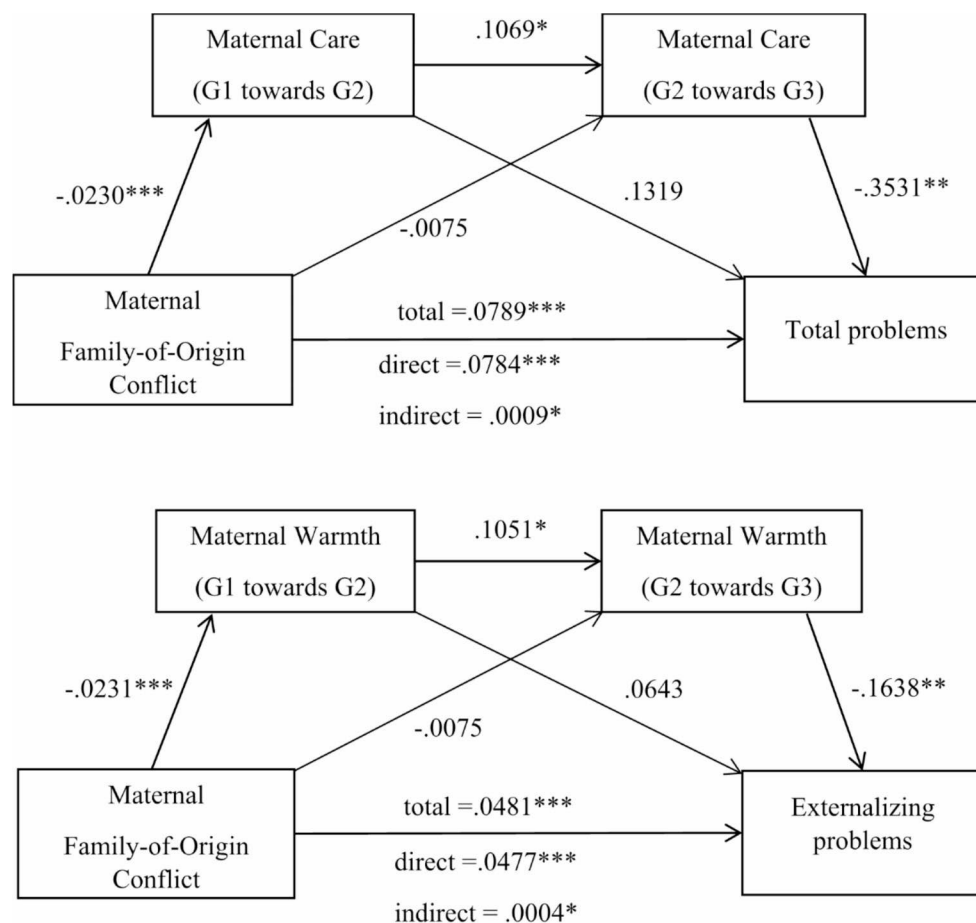
Analyses required (1) point estimates to be calculated for the direct and indirect effects linking family-of-origin and child problem behavior; and (2) inferential tests to be conducted to decide whether these effects are different from zero (Preacher and Hayes, 2008). To conduct the inference tests for the indirect effects, bootstrapping was used taking 5,000 samples from the original data set ($n=642$) to construct 95% bias-corrected confidence intervals (Hayes and Scharkow, 2013). Bootstrapping is considered better than the Sobel test because it makes no assumptions about normality in the sampling distribution and decreases likelihood of Type I error (MacKinnon et al. 2004; Preacher and Hayes 2008). By convention, an indirect effect is significant if the 95% confidence interval fails to include 0.

