

# Marital Hostility, Hostile Parenting, and Child Aggression: Associations From Toddlerhood to School Age

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**Objective:** The spillover hypothesis suggests that childhood aggression results from spillover of interparental conflict to poor parenting, which promotes aggressive child behavior. This study was designed to examine the spillover hypothesis in non-genetically related parent-child dyads from the toddler period through age 6 years.

**Method:** A sample of 361 sets of children, adoptive parents, and birth parents from the Early Growth and Development Study (EGDS) was assessed from child age 9 months to 6 years on measures of adoptive parent financial strain, antisocial traits, marital hostility, hostile parenting, and child aggression. Structural equation modeling was used to examine links from financial strain, parent antisocial traits, and marital hostility in infancy and toddlerhood to hostile parenting and child aggression at ages 4.5 and 6 years.

**Results:** Spillover of marital conflict from child age 18 to 27 months was associated with more parental hostility in

mothers and fathers at 27 months. In turn, adoptive fathers' parental hostility, but not mothers', was associated with aggression in children at age 4.5 years. However, there was no significant spillover from hostile parenting at 4.5 years to child aggression at 6 years. Birth mother antisocial traits were unassociated with child aggression.

**Conclusion:** This study is the first to examine spillover of marital hostility to parenting to child aggression from toddlerhood through age 6 years in an adoption design, highlighting the impact of these environmental factors from the toddler to preschool period. The findings support the potential benefit of early identification of marital hostility.

**Key words:** spillover, marital hostility, hostile parenting, child aggression, adoption

*J Am Acad Child Adolesc Psychiatry* 2016;55(3):235–242.

Aggression is a serious problem in childhood and adolescence, with significant associations with a wide variety of negative outcomes.<sup>1,2</sup> The spillover hypothesis has been studied over the last several decades and proposes that conflict and negative emotion in 1 family subsystem (husband-wife) can negatively impact another subsystem (parent-child).<sup>3</sup> This would imply that childhood aggression may in part result from spillover of interparental conflict to poor parenting practices, which promotes aggressive behavior.<sup>3</sup> This study tests the spillover hypothesis by examining associations among marital hostility, parental hostility, and child aggression from the toddler to school-age period. We use a longitudinal adoption design of children placed with nonrelative adoptive families at birth to identify those associations that could not be attributable to genes shared by rearing parents and their offspring.

**Links From Marital Conflict to Parent to Child Aggression**  
Several meta-analytic studies have found moderate effects sizes for the spillover from marital conflict to negative parenting behaviors and from parenting to child aggression.<sup>4,5</sup> Spillover effects from marital conflict to childhood behavior may be a result of the emotional distress caused by poor interparental relationship quality, which erodes parenting, or the direct influence of witnessing high levels of parents' negative emotions, including verbal and/or physical aggression.<sup>6,7</sup> Many of the prior studies of the spillover

hypothesis are in school-aged and adolescent samples.<sup>7-10</sup> Studies examining the full spillover model from marital to parenting to child aggression specifically in early childhood using genetically informed designs are scarce.

To our knowledge, 3 studies have examined pathways from marital conflict to parenting to childhood outcomes in early childhood using genetically informed designs. Using the current sample, the first assessed relationships among marital conflict, parental harsh discipline, and childhood anger/frustration in a sample of toddlers<sup>11</sup> and found an indirect relationship from marital conflict at child age 9 months to child anger/frustration at 18 months via parental harsh discipline. The second, also using the current sample, examined the spillover of marital to parenting hostility to child aggression for both mothers and fathers when children were 27 months old.<sup>12</sup> Results indicated a significant unique contribution of spillover from marital hostility to parenting hostility to child aggression for both adoptive mothers and adoptive fathers. Finally, a study of 6-year-old children and their families, using data from both the current sample and a sample of families that used in vitro fertilization, found indirect associations of interparental conflict to childhood externalizing problems at age 6 years via parent-to-child hostility for both mothers and fathers in genetically related and non-genetically related parent-child units.<sup>13</sup> Consistently, twin studies indicate that nonshared environmental effects account for a greater proportion (64%) of the variance

in global family conflict than genetic influences.<sup>14</sup> These studies all lend support for the spillover hypothesis, but they are primarily cross-sectional.

There is evidence to suggest that younger children may be more likely to exhibit distress as a result of marital conflict through aggressive behaviors,<sup>15</sup> but aggressive behaviors typically subside as children enter school age,<sup>16</sup> because children learn to regulate their emotions and to reduce aggressive behaviors in preschool before they enter formal schooling.<sup>17</sup> No studies have examined whether marital hostility in infancy and toddlerhood will have an impact on child aggression as children progress through preschool and enter kindergarten, when aggression is expected to have decreased. Understanding the longitudinal impact of marital hostility and hostile parenting in early childhood on later aggression in childhood can further inform intervention and prevention efforts for child conduct and aggression problems.

### Additional Factors That Contribute to Spillover

Socioeconomic distress has been consistently linked with marital discord and conflict.<sup>18,19</sup> Financial strain is defined as the subjective experience of financial burden that is not necessarily linked to a lack of money. Individuals may earn sufficient income to meet basic needs but be overburdened by bills or expenses. Subjective financial strain has been associated directly with marital hostility and indirectly to poor parenting through marital hostility.<sup>12,20</sup> Parental traits also have been linked to marital and parenting behaviors. Studies have indicated that parental antisocial traits in particular contribute to negative marital and parenting behaviors.<sup>21,22</sup>

Shared genetic influences can also have an impact on associations between parenting and child aggression. The same genetic factors that influence parenting behaviors may affect child behavior. Heritability of aggression<sup>23</sup> and parenting behaviors<sup>24</sup> has been found to be in the moderate range. The current sample of unrelated parent-offspring dyads, along with inclusion of birth mother antisocial traits in statistical models, allows examination of family environmental factors without shared genes between parents and children, as well as inherited contributions to child aggressive behaviors.