Table 1 Descriptive Statistics and Zero-Order Correlations among Behavior Problems, Family-of-Origin Conflict, and Two-Generation Maternal Warmth ($n = 642$)

	M(SD)	1	2	3	4	5
1. Total behavior problems	9.34 (9.34)	—				
2. Externalizing problems	4.70 (5.06)	0.91***	—			
3. Internalizing problems	4.65 (5.27)	0.92***	0.68***	—		
4. Family-of-origin conflict	20.37 (15.75)	0.13**	0.15***	0.09*	—	
5. Maternal warmth received by mothers (G1-G2)	14.98 (2.70)	-0.004	-0.003	-0.004	-0.13**	—
6. Maternal warmth received by children (G2-G3)	14.46 (3.45)	-0.15***	-0.13**	-0.14***	-0.04	0.10*

Note. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. G1 = Generation 1, G2 = Generation 2, G3 = Generation

Fig. 2 Serial Multiple Mediation Analysis Models ($N = 642$). Note. Path coefficients were mean direct or indirect effects after bootstrapping and were in unstandardized form. G1: Generation 1; G2: Generation 2; G3: Generation 3. * $p < .05$, ** $p < .01$, *** $p < .001$



The serial mediation analysis was repeated three times, using total behavior problems (Model 1), externalizing problems (Model 2), and internalizing problems (Model 3) as the outcome variable, respectively. The significance level was set at $\alpha = 0.05$ (two sided). Analyses were performed using IBM SPSS Statistic version 26 (IBM Corp, Armonk, NY, USA).

Results

Means and standard deviations for study variables are presented in Table 1. The means for behavior problems on the CBCL were generally low, with the mean for total problems being 9.34 out of a possible score of 134, the mean for externalizing problems being 4.70 out of a possible score of 70, and the mean for internalizing being 4.65 out of a possible score of 64. The sample was 51.7% boys and 48.3% girls. Parents reported higher levels of total behavior problems and externalizing problems in boys compared to girls (total problems: $t = 2.26$, $p = .024$; externalizing:

$t=3.66, p<.001$), but there were no gender differences in internalizing problems. The percentage of rural, suburban, and city was 14.8% ($n=95$), 41.6% ($n=267$), and 43.6% ($n=280$) respectively. Children from rural areas scored higher on behavior problems in comparison to their counterparts from suburban or urban areas (total problems: $t=6.37, p=.002$; externalizing: $t=4.30, p=.014$; internalizing: $t=6.46, p=.002$). The mean for SES was 0.155 and ranged from standardized z-scores of -3.49 to 3.12. Higher SES was associated with lower levels of behavior problems (total problems: $r=-.11, p=.006$; internalizing: $r=-.13, p=.002$). Thus, gender, location and SES were controlled for in analyses.

The mean for family-of-origin conflict was 20.38 on a scale of 0–80, suggesting modest levels of conflict. For maternal warmth, the means were between 14 and 15 on an 18-point scale, indicating moderately high levels of warmth.

Bivariate Associations

Higher levels of conflict within the mother's family of origin were associated with higher levels of reported behavior problems in children, though correlations were small (total problems: $r=.13, p=.001$; externalizing: $r=.15, p<.001$; internalizing: $r=.09, p=.027$; Table 1). Children reporting receiving higher levels of maternal warmth and affection demonstrated fewer behavior problems, as reported by mothers, though correlations were small (total problems: $r=-.15, p<.001$; externalizing: $r=-.13, p=.001$; internalizing: $r=-.14, p<.001$). Mothers' reports of maternal warmth and affection received from their mothers (G1-G2) was positively correlated with children's reports of maternal warmth and affection received from their mothers (G2-G3) ($r=.10, p=.012$). Mothers' reports of greater maternal warmth and affection received from their mothers (G1) was associated with lower levels of conflict within the mother's family of origin ($r=-.13, p=.001$).

Serial Multiple Mediation Models

A serial multiple mediator model was specified (Hayes 2013, PROCESS Model 6). This model examined whether the effect of family-of-origin conflict on behavior problems is mediated serially through maternal warmth and affection received by the mother, and then maternal warmth and affection received by the child (Fig. 2), controlling for gender, location, and SES. In each mediation model, greater family-of-origin conflict was associated with lower maternal warmth and affection received by mothers ($b=-0.0230, p<.001$). Lower warmth and affection received by mothers was associated with lower maternal warmth and affection received by children ($b=0.1069, p=.04$). Paths were

not significant between family-of-origin conflict to G2-G3 maternal warmth and affection, or between G1-G2 maternal warmth and affection and child behavior problems.