This study seeks to add to the evidence for the spillover hypothesis as children transition from toddlerhood through the preschool years and formal school entry by means of the following: examining contextual factors of financial strain and parent antisocial traits and their associations with

marital hostility and hostile parenting; and testing the spillover hypothesis over time from marital hostility to hostile parenting at child age 27 months to later child aggression at age 4.5 years and age 6 years, while controlling for birth mother antisocial traits.

## METHOD

### Participants

The sample consisted of 361 sets of adopted children, adoptive parents, and birth parents from the Early Growth and Development Study (EGDS), a longitudinal multisite study.<sup>25</sup> The full sample of 2 cohorts consists of 561 family sets; however, only cohort I had complete data collection at child age 6 years as of the writing of this report. Hence, the sample used in this study included the 361 families from cohort I only.

Study participants were representative of those completing adoption plans at the participating agencies during the recruitment period.<sup>26</sup> Based on the goal of this study—to examine relations among marital hostility, child aggression, and parental hostility for both mothers and fathers—individuals with same-sex parents (2 adoptive fathers,  $n = 12$ ; 2 adoptive mothers,  $n = 8$ ) or single parents ( $n = 5$ ) were excluded from the sample, resulting in a sample of 336 sets for analysis.

The EGDS cohort I sample consisted of 57% male adopted children with a mean age of 7 days ( $SD = 13$  days) at the time of adoption. The adoptive parents had been married or living together in a committed relationship for an average of 17 years ( $SD = 5.2$  years) at the time of adoption, and were typically college educated and middle class. Both birth mothers and birth fathers typically had a high school or trade school education level and household incomes less than \$25,000. Additional demographic data related to birth and adoptive parents are presented in Table 1 and in other reports.<sup>25</sup> Although data were available for a subset of birth fathers ( $n = 121$ ), their data were not used in the current analyses due to the need for a larger sample size given the complex modeling. There were no significant differences in demographic characteristics between the full EGDS sample and the participants in cohort I examined in the current analyses.

### Procedure

The present analyses used data from birth mothers at child age 3 to 6 months, 18 months, and 4.5 years, and from adoptive families at child age 18 months, 27 months, 4.5 years, and 6 years. All participants were paid for their time. Following informed consent procedures, interviewers asked participants computer-assisted interview questions, and each participant independently completed a set of questionnaires. Full details on the EGDS study recruitment procedures, sample, and assessment methods are reported elsewhere.<sup>26</sup>

**TABLE 1** Demographic Characteristics of the Sample

	Mean Age (y)	White	African American	Multiethnic	Hispanic/Latino	American Indian	Other
Adoptive mother	38	92	4	1	2	<1	<1
Adoptive father	38	91	5	<1	<1	<1	<1
Birth mother	24	72	11	4	7	3	3
Birth father	25	75	9	5	<1	1	10

Note:  $N = 361$ . All data shown as percentages except for mean age.

## Measures

**Marital hostility.** Marital hostility was assessed using the 13-item hostility index of the Behavior Affective Rating Scale.<sup>27</sup> Adoptive mothers (AMs) and adoptive fathers (AFs) were asked to report on their partners' hostility toward them at child age 18 months, 27 months, and 4.5 years. Each parent reported on a 7-point Likert hostility subscale how often in the last year his/her partner acted in a hostile way on items such as "Criticized you or your ideas," "Hit, pushed, grabbed or shoved you," and "Ignored you when you tried to talk to him/her." The mean across items of the subscale served as a marital hostility score for AM ( $\alpha = 0.89$ – $0.90$  across waves) and AF ( $\alpha = 0.89$ – $0.90$  across waves), with higher scores indicating more hostility. Given evidence for the deleterious impact of marital hostility in early childhood on child behavior during school age and adolescence,<sup>28,29</sup> we aimed to create a marital hostility variable that would provide a summary of the marital hostility within the environment in toddlerhood based on both maternal and paternal reports. To best account for marital hostility, latent variables were created to account for marital hostility in the toddler period and then from the toddler period into preschool with the indicators of both AM and AF report across waves (see the model diagrams in Figures 1 and 2). Marital hostility across time was highly stable for both AM and AF reports ( $r > 0.74$ ), and the correlations between AM and AF reports were moderate ( $r > 0.42$ ).

**Hostile parenting.** The AMs and AFs reported on their behaviors on the 7-point Likert hostility subscale of the Iowa Family Interaction Rating Scales of his/her behavior toward the child over the last month<sup>30</sup> when the child was 27 months and 4.5 years of age. Items included "Criticized him/her," "Shouted at him/her when you were mad," and "Hit, pushed, or shoved him/her." The hostility subscale served as the outcome for AM and AF hostile parenting at 27 months (AM  $\alpha = 0.77$  and AF  $\alpha = 0.70$ ) and 4.5 years (AM  $\alpha = 0.78$  and AF  $\alpha = 0.77$ ), with higher scores indicating more hostile parenting.

**Child aggression.** Child aggression was reported by the adoptive parents using the Aggression scale of the Child Behavior Checklist when the child was 27 months, 4.5, and 6 years of age.<sup>31,32</sup> Scores were standardized  $t$  scores, with higher scores indicating a higher level of aggression. To best account for both AMs' and AFs' reports on child aggression and to reduce rater bias, latent variables were used in the study with the indicators of AM and AF scores at 4.5 years and 6 years, respectively (see the model diagrams in Figures 1 and 2). AM and AF scores were significantly correlated at each wave (all  $r > 0.52$ , all  $p < .001$ ). The  $\alpha$  values were high at each wave for AM ( $\alpha = 0.85, 0.91, 0.92$ ) and AF ( $\alpha = 0.87, 0.92, 0.92$ ).

**Adoptive parent financial strain.** Financial strain was reported by AM and AF when the child was 18 months old. This measure was used in previous studies<sup>33,34</sup> and asked parents to report separately (on a 5-point Likert scale): How much difficulty have you had paying bills each month? How much trouble have you had making ends meet? The mean of the scale served as the outcome for AMs ( $\alpha = 0.73$ ) and AFs ( $\alpha = 0.71$ ), with higher scores indicating greater subjective experiences of financial strain.

**Adoptive parent antisocial traits.** Adoptive parent antisocial traits were measured when the child was 18 months of age using a 13-item adaptation of the Antisocial Action Scale<sup>35</sup> on a 4-point Likert scale. Sample items include, "I cheat at work or other places," "I use other people's credit cards without permission," and "I tell lies to people." The mean of the scale served as the outcome for AM antisocial traits ( $\alpha = 0.56$ ) and AF antisocial traits ( $\alpha = 0.51$ ), with higher scores indicating more antisocial behaviors.

**Adoption openness.** Openness was a composite of standardized birth mother's, AM's, and AF's reports of perceived openness in the adoption (e.g., contact with and knowledge about their counterpart), with higher scores indicating more openness at child age 18 months.

Interrater agreement was high and ranged from 0.66 to 0.81 (all  $p < .001$ ).<sup>36</sup>

**Birth mother antisocial traits.** Birth mother antisocial traits were the sum of 3 measures collected at multiple times of assessment: delinquency, substance use, and antisocial behaviors.

**Birth mother delinquency:** Self-reports of birth mother engagement in various delinquent behaviors over the previous 12 months on the Elliott Youth Questionnaire<sup>37</sup> were collected at 3 to 6 months, 18 months, and 54 months postpartum. Item scores were summed at each time (all  $\alpha > 0.82$ ) and log-transformed to reduce skewness. Finally, birth mother reports at the 3 times were averaged to create a composite for delinquency, given that the reports were significantly correlated across time points and were quite stable (all  $r > 0.43$ , all  $p < .001$ ). The composite measure ranged from  $-0.76$  to  $3.44$ , with higher scores indicating more delinquent activity.

**Birth mother substance use:** A variable representing birth mothers' serious use of substances was generated from the Composite International Diagnostic Interview–Short Form (CIDI-SF).<sup>38</sup> Birth mothers reported their lifetime use of a list of drugs at 3 to 6 months postpartum. Any report of "yes" to any of the drugs was coded into a dichotomous variable, with the value of 0 indicating no serious use of any drug type and the value of 1 indicating serious use of at least 1 type of drug.

**Birth mother antisocial behavior:** Birth mother antisocial behavior was measured using the Computerized Diagnostic Interview Schedule<sup>39</sup> at 18 months postpartum. Data were coded to create a dichotomous variable, with the values of 0 = no antisocial symptoms and 1 = antisocial symptoms present.

## Analytic Strategy

Two structural equation models were estimated in Mplus 6, using the maximum likelihood estimation with robust standard errors (MLR) for nonnormal continuous variables with missing data. For all variables in the study, there was approximately 4% to 30% missing data under the assumption of missing at random. To evaluate model fit, we used multiple indices, including the model  $\chi^2$ , comparative fit index (CFI),<sup>40</sup> standardized root mean square residual (SRMR), and root mean square error of approximation (RMSEA).<sup>41</sup> According to Kline,<sup>42</sup> the combination of model  $\chi^2$  values accompanying  $p$  values greater than .05, CFI values greater than 0.95, RMSEA values less than 0.06, and SRMR values less than 0.08 indicates a good model fit.

## RESULTS

### Model Variable Correlations

Means, standard deviations (SD), and Pearson's bivariate correlations among all study variables were reported in Table 2. Results show that marital hostility was associated with parents' antisocial traits and AFs' financial strain. Marital hostility was related to child aggression and AFs' hostile parenting across time, as well as AMs' hostile parenting when the child was 27 months and 4.5 years old. In addition, AMs' hostile parenting across time was related to their antisocial traits and financial strain. In contrast, AFs' hostile parenting was related to their antisocial traits across time and with financial strain when the child was 27 months and 4.5 years old. Finally, child aggression was significantly associated with both AMs' hostile parenting and AFs' hostile parenting across time. Adoption openness was not significantly associated with any of our variables of interest and therefore was not included in the SEM models presented below.