The first mediation model examined total behavior problems as the outcome measure. All path coefficients for the full PROCESS model are shown in Fig. 2. The total effect of family-of-origin conflict was significant ($p<.001$). The inclusion of the mediators reduced the strength of the original association, but the total direct effect was still significant, suggesting partial mediation. The mean indirect effect was significant, but only accounted for 1.1% of the total effect (0.0009/0.0789).

When externalizing problems was entered as the outcome variable, total effect of family-of-origin conflict was significant ($p<.001$; Fig. 2). The inclusion of the mediators reduced the strength of the original association, but the total direct effect was still significant, again suggesting partial mediation. The mean indirect effect was significant, but only accounted for 0.8% of the total effect (0.0004/0.0481).

When internalizing problems was entered as the outcome variable, total effect of family-of-origin conflict was significant $p<.001$; Fig. 2). The inclusion of the mediators reduced the strength of the original association, but the total direct effect was still significant, suggesting partial mediation. The mean indirect effect was significant, but only accounted for 1.6% of the total effect (0.0005/0.0308).

For each model, the indirect effects were small in magnitude, but significant, though the lower limit of all 95% CIs were close to 0.

Discussion

Child behavior problems, including internalizing and externalizing behaviors, are major public health concerns given their significant consequences. Better understanding risk factors for behavior problems, especially intergenerational transmission of risk, is important for preventing these behavior problems in the future and developing intervention strategies. In this longitudinal cohort study, we investigated the relationship between maternal family-of-origin conflict and their offspring's behavioral problems and tested one of the possible indirect pathways sequentially mediated by maternal warmth and affection of the two generations. In a series of mediation models, we found a significant direct relationship between greater family-of-origin conflict and higher children's behavior problems. Indirect relationships were also observed through lower maternal warmth and affection received by the mother and child. Increased conflict in the mother's family-of-origin predicted less maternal warmth and affection for the mother, which in turn predicted less maternal warmth and affection for received by

her child, which was associated with overall higher levels of childhood behavior problems, including both internalizing and externalizing behaviors. These findings suggest that maternal experiences of family dynamics as children not only influence later parenting practices, but also have a legacy of impact on their children's behavioral health. Our findings of direct effects of family conflict and maternal warmth and affection on children's behavior were consistent with limited prior findings of the positive association between parental adverse childhood experiences and child behavior or developmental outcomes (e.g., McDonnell & Valentino, 2016; Racine et al., 2018).

It should be noted that the effect size of the relationship between greater family-of-origin conflict and increased child behavior problems was small, with standardized betas ranging from 0.09 to 0.15. This is to be expected, as this was a temporally distant predictor compared to proximal influences from the present families and environments of the children (G3) such as current parenting styles. Indirect effects through maternal warmth and affection across two generations were also very small, with confidence intervals approaching zero. Thus, although our results suggest that intergenerational effects of parenting account for a small portion of the relationship between family-of-origin conflict and child behavior problems, other factors that were not examined in this study likely also contribute to this relationship. For example, Madigan et al. (2017) examined the impact of maternal adverse childhood experiences (experienced by the mother during her childhood) on infant physical and emotional health outcomes in a sample of 501 Canadian community mother-infant dyads. Mothers who experienced four or more adverse childhood experiences were at greater risk for experiencing negative biomedical outcomes such as prenatal complications and psychosocial outcomes such as maternal depression, single parenthood, and marital conflict. Madigan et al. suggest that early adversity can influence later stress reactivity and/or exacerbate pre-existing stress or anxiety during pregnancy and the post-partum period. Thus, there are factors beyond parenting that may also act as mediators.

The results of the serial mediation model highlight the importance of maternal warmth and affection as a factor that demonstrates intergenerational continuity and that may partially facilitate the relationships between negative experiences during childhood to behavioral outcomes of offspring. Previous studies have explored multiple mediators such as aggravated parenting (Schickedanz et al., 2018; Racine et al., 2018), parent mental well-being (Madigan et al., 2015; Folger et al., 2018), and a series of negative life events (Collishaw et al., 2007; Madigan et al., 2017), but not maternal warmth and affection. One possibility is that when girls experience or witness aggression and chaos in their

family as a child, they feel less emotional warmth, love, and empathy from their parents, especially mothers, who may be preoccupied by the unpleasant family events and may be emotionally exhausted. Due to a lack of or inconsistent care, these girls may not have developed secure childhood attachment, characterized by positive internal representations of self and others, which in turn generalized to form insecure adulthood attachment (Bowlby, 1988) and decreased their social support in other relationships (Muller et al., 2008). Entering parenthood, these mothers may feel anxious and overwhelmed under parenting stress, and less able to respond to their children in a sensitive and affectionate way.