**TABLE 2** Correlations and Descriptive Statistics for All Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
1 AM Financial	1.00																			
2 AM Antisocial	0.16*	1.00																		
3 AF Financial	0.68***	-0.02	1.00																	
4 AF Antisocial	0.01	0.19**	0.09	1.00																
5 BM Antisocial	-0.05	0.06	-0.08	-0.02	1.00															
6 AM Marital hostility 18 mo	0.13*	0.40***	0.12*	0.27*	-0.06	1.00														
7 AM Marital hostility 27 mo	0.08	0.31**	0.08	0.19*	0.02	0.81***	1.00													
8 AM Marital Hostility 4.5 y	0.09	0.28**	0.04	0.15*	0.02	0.74***	0.75***	1.00												
9 AF Marital hostility 18 mo	0.08	0.07	0.14*	0.24*	-0.03	0.50***	0.44***	0.43***	1.00											
10 AF Marital hostility 27 mo	0.06	0.09	0.16**	0.27*	-0.04	0.45***	0.45***	0.46***	0.85***	1.00										
11 AF Marital Hostility 4.5 y	0.10	0.14*	0.12	0.29*	-0.13*	0.43***	0.41***	0.50***	0.71***	0.77***	1.00									
12 AM Child Agg 4.5 y	0.14*	0.06	0.16**	0.14*	-0.04	0.20**	0.11	-0.00	0.15**	0.11	0.03	1.00								
13 AM Child Agg 6 y	0.15*	-0.02	0.17**	0.19**	-0.05	0.10	0.07	0.03	0.09	0.06	0.03	0.74***	1.00							
14 AM Parenting 27 mo	0.11*	0.20**	0.09	0.11*	-0.05	0.11*	0.13*	0.13*	0.04	0.05	0.19**	0.21**	0.23**	1.00						
15 AF Child Agg 4.5 y	0.09	-0.03	0.16*	0.14*	-0.12	0.11	0.03	-0.07	0.15**	0.16**	0.11	0.52***	0.45***	0.22**	1.00					
16 AF Child Agg 6 y	0.04	0.07	0.08	0.17**	-0.08	0.15*	0.11	0.02	0.22**	0.19**	0.18**	0.36***	0.59***	0.20**	0.66***	1.00				
17 AM Parent 4.5 y	0.18**	0.24**	0.16**	0.18**	-0.02	0.18**	0.14**	0.14**	0.07	0.12*	0.14**	0.44**	0.32**	0.50***	0.39***	0.31***	10.00			
18 AF Parent 27 mo	0.06	0.03	0.16**	0.29**	0.08	0.14**	0.11*	0.03	0.25***	0.27***	0.16**	0.22**	0.17**	0.33***	0.28***	0.30***	0.23**	10.00		
19 AF Parent 4.5 y	0.14*	0.10	0.19**	0.25**	0.03	0.16**	0.10	0.10	0.23***	0.28***	0.27***	0.32***	0.28**	0.23***	0.44***	0.32***	0.34**	0.23**	1.00	
Mean	3.62	1.30	3.52	1.31	1.06	25.01	24.40	25.14	28.39	27.74	28.81	53.78	51.85	9.05	52.11	52.83	10.99	8.90	10.3	
SD	1.50	0.19	1.40	0.20	1.43	7.93	7.76	8.59	9.08	9.39	9.75	5.23	4.13	2.58	3.86	4.60	3.02	2.47	2.88	
n	313	313	300	302	234	337	325	282	324	317	276	265	220	314	247	239	268	297	241	

Note: AF = adoptive father; Agg = aggression; AM = adoptive mother; BM = birth mother.  
\*p < .05; \*\*p < .01; \*\*\*p < .001.

Spillover Models

We first tested the relationships among adoptive parents' antisocial traits, financial strain, marital hostility, and hostile parenting when the child was 27 months and their relationship to child aggression at age 4.5 years (Figure 1). The model fit the data acceptably ( $\chi^2 [63] = 136.22, p = .00, CFI = 0.95; RMSEA = 0.04, 90\% CI = 0.03-0.06, SRMR = 0.07$ ). The model significantly explained 13.3% of the variance in AFs' hostile parenting, 78% of the variance of the latent variable of child aggression at 4.5 years, and 10.6% of the variance of the latent variable of marital hostility.

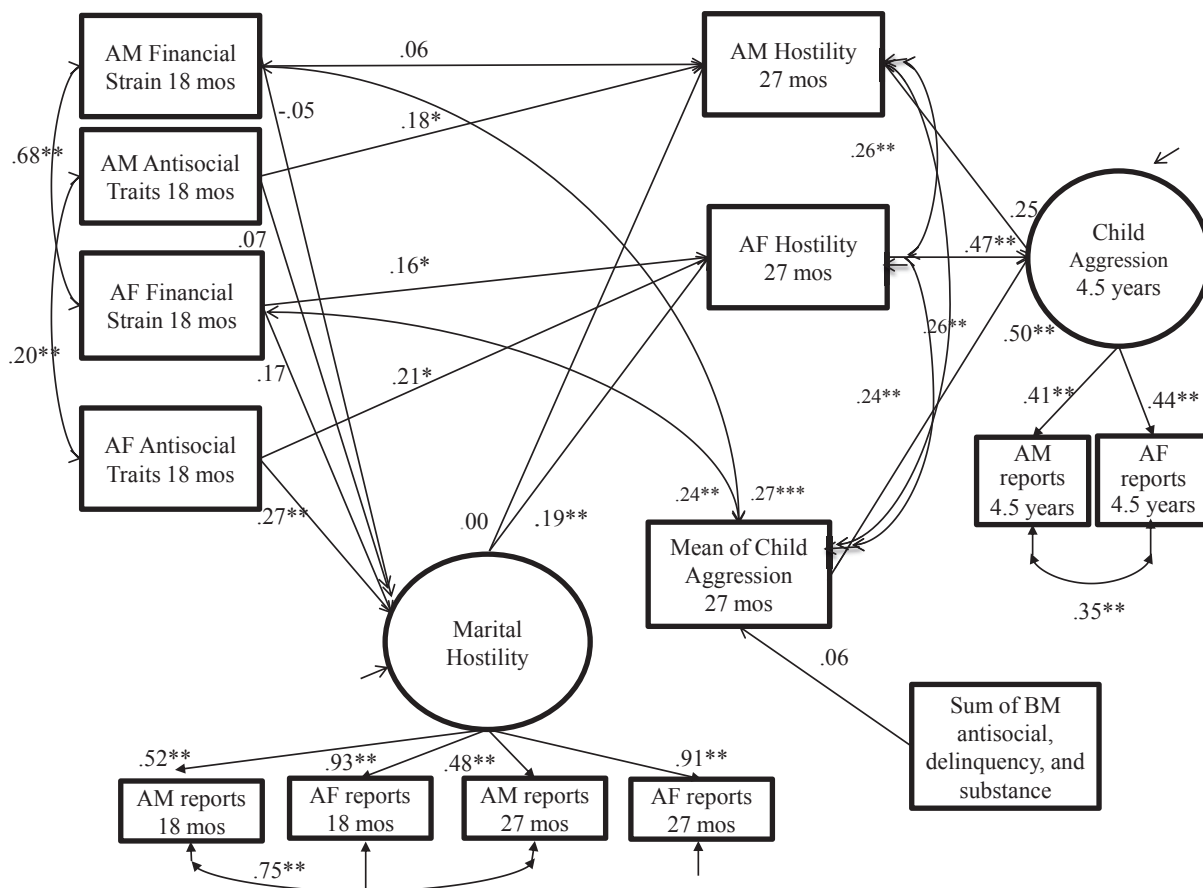
As Figure 1 indicates, AFs' antisocial traits at 18 months were related to parents' marital hostility from 18 to 27 months, which was positively associated with AFs' hostile parenting when the child was 27 months of age. In addition, AFs' hostile parenting at age 27 months was also significantly associated with their financial strain and antisocial traits, after controlling for marital hostility. Moreover, AFs' parenting hostility at child age 27 months was significantly positively related to child aggression at age 4.5 years. Examining the indirect effects in the model, child aggression at age 4.5 years was indirectly related to marital hostility ( $\beta = 0.08, p < .05$ ) through AFs' hostile

parenting at child age 27 months, after controlling for the other predictors.

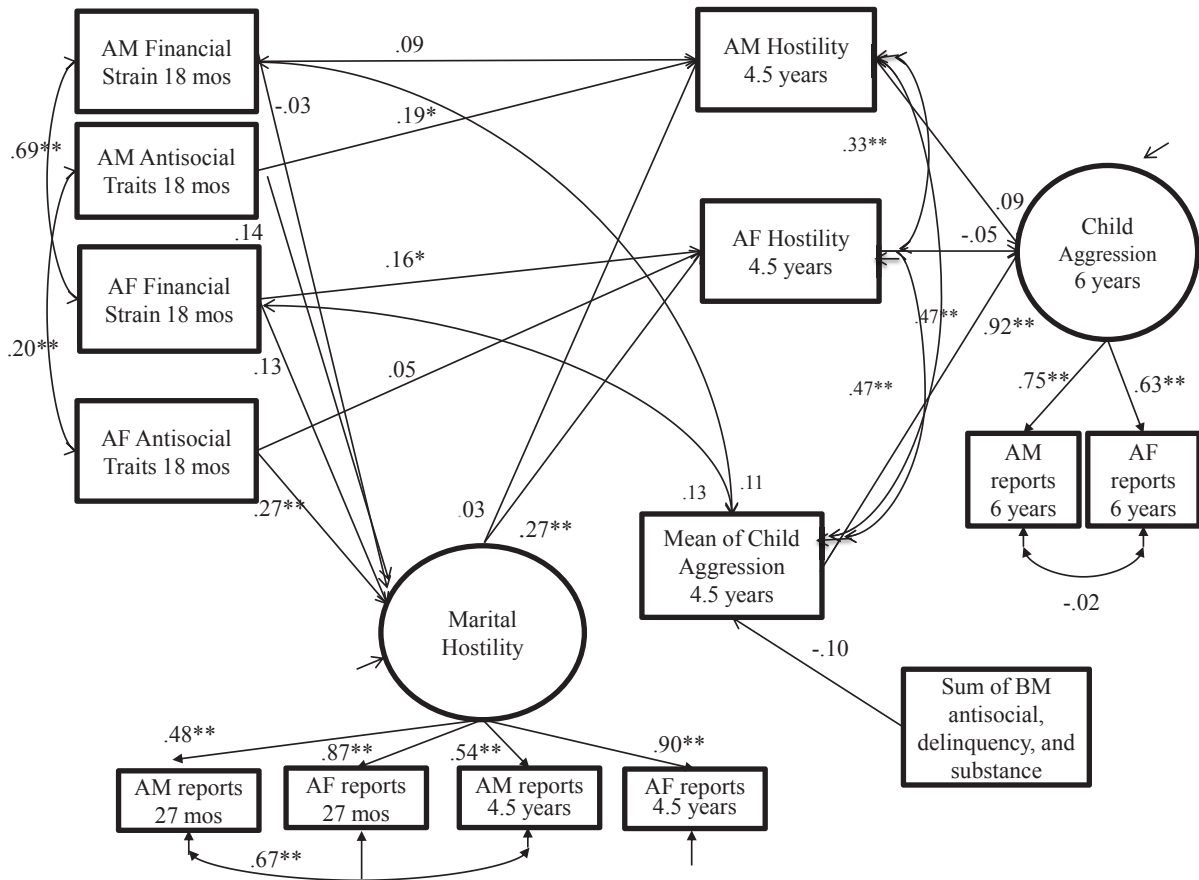
The subsequent model tested the relationships among adoptive parents' antisocial traits, financial strain at 18 months, marital hostility from child age 27 months to 4.5 years, hostile parenting when the child was 4.5 years old, and child aggression at age 6 years (Figure 2). The model fit the data acceptably ( $\chi^2 [63] = 124.13, p = .00, CFI = 0.94; RMSEA = .04, 90\% CI = 0.03-0.05, SRMR = 0.07$ ). The model significantly explained 4.9% of the variance in AMs' hostile parenting as well as 11.8% of the variance in AFs' hostile parenting, 88% of the variance of the latent variable of child aggression at 6 years, and 12.1% of the variance of the latent variable of marital hostility.

As the standardized coefficients in Figure 2 indicate, AFs' antisocial traits were associated with their marital hostility from 27 to 54 months, which positively related to fathers' hostile parenting when the child was aged 4.5 years. Meanwhile, AFs' hostile parenting at child age 4.5 years was also significantly associated with their financial strain after controlling for marital hostility. However, neither AFs' parenting hostility nor AMs' parenting hostility at child age 4.5 years was linked to child aggression at age 6 years. Child

**FIGURE 1** Parents' personality, financial strain, marriage, parenting at 27 months, and child aggression at age 4.5 years. Note: Standardized path coefficients. AF = adoptive father; AM = adoptive mother; BM = birth mother. \* $p < .05$ , \*\* $p < .01$ .