Biologically, one study found that adults reporting low maternal care in childhood had greater DNA methylation in the oxytocin receptor gene, which is associated with bonding and stress, and in the brain-derived neurotrophic factor (BDNF) gene, which is associated with brain development and plasticity (Unternaehrer et al., 2015). The authors suggest that maternal care associated changes in DNA methylation might contribute to differences in stress reactivity and increase susceptibility to psychopathology. Psychologically, another possibility is that mothers may be modeling the parenting style that they received and may not know how to adequately express their love and care to their children (Simons et al., 1991). This is consistent with the Social Development Model, which suggests that a child is more likely to adopt behavior that has been modeled. Interestingly, the serial mediation model showed that the deleterious influence of family conflict on grandmothers' (G1) parenting would not be brought forward into the third generation without its impact on the second generation's (mothers') lower maternal warmth and affection for her children. Therefore, the lower maternal warmth and affection of *both* generations played a mediating role.

Our findings indicate that the assessment of factors in the parental environment, such as family conflict and parenting, could assist clinicians in identifying children at heightened risk of behavior problems at an early age. By recognizing that features of the parent's developmental environment may partially contribute to a child's behavior problems, preventive interventions that target parenting practices could help to equip parents with the necessary skills to foster their child's healthy emotional development. Given the relative ease of collecting information about a parent's developmental environment, it may be worthwhile to include such information in behavioral risk assessments in clinical settings.

The current study has several strengths. First, our study design allows for the assessment of factors across three generations, to examine influences on child behavior problems in late childhood. Second, the key measure of maternal warmth and affection was assessed through two generations, mother and child, using the same instrument to assess each

of their experiences at different time points. More specifically we asked the mothers to report their relationship with the grandmothers, and the children to report the warmth and affection received from the mothers. This method is helpful to avoid method variance bias, which may result from the mothers filling out the PBI for both generations' maternal warmth and affection as many prior studies have. Future studies should explore other dimensions of parental bonding, such as overprotection, indifference, and autonomy, as well as other factors such as how a mother interprets her family-of-origin dynamics. How a mother interprets her personal history is likely to affect her own warmth and affection for her child (Jones et al., 2015).

Finally, this study combined marital conflict and parent-child conflict (maladaptive interaction) to obtain an index of overall conflict or aggression level in the family environment, unlike previous research which examined either marital conflict or child maltreatment. As pointed out by Madigan and his colleagues (2017), singular adverse events may not predict developmental outcomes reliably compared to a cluster of risks.

Nonetheless, the current study also had some limitations. The first limitation is the fact that for some children, the second-wave PBI was assessed one year after the measure of behavior problems. However, the PBI was modified to cover the period in which behavior problems were assessed, and parental bonding is not expected to change significantly within one year. Another limitation is the retrospective method used in assessing family-of-origin conflict and maternal warmth and affection during mothers' childhood. These retrospective questionnaires have potential for bias of recall. It remains a question whether adults' recall of parenting in their childhood are accurate and valid reflections of actual behaviors of their parents (Gerlsma, 1994). Prospective studies on intergenerational transmission of family and parenting dynamics are needed. A final limitation is that the present study focused on mothers. Additional studies are needed to examine the role of fathers in the intergenerational transmission of these dynamics (Barker et al., 2017; Cabrera et al., 2018).

Overall, this study furthers our understanding of the intergenerational developmental trajectory of children's problem behavior. Current developmental theories of child behavior problems emphasize family dynamics and parental roles. However, there has been less focus on understanding direct and indirect effects of intergenerational family dynamics and maternal warmth and affection on childhood behavioral outcomes. The present study established a small direct relationship between maternal family-of-origin conflict and child behavioral problems, and a serial mediation model with the two-generation maternal warmth and affection as the two mediators. The mediation mechanism

involving intergenerational family dynamics in terms of maternal warmth and affection is a quite novel, which not only sheds light on this emerging research sub-field but also offers implications for clinical practice in the prevention and intervention of child problem behaviors. Findings may raise awareness of the importance of a cross-generational family systems in the intervention and prevention of child problem behaviors.

Funding This work was supported by the National Institute of Environmental Health Sciences and the National Institutes of Health (R01-ES-018858, K02-ES-019878, and K01-ES015877), and Eunice Kennedy Shriver National Institute of Child Health and Human Development (R01-HD087485)

Declarations

Conflict of Interest The authors declare that they have no conflict of interest.

References

- Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA School-Age Forms & Profiles*. University of Vermont, Research Center for Children, Youth, & Families.
- Bandura, A., & Walters, R. H. (1977). *Social learning theory* (1 vol.). Englewood Cliffs.
- Barker, B., Iles, J. E., & Ramchandani, P. G. (2017). Fathers, fathering and child psychopathology. *Current Opinion in Psychology*, 15, 87–92. <https://doi.org/10.1016/j.copsyc.2017.02.015>.
- Bowlby, J. (1988). *A secure base: Parent child attachment and healthy human development*. Basic Books.
- Cabrera, N. J., Volling, B. L., & Barr, R. (2018). Fathers are parents, too! Widening the lens on parenting for children's development. *Child Development Perspectives*, 12, 152–157. <https://doi.org/10.1111/cdep.12275>.
- Catalano, R. F., & Hawkins, J. D. (1996). The social developmental model: A theory of antisocial behavior. In J. D. Hawkins (Ed.), *Delinquency and crime: Current theories* (pp. 149–197). Cambridge University Press.
- Collishaw, S., Pickles, A., Messer, J., Rutter, M., Shearer, C., & Maughan, B. (2007). Resilience to adult psychopathology following childhood maltreatment: Evidence from a community sample. *Child Abuse & Neglect*, 31, 211–229. <https://doi.org/10.1016/j.chiabu.2007.02.004>.
- Colman, I., Murray, J., Abbott, R. A., Maughan, B., Kuh, D., Croudace, T. J., & Jones, P. B. (2009). Outcomes of conduct problems in adolescence: 40-year follow-up of national cohort. *Bmj*, 338, a2981.
- Cui, N., Deatrick, J. A., & Liu, J. (2018). Maternal and paternal physical abuse: Unique and joint associations with child behavioral problems. *Child Abuse & Neglect*, 76, 524–532. <https://doi.org/10.1016/j.chiabu.2017.05.003>.
- Deater-Deckard, K., Dodge, K. A., Bates, J. E., & Pettit, G. S. (1998). Multiple risk factors in the development of externalizing behavior problems: Group and individual differences. *Development & Psychopathology*, 10, 469–493. <https://doi.org/10.1017/S0954579498001709>.
- Folger, A. T., Eismann, E. A., Stephenson, N. B., Shapiro, R. A., Macaluso, M., Brownrigg, M. E., & Gillespie, R. J. (2018). Parental adverse childhood experiences and offspring development at 2