**FIGURE 2** Parents' personality, strain, marriage, parenting at 4.5 years, and child aggression at 6 years. Note: Standardized path coefficients. AF = adoptive father; AM = adoptive mother; BM = birth mother. \* $p < .05$ , \*\* $p < .01$ .



aggression at age 4.5 years significantly predicted child aggression at age 6 years.

## DISCUSSION

This study was designed to examine the spillover hypothesis, the contention that marital conflict increases childhood aggression via influences on parenting, from early to middle childhood, using an adoption design. This study expands on previous work in toddlerhood<sup>11,12</sup> by examining spillover pathways from toddler to preschool and formal school entry. Parental antisocial traits and perceived financial strain contributed to marital conflict in the toddler period. These same factors contributed directly to hostile parenting at child age 27 months for fathers but not for mothers. In turn, fathers' hostile parenting was associated with child aggression at age 4.5 years. These 2 factors contribute to negativity both in marital and parenting behaviors for fathers. The majority of research on the topic suggests that fathers exhibit more negative parenting behaviors as a consequence of marital conflict.<sup>43-46</sup> The lack of significant associations for mothers may be explained by differences in coping behavior: Women are more likely than men to use a wider variety of coping mechanisms in response to relationship difficulties,

including several positive coping strategies such as active problem solving, seeking of social support, and positive self-talk,<sup>47</sup> which may enable them to handle conflict without detriment to their parenting behavior. Studies have also suggested that fathers' parenting may be influenced more by the marital relationship and behavior of the mother.<sup>9,48</sup>

The model examining spillover from parenting to child aggression at age 6 years revealed long-lasting associations between fathers' feelings of financial strain at child age 18 months to their parenting at 4.5 years. Previous work suggests that financial strain contributes to both marital discord and poorer parenting,<sup>12,20</sup> and it is an important risk factor to measure in families in the early toddler period. Subjective financial strain may help to identify individuals at risk for marital hostility and fathers' hostile parenting. Parental antisocial traits in early toddlerhood predicted parenting behavior in the preschool years. The relationship between antisocial traits and hostile parenting has been commonly found in previous research,<sup>12,49</sup> indicating an important marker for parenting risk.

Importantly, there was no significant spillover from hostile parenting at child age 4.5 years to child aggression at age 6 years for either mothers or fathers. Other studies that have found significant spillover for children at age 6 years

have been cross-sectional<sup>13</sup> or were conducted with biologically related families.<sup>8</sup> The model did account for 88% of the variance in child aggression at age 6 years, which seemed to be largely accounted for by child aggression at age 4.5 years. The model also suggests significant associations between child aggression and hostile parenting and vice versa at age 4.5 years, suggesting bidirectional pathways with each member of the parent-child dyad contributing to the other's behaviors. Other studies have found child difficult behaviors and aggression to contribute to hostile and negative parenting behaviors.<sup>50,51</sup>

Our indicators of birth mother antisocial traits, selected to partially control for heritable aspects of aggression, did not predict child aggression. Adult antisocial behavior is quite different from early childhood aggression and may not have served as an ideal proxy for inherited influences on child aggression. It may be that direct associations may emerge as the children become adolescents because the construct of adolescent aggression is likely closer to adult antisocial behavior than is preschool and early school-age aggression. We also did not have sufficient data to include birth father antisocial traits, which would be important in future studies. Alternatively, the lack of association may be explained by the ameliorative effects of the rearing environment in offsetting inherited risks.

These findings have implications for both prevention and intervention. Assessing financial distress and marital hostility in very early childhood may allow intervention that could have an impact on hostile parenting. These data indicate that this focus may be particularly important for fathers of young children. Recent meta-analytic findings have suggested that parenting programs aimed at reducing conduct problems are more effective when fathers are included.<sup>52</sup> Programs that focus on co-parenting communication with both parents seem to be particularly effective at improving outcomes for families at risk.<sup>53-56</sup>

These findings are qualified by a few limitations. First, most of the study variables were measured via self-report. Although several of our key measures had reports from both parents, observational or clinical evaluation measures of child aggression or marital conflict would add to the validity of the study. Next, we also chose to use a latent variable, including mother and father reports of child aggression. It is possible that examining each parent separately may yield differential patterns of results. Also, we were able to include indicators of only birth mother antisocial behavior because of a smaller sample of birth fathers (i.e., available for only 34% of biological fathers). Inclusion of both birth mother and birth father data to represent inherited risk would strengthen future studies. Finally, our sample had a large proportion of children with aggression levels within the normal range who are being raised by older

adoptive parents (mean age of 38 years at the time of adoption). Findings may not generalize to samples of younger parents or to clinical populations.

This study is the first to examine spillover of marital hostility to parenting to child aggression from toddlerhood to early school age in genetically unrelated parents and children. Spillover of subjective financial strain and marital conflict in the toddler period may be associated with more hostile parenting behaviors in fathers. In turn, these hostile parenting behaviors in the toddler period may contribute to later aggression in preschool children. These findings support the need for early identification and intervention for families experiencing marital hostility. Interventions attempting to improve parenting and child behaviors may benefit from addressing family stressors. *Ⓔ*

Accepted December 18, 2015.

This article was reviewed under and accepted by James J. Hudziak, MD.

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This project was supported by the following grants: R01 HD042608; Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), National Institute on Drug Abuse (NIDA), and the Office of the Director; National Institutes of Health (NIH); US Public Health Service (PHS); principal investigator [PI] Years 1–5: David Reiss, MD; PI Years 6–10: Leslie Leve, PhD, and R01 MH092118 from the National Institute of Mental Health (NIMH), NIH, US PHS (PIs: Jenae Neiderhiser, PhD, and Leslie Leve, PhD). The writing of this manuscript was partially supported by the following grants: K23DA023334-01A2 (PI: Stover), P50 DA035763 and R01 DA020585, NIDA, NIH, and US PHS.