- years of age. *Pediatrics*, *141*, e20172826. <https://doi.org/10.1542/peds.2017-2826>.
- Formoso, D., Gonzales, N. A., & Aiken, L. S. (2000). Family conflict and children's internalizing and externalizing behavior: Protective factors. *American Journal of Community Psychology*, *28*, 175–199. <https://doi.org/10.1023/A:1005135217449>.
- Gerlisma, C. (1994). Parental rearing styles and psychopathology: Notes on the validity of questionnaires for recalled parental behavior. In C. Perris, W. A. Arrindell, & M. Eisemann (Eds.), *Parenting and psychopathology* (pp. 75–105). Wiley.
- Greene, C. A., Haisley, L., Wallace, C., & Ford, J. D. (2020). Intergenerational effects of childhood maltreatment: A systematic review of the parenting practices of adult survivors of childhood abuse, neglect, and violence. *Clinical Psychology Review*, *80*, 101891. <https://doi.org/10.1016/j.cpr.2020.101891>.
- Gryczkowski, M. R., Jordan, S. S., & Mercer, S. H. (2010). Differential relations between mothers' and fathers' parenting practices and child externalizing behavior. *Journal of Child & Family Studies*, *19*, 539–546. <https://doi.org/10.1007/s10826-009-9326-2>.
- Hawkins, J. D., & Weis, J. G. (1985). The social development model: An integrated approach to delinquency prevention. *The Journal of Primary Prevention*, *6*(2), 73–97. <https://doi.org/10.1007/BF01325432>.
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: The Guilford Press.
- Hayes, A. F., & Scharkow, M. (2013). The relative trustworthiness of inferential tests of the indirect effect in statistical mediation analysis: does method really matter?. *Psychological science*, *24*(10), 1918–1927.
- Hirschi, T. (1969). *Causes of delinquency*. Routledge.
- Jones, J. D., Cassidy, J., & Shaver, P. R. (2015). Parents' self-reported attachment styles: A review of links with parenting behaviors, emotions, and cognitions. *Personality & Social Psychology Review*, *19*, 44–76. <https://doi.org/10.1177/1088868314541858>.
- Lansford, J. E., Sharma, C., Malone, P. S., Woodlief, D., Dodge, K. A., Oburu, P., & Di Giunta, L. (2014). Corporal punishment, maternal warmth, and child adjustment: A longitudinal study in eight countries. *Journal of Clinical Child & Adolescent Psychology*, *43*(4), 670–685.
- Leung, P. W., Kwong, S. L., Tang, C. P., Ho, T. P., Hung, S. F., Lee, C. C., & Liu, W. S. (2006). Test-retest reliability and criterion validity of the chinese version of CBCL, TRF, and YSR. *Journal of Child Psychology and Psychiatry & Allied Disciplines*, *47*, 970–973. <https://doi.org/10.1111/j.1469-7610.2005.01570.x>.
- Liu, J., McCauley, L. A., Zhao, Y., Zhang, H., Pinto-Martin, J., & Jintan Cohort Study Group. (2010). Cohort profile: The China Jintan child cohort study. *International Journal of Epidemiology*, *39*, 668–674. <https://doi.org/10.1093/ije/dyp205>.
- Liu, J., Cheng, H., & Leung, P. W. (2011a). The application of the preschool child Behavior Checklist and the caregiver-teacher report form to Mainland Chinese children: Syndrome structure, gender differences, country effects, and inter-informant agreement. *Journal of Abnormal Child Psychology*, *39*, 251–264. <https://doi.org/10.1007/s10802-010-9452-8>.
- Liu, J., Li, L., & Fang, F. (2011b). Psychometric properties of the Chinese version of the parental bonding instrument. *International Journal of Nursing Studies*, *48*, 582–589. <https://doi.org/10.1016/j.ijnurstu.2010.10.008>.
- Liu, J., Cao, S., Chen, Z., Raine, A., Hanon, A., Ai, Y., & Jintan Cohort Study Group. (2015). Cohort profile update: The China Jintan child cohort study. *International Journal of Epidemiology*, *44*, 1548–1548. <https://doi.org/10.1093/ije/dyv119>.
- Lounds, J. J., Borkowski, J. G., & Whitman, T. L. (2006). The potential for child neglect: The case of adolescent mothers and their children. *Child Maltreatment*, *11*(3), 281–294.
- MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate behavioral research*, *39*(1), 99–128.
- Madden, V., Domoney, J., Aumayer, K., Sethna, V., Iles, J., Hubbard, I., & Ramchandani, P. (2015). Intergenerational transmission of parenting: Findings from a UK longitudinal study. *European Journal of Public Health*, *25*, 1030–1035. <https://doi.org/10.1093/eurpub/ckv093>.
- Madigan, S., Wade, M., Plamondon, A., & Jenkins, J. (2015). Maternal abuse history, postpartum depression, and parenting: Links with preschoolers internalizing problems. *Infant Mental Health Journal*, *36*, 146–155. <https://doi.org/10.1002/imhj.21496>.
- Madigan, S., Wade, M., Plamondon, A., Maguire, J. L., & Jenkins, J. M. (2017). Maternal adverse childhood experience and infant health: Biomedical and psychosocial risks as intermediary mechanisms. *The Journal of Pediatrics*, *187*, 282–289. <https://doi.org/10.1016/j.jpeds.2017.04.052>.
- Marcone, R., Affuso, G., & Borrone, A. (2020). Parenting styles and children's internalizing-externalizing behavior: The mediating role of behavioral regulation. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues*, *39*, 13–24. <https://doi.org/10.1007/s12144-017-9757-7>.
- McDonnell, C. G., & Valentino, K. (2016). Intergenerational effects of childhood trauma: Evaluating pathways among maternal ACEs, perinatal depressive symptoms, and infant outcomes. *Child Maltreatment*, *21*, 317–326. <https://doi.org/10.1177/1077559516659556>.
- McKee, L., Roland, E., Coffelt, N., Olson, A. L., Forehand, R., Massari, C., Jones, D., Gaffney, C. A., & Zens, M. S. (2007). Harsh discipline and child problem behaviors: The roles of positive parenting and gender. *Journal of Family Violence*, *22*(4), 187–196. <https://doi.org/10.1007/s10896-007-9070-6>.
- Miller, L., Kramer, R., Warner, V., Wickramaratne, P., & Weissman, M. (1997). Intergenerational transmission of parental bonding among women. *Journal of the American Academy of Child & Adolescent Psychiatry*, *36*, 1134–1139. <https://doi.org/10.1097/00004583-199708000-00022>.
- Muller, R. T., Gragtmans, K., & Baker, R. (2008). Childhood physical abuse, attachment, and adult social support: Test of a mediational model. *Canadian Journal of Behavioural Science*, *40*, 80–89. <https://doi.org/10.1037/0008-400X.40.2.80>.
- Nelson, J. R., Stage, S., Duppong-Hurley, K., Synhorst, L., & Epstein, M. H. (2007). Risk factors predictive of the problem behavior of children at risk for emotional and behavioral disorders. *Exceptional Child*, *73*, 367–379. <https://doi.org/10.1007/s10826-009-9326-2>.
- O'Keefe, M. (1994). Linking marital violence, mother-child/father-child aggression, and child behavior problems. *Journal of Family Violence*, *9*, 63–78. <https://doi.org/10.1007/BF01531969>.
- Parker, G., Tupling, H., & Brown, L. B. (1979). A parental bonding instrument. *British Journal of Medical Psychology*, *52*, 1–10. <https://doi.org/10.1111/j.2044-8341.1979.tb02487.x>.
- Pasalich, D. S., Witkiewitz, K., McMahon, R. J., Pinderhughes, E. E., & Conduct Problems Prevention Research Group. (2016). Indirect effects of the fast track intervention on conduct disorder symptoms and callous-unemotional traits: Distinct pathways involving discipline and warmth. *Journal of Abnormal Child Psychology*, *44*, 587–597.
- Piquero, A. R., Jennings, W. G., Diamond, B., et al. (2016). A meta-analysis update on the effects of early family/parent training programs on antisocial behavior and delinquency. *Journal of Experimental Criminology*, *12*, 229–248. <https://doi.org/10.1007/s11292-016-9256-0>.

- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior research methods*, *40*(3), 879–891.
- Racine, N., Plamondon, A., Madigan, S., McDonald, S., & Tough, S. (2018). Maternal adverse childhood experiences and infant development. *Pediatrics*, *141*, e20172495. <https://doi.org/10.1542/peds.2017-2495>.
- Reid, W. J., & Crisafulli, A. (1990). Marital discord and child behavior problems: A meta-analysis. *Journal of Abnormal Child Psychology*, *18*, 105–117. <https://doi.org/10.1007/BF00919459>.
- Reiss, A. J. (1951). Delinquency as the failure of personal and social controls. *American Sociological Review*, *16*, 196–207.
- Robson, D. A., Allen, M. S., & Howard, S. J. (2020). Self-regulation in childhood as a predictor of future outcomes: A meta-analytic review. *Psychological Bulletin*, *146*, 324–354. <https://doi.org/10.1037/bul0000227>.
- Rothenberg, W. A., Lansford, J. E., Bacchini, D., & Al-Hassan, S. M. (2020). Cross-cultural effects of parent warmth and control on aggression and rule-breaking from ages 8 to 13. *Aggressive Behavior*, *46*, 327–340. <https://doi.org/10.1002/ab.21892>.
- Savage, L., Tarabulsky, G. M., Pearson, J., Collin-Vézina, D., & Gagné, L. M. (2019). Maternal history of childhood maltreatment and later parenting behavior: A meta-analysis. *Development and Psychopathology*, *31*, 9–21. <https://doi.org/10.1017/S0954579418001542>.
- Schickedanz, A., Halfon, N., Sastry, N., & Chung, P. J. (2018). Parents' adverse childhood experiences and their children's behavioral health problems. *Pediatrics*, *142*, 1–9. <https://doi.org/10.1542/peds.2018-0023>.
- Sexton, M. B., Davis, M. T., Menke, R., Raggio, G. A., & Muzik, M. (2017). Mother-child interactions at six months postpartum are not predicted by maternal histories of abuse and neglect or maltreatment type. *Psychological Trauma*, *9*, 622–626. <https://doi.org/10.1037/tra0000272>.
- Simons, R. L., Whitbeck, L. B., Conger, R. D., & Wu, C. I. (1991). Intergenerational transmission of harsh parenting. *Developmental Psychology*, *27*, 159–171. <https://doi.org/10.1037/0012-1649.27.1.159>.
- Simons, R. L., Beaman, J., Conger, R. D., & Chao, W. (1993). Childhood experience, conceptions of parenting, and attitudes of spouse as determinants of parental behavior. *Journal of Marriage and the Family*, *55*, 91–106. <https://doi.org/10.2307/352961>.
- Sternberg, K. J., Baradaran, L. P., Abbott, C. B., Lamb, M. E., & Guterman, E. (2006). Type of violence, age, and gender differences in the effects of family violence on children's behavior problems: A mega-analysis. *Developmental Review*, *26*, 89–112. <https://doi.org/10.1016/j.dr.2005.12.001>.
- Straus, M. A., Hamby, S. L., Boney-McCoy, S., & Sugarman, D. B. (1996). The revised conflict tactics scales (CTS2): Development and preliminary psychometric data. *Journal of Family Issues*, *17*, 283–316. <https://doi.org/10.1177/019251396017003001>.
- Tanaka, M., Kitamura, T., Chen, Z., Murakami, M., & Goto, Y. (2009). Do parents rear their children as they were reared themselves? Intergenerational transmission of parental styles (warmth and control) and possible mediation by personality traits. *The Open Family Studies Journal*, *2*, 82–90. <https://doi.org/10.2174/1874922400902010082>.
- Unternaehrer, E., Meyer, A. H., Burkhardt, S. C., Dempster, E., Staehli, S., Theill, N., Meinschmidt, G., et al. (2015). Childhood maternal care is associated with DNA methylation of the genes for brain-derived neurotrophic factor (BDNF) and oxytocin receptor (OXTR) in peripheral blood cells in adult men and women. *Stress (Amsterdam, Netherlands)*, *18*(4), 451–461.
- van de Weijer, S. G. A., Bijleveld, C. C. J. H., & Blokland, A. A. J. (2014). The intergenerational transmission of violent Offending. *Journal of Family Violence*, *29*, 109–118. <https://doi.org/10.1007/s10896-013-9565-2>.
- Waller, R., Hyde, L. W., Klump, K. L., & Burt, S. A. (2018). Parenting is an environmental predictor of callous-unemotional traits and aggression: A monozygotic twin differences study. *Journal of the American Academy of Child and Adolescent Psychiatry*, *57*, 955–963. <https://doi.org/10.1016/j.jaac.2018.07.882>.
- Wang, M., Xing, X., & Zhao, J. (2014). Intergenerational transmission of corporal punishment in China: The moderating role of marital satisfaction and gender. *Journal of Abnormal Child Psychology*, *42*, 1263–1274. <https://doi.org/10.1007/s10802-014-9890-9>.
- Zvara, B. J., Mills-Koonce, R., & Cox, M. (2017). Maternal childhood sexual trauma, child directed aggression, parenting behavior, and the moderating role of child sex. *Journal of family violence*, *32*(2), 219–229.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.