The content is solely the responsibility of the authors and does not necessarily represent the official views of the Eunice Kennedy Shriver National Institute of Child Health and Human Development or the National Institutes of Health.

Dr. Zhou served as the statistical expert for this research.

The authors thank the adoptive and birth families who participated in this study; the adoption agency staff members who helped with the recruitment of study participants; Rand Conger, PhD, of the University of California Davis, and the late John Reid, PhD, of the Oregon Social Learning Center, and the late Xiaojia Ge, PhD, of the University of Minnesota, for their long-term collaboration and significant contributions to the study.

Disclosure: Drs. Stover, Zhou, Leve, Neiderhiser, Shaw, Natsuaki, Scaramella, Reiss, and Mr. Kiselica report no biomedical financial interests or potential conflicts of interest.

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<http://dx.doi.org/10.1016/j.jaac.2015.12.008>

## REFERENCES

- Card NA, Little TD. Proactive and reactive aggression in childhood and adolescence: a meta-analysis of differential relations with psychosocial adjustment. *Int J Behav Dev.* 2006;30:466-480.
- Card NA, Stucky BD, Sawalani GM, Little TD. Direct and indirect aggression during childhood and adolescence: a meta-analytic review of gender differences, intercorrelations, and relations to maladjustment. *Child Dev.* 2008;79:1185-1229.
- Erel O, Burman B. Interrelatedness of marital relations and parent-child relations: a meta-analytic review. *Psychol Bull.* 1995;118:108-132.

4. Buehler C, Anthony C, Krishnakumar A, Stone G. Interparental conflict and youth behavior problems: a meta-analysis. *J Child Fam Studies*. 1997; 6:223-247.
5. Krishnakumar A, Buehler C. Interparental conflict and parenting behaviors: a meta-analytic review. *Fam Relat*. 2000;49:25-44.
6. Easterbrooks MA, Emde RN. Marital and parent child relationships: the role of affect in the family system. In: Hinde RA, Stevenson-Hinde J. *Relationships Within Families: Mutual Influences*. Oxford, UK: Carendon; 1988:83-103.
7. Margolin G, Christensen A, John RS. The continuance and spillover of everyday tensions in distressed and nondistressed families. *J Fam Psychol*. 1996;10:304-321.
8. Sturge-Apple ML, Davies PT, Cicchetti D, Cummings EM. The role of mothers' and fathers' adrenocortical reactivity in spillover between interparental conflict and parenting practices. *J Fam Psychol*. 2009;23:215-225.
9. Katz LF, Gottman JM. Spillover effects of marital conflict: in search of parenting and coparenting mechanisms. *N Direct Child Dev*. 1996; 1996:57-76.
10. Cummings EM, Goeke-Morey M, Papp L. Everyday marital conflict and child aggression. *J Abnorm Child Psychol*. 2004;32:191-202.
11. Rhoades KA, Leve LD, Harold GT, Neiderhiser JM, Shaw DS, Reiss D. Longitudinal pathways from marital hostility to child anger during toddlerhood: genetic susceptibility and indirect effects via harsh parenting. *J Fam Psychol*. 2011;25:282-291.
12. Stover CS, Connell CM, Leve LD, *et al.* Fathering and mothering in the family system: linking marital hostility and aggression in adopted toddlers. *J Child Psychol Psychiatry*. 2012;53:401-409.
13. Harold GT, Leve LD, Elam KK, *et al.* The nature of nurture: disentangling passive genotype-environment correlation from family relationship influences on children's externalizing problems. *J Fam Psychol*. 2013; 27:12-21.
14. Horwitz BN, Ganiban JM, Spotts EL, Lichtenstein P, Reiss D, Neiderhiser JM. The role of aggressive personality and family relationships in explaining family conflict. *J Fam Psychol*. 2010;25:174-183.
15. Cummings EM. Coping with background anger in early childhood. *Child Dev*. 1987;58:976-984.
16. Jouriles EN, Spiller LC, Stephens N, McDonald R, Swank P. Variability in adjustment of children of battered women: the role of child appraisals of interparental conflict. *Cognit Ther Res*. 2000;24:233-249.
17. Tremblay RE, Nagin DS, Séguin JR, *et al.* Physical aggression during early childhood: trajectories and predictors. *Pediatrics*. 2004;114:e43-e50.
18. Conger RD, Elder GH Jr, Lorenz FO, *et al.* Linking economic hardship to marital quality and instability. *J Marriage Fam*. 1990;52:643-656.
19. Gudmunson C, Beutler I, Israelsen C, McCoy J, Hill E. Linking financial strain to marital instability: examining the roles of emotional distress and marital interaction. *J Fam Econ Issues*. 2007;28:357-376.
20. Barnett MA. Economic disadvantage in complex family systems: expansion of family stress models. *Clin Child Fam Psychol Rev*. 2008;11:145-161.
21. Connell A, Goodman SH. The association between psychopathology in fathers versus mothers and children's internalizing and externalizing behavior problems: a meta-analysis. *Psychol Bull*. 2002;146:746-773.
22. Bomovalova MA, Blazer R, Malone SH, McGue M, Iacono WG. Disentangling the relative contribution of parental antisociality and family discord to child disruptive disorders. *Personal Dis Res Treat*. 2013;4:239-246.
23. Burt A. Rethinking environmental contributions to child and adolescent psychopathology: a meta-analysis of shared environmental influences. *Psychol Bull*. 2009;135:608-637.
24. Klahr AM, Burt SA. Elucidating the etiology of individual differences in parenting: a meta-analysis of behavioral genetic research. *Psychol Bull*. 2014;140:544-586.
25. Leve LD, Neiderhiser JM, Shaw DS, Ganiban J, Natsuaki MN, Reiss D. The Early Growth and Development Study: a prospective adoption study from birth through middle childhood. *Twin Res Hum Genet*. 2013;16: 412-423.
26. Leve LD, Neiderhiser JM, Ge X, *et al.* The Early Growth and Development Study: a prospective adoption design. *Twin Res Hum Genet*. 2007; 10:84-95.
27. Cui M, Lorenz FO, Conger RD, Melby JN, Bryant CM. Observer, self-, and partner reports of hostile behaviors in romantic relationships. *J Marriage Fam*. 2005;67:1169-1181.
28. Litrownik AJ, Newton R, Hunter WM, English D, Everson MD. Exposure to family violence in young at-risk children: a longitudinal look at the effects of victimization and witnessed physical and psychological aggression. *J Fam Viol*. 2003;18:59-73.
29. Yates TM, Dodds MF, Sroufe L, Egeland B. Exposure to partner violence and child behavior problems: a prospective study controlling for child physical abuse and neglect, child cognitive ability, socioeconomic status, and life stress. *Dev Psychopathol*. 2003;15:199-218.
30. Melby JN, Conger RD. The Iowa Family Interaction Rating Scales: instrument summary. In: Kerig PK, Lindahl KM. *Family Observational Coding Systems: Resources for Systemic Research*. Mahwah, NJ: Erlbaum; 2001.
31. Achenbach T, Rescorla L. *Manual for the Achenbach System of Empirically Based Assessment School-Age Forms Profiles*. Burlington, VT: Aseba; 2001.
32. Achenbach TM, Rescorla LA. *Manual for the ASEBA Preschool Forms and Profiles*. Burlington, VT: Research Center for Children Youth and Families; 2000.
33. Conger R, Ge X, Elder GH, Lorenz FO, Simon RL. Economic stress, coercive family process, and developmental problems of adolescents. *Child Dev*. 1994;65:541-561.
34. Conger RD, Conger KJ, Elder GH, Lorenz FO, Simons RL, Whitbeck LB. A family process model of economic hardship and adjustment of early adolescent boys. *Child Dev*. 1992;63:526-541.
35. Levenson MR. Assessing psychopathic attributes in a noninstitutionalized population. *J Pers Soc Psychol*. 1995;68:151-158.
36. Lipscomb ST, Leve LD, Shaw DS, *et al.* Negative emotionality and externalizing problems in toddlerhood: overreactive parenting as a moderator of genetic influences. *Dev Psychopathol*. 2012;24:167-179.
37. Elliott DS, Huizinga D, Ageton SS. *Explaining Delinquency and Drug Use*. Beverly Hills, CA: Sage Publications; 1985.
38. Kessler R, Andrews G, Mroczek D, Ustun B, Wittchen H. The World Health Organization Composite International Diagnostic Interview Short-Form (CIDI-SF). *Int J Methods Psychiatr Res*. 1998;7:171-184.
39. Blouin AG, Perez EL, Blouin JH. Computerized administration of the diagnostic interview schedule. *Psychiatry Res*. 1988;23:335-344.
40. Bentler PM. Comparative fit indexes in structural models. *Psychol Bull*. 1990;107:238-246.
41. Steiger M. Structural model evaluation and modification: an interval estimation approach. *Multivariate Behav Res*. 1990;25:173-180.
42. Kline RB. *Principles and Practice of Structural Equation Modeling*. 3rd ed. New York: Guilford Press; 2011.
43. McCoy KP, George MRW, Cummings EM, Davies PT. Constructive and destructive marital conflict, parenting, and children's school and social adjustment. *Soc Dev*. 2013;22:641-662.
44. Moore DR, Florsheim P. Interpartner conflict and child abuse risk among African American and Latino adolescent parenting couples. *Child Abuse Negl*. 2008;32:463-475.
45. Krishnakumar A, Buehler C. Interparental conflict and parenting behaviors: a meta-analytic review. *Fam Rel*. 2000;49:25-44.
46. Kitzmann KM. Effects of marital conflict on subsequent triadic family interactions and parenting. *Dev Psychol*. 2000;36:3-13.
47. Tamres LK, Janicki D, Helgeson VS. Sex differences in coping behavior: a meta-analytic review and an examination of relative coping. *Pers Soc Psychol Rev*. 2002;6:2-30.
48. Davies PT, Sturge-Apple ML, Weitach MJ, Cummings EM. A process analysis of the transmission of distress from interparental conflict to parenting: adult relationship security as an explanatory mechanism. *Dev Psychol*. 2009;45:1761-1773.
49. Harold GT, Leve LD, Barrett D, *et al.* Biological and rearing mother influences on child ADHD symptoms: revisiting the developmental interface between nature and nurture. *J Child Psychol Psychiatry*. 2013; 54:1038-1046.
50. Gault-Sherman M. It's a two-way street: the bidirectional relationship between parenting and delinquency. *J Youth Adolesc*. 2012;41:121-145.
51. Scaramella LV, Conger RD. Intergenerational continuity of hostile parenting and its consequences: the moderating influence of children's negative emotional reactivity. *Soc Dev*. 2003;12:420-439.
52. Lundahl BW, Tollefson D, Risser H, Lovejoy MC. A meta-analysis of father involvement in parent training. *Res Soc Work Pract*. 2008;18:97-106.
53. Cowan CP, Cowan PA, Pruett MK, Pruett K. An Approach to preventing coparenting conflict and divorce in low-income families: strengthening couple relationships and fostering fathers' involvement. *Fam Process*. 2007;46:109-121.
54. McHale J. *Charting the Bumpy Road of Coparenthood*. Washington, DC: Zero to Three Press; 2007.
55. McHale J, Waller MR, Pearson J. Coparenting interventions for fragile families: what do we know and where do we need to go next? *Fam Process*. 2012;51:284-306.
56. Pruett MK, Cowan CP, Cowan PA, Diamond JS. Supporting father involvement in the context of separation and divorce. In: Kuehnle KF, Drozd LM, eds. *Parenting Plan Evaluations: Applied Research for the Family Court*. New York: Oxford University Press; 2012:123-151.