



The Differential Impact of Parenting on Adolescent Externalizing Behaviors in the Context of Maternal Stress

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Abstract

The effectiveness of parenting on child outcomes may be dependent on other contextual factors. To date, few studies have focused on the potential moderating effect of maternal stress on the relationship between parenting and youth externalizing behaviors. This study extends prior work by assessing how the relationship between parenting and youth outcomes varies by the presence of maternal stress, while focusing on the developmental period of adolescence and two dimensions of parenting, parental knowledge and maternal warmth. Data were collected from 278 Mother-adolescent dyads ($M_{\text{adolescent age}} = 14.05$; 53.2% females; 61.9% minority) on maternal stress, maternal warmth and parental knowledge, and youth aggression and delinquency. Multi-level regression models found significant two-way interactions between parental knowledge and maternal stress on aggression and between maternal warmth and maternal stress on both outcomes. Parental knowledge was associated with lower aggression in the context of high maternal stress, but warmth only attenuated the risk of youth outcomes among low maternal stress. This study highlights the importance of considering how contextual factors impact the relationship between parenting and youth externalizing behaviors.

Keywords Child externalizing behaviors · Parental knowledge · Maternal warmth · Maternal stress

Introduction

Parenting plays a vital role in determining the presence or absence of child behavior problems. During adolescence, socialization spheres expand beyond the family unit to peer influence and problem behaviors increase (Solmi et al., 2022); however, parenting is still one of the strongest predictors of externalizing behavior problems, accounting for more variance than economic hardship (Wang et al., 2022) and other family factors (Dekovic et al., 2003). Nevertheless, parenting practices occur within a larger family system. Family stress models highlight that stress experienced in one context can impact other family dynamics, that in turn, have a negative impact on child development (Masarik & Conger, 2017; Zietz et al., 2022). Although numerous studies have examined how parenting practices mediate the effects of family stress on child outcomes,

fewer studies have tested whether parenting dimensions are moderated by maternal stress levels, which may increase or decrease the association between parenting and youth externalizing behaviors. This study augments current literature on the effectiveness of parenting on child outcomes by examining how maternal stress may moderate the association between parenting dimensions and youth externalizing behaviors.

Parenting Practices

There are many conceptual ways of defining parenting typologies and numerous measures of parenting practices. Two of the most commonly studied parenting practices are warmth and parental knowledge, which represent aspects of parental support and control, respectively, key dimensions of parenting during adolescence (e.g., Barber et al. 2005; Hovee et al., 2009). Maternal warmth is the degree to which a child feels loved and accepted by their caregiver (MacCoby & Martin, 1983). The importance of warmth on development has been rigorously explored, beginning with seminal studies of the impact of touch and social isolation on infant rhesus monkeys (Harlow et al., 1965) to decades of human studies looking at the positive relationship

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between maternal warmth and a range of beneficial child and adolescent outcomes, including decreases in externalizing behaviors and increases in self-esteem (Hoskins, 2014; Yun & Cui, 2020). On the opposite end, maternal detachment is associated with higher internalizing and externalizing behaviors (Conger et al., 1992; McKee et al., 2008). Maternal warmth undergoes a shift during the adolescent period as the relationship becomes more egalitarian in nature (Branje, 2018). However, the interpersonal acceptance-rejection theory posits that humans have a biological need for acceptance and maternal warmth, and because of this biological need, maternal warmth should show universal protective effects across the lifespan (Rohner & Lansford, 2017; Rohner, 2021). Moreover, social control theory (Hirschi, 1969) posits that familial attachment prevents adolescents from engaging in deviant behavior, and their bonds with their parental figures provide motivation to conform to society rules and regulations.

Parental knowledge is defined as the knowledge of one's child's activities, such as where they are, who they are with, and what they are doing (Stattin & Kerr, 2000). The coercive family process model (Patterson, 1982) proposes that parental knowledge is a protective factor within the family context that reduces the risk of problem behaviors. During adolescence, as the child gains autonomy, parental knowledge shifts from direct supervision of the child to voluntary youth disclosure of their activities (Laird et al., 2003; Pettit et al., 2007). Despite this change, parental knowledge is still one of the strongest predictors of reduced externalizing problems (Pinquart, 2017), substance use (Lac & Crano, 2009), and other risky behaviors (Dittus et al., 2015) in adolescence. Indeed, research has demonstrated that the level of parental knowledge, rather than active monitoring and supervision, is linked to adolescent behavior (Augenstein et al., 2016; Eaton et al., 2009).

The Role of Maternal Stress

Maternal stress has been routinely associated with increased child behavior and emotional problems (Bagner et al., 2009; Bakoula et al., 2009). Not only does maternal stress have indirect effects on child outcomes through disruptions in parenting practices in early childhood (Cmic et al., 2005; Dau et al., 2019), middle childhood (Van Der Kaap-Deeder et al., 2019), and adolescence (Bülow et al., 2021; Conger et al., 1995), but the stress contagion model also suggests that maternal stress has a direct effect on the dynamic covariation of physiological reactivity in early childhood (Priel et al., 2019) and adolescence (Papp et al., 2009). Moreover, covariation between a mother and child may increase over time (Waters et al., 2014). Furthermore, bidirectional effects of parental stress and child behavior problems have been reported in both child (Neece et al., 2012; Cherry et al.,

2019) and adolescent (Goodrum et al., 2021) samples, such that parental stress levels at a particular time point were significantly associated with higher child behavior problems at the subsequent time point, and vice versa.

While many studies have focused specifically on maternal stress associated with child-rearing (i.e., parenting stress), there is evidence that both parenting stress and individual stress have independent effects on child outcomes (Cmic & Coburn, 2020; Spinelli et al., 2020). Recently, pre-pandemic daily maternal stress measured longitudinally using the Perceived Stress Scale had a significant and independent association with children's emotional problems reported during the SARS-CoV-2 pandemic (Köhler-Dauner et al., 2021). Likewise, using 30-day daily diary data collected from 99 Canadian parent-adolescent dyads, parental daily stress was negatively linked to adolescent negative affect on the next day (Xu & Zheng, 2023). In addition, parental daily stress, but not youth stress, was linked to adolescent perceptions of parental warmth the following day, supporting parent-driven family stress processes in daily lives, but not child-driven effects (Xu & Zheng, 2023).

Although there is strong evidence of the importance of warmth and parental knowledge on adolescent development, researchers generally acknowledge that the effects of parenting are not the same for all youth, and studies examining how relationships between parenting and youth outcomes are moderated by individual or family characteristics are needed to refine existing theoretical models (Bronfenbrenner, 1986; Belsky & Pluess, 2009; Conger et al., 2010). Despite evidence that supportive parenting can buffer the risk effects of family conflict on child and adolescent outcomes (Silva et al., 2020), there are few studies examining interactions between supportive parenting and maternal stress, and results have been inconsistent. One study assessed the interactive effect of maternal attunement, defined as the ability to understand the child's experiences, and parenting stress on child internalizing problems in a sample of 200 mothers and their children aged 8–12 years old. There was a significant interaction between maternal attunement and maternal stress, such that under conditions of high maternal stress, high maternal attunement resulted in the lowest rate of child internalizing problems, but under conditions of low maternal stress, low maternal attunement resulted in the lowest rate of child internalizing problems (Arbel et al., 2020). In contrast, another study found that under conditions of high maternal parenting stress, high maternal affection showed an increase in both internalizing and externalizing behavior problems in a sample of Finnish adolescents (Silinskas et al., 2020).

Current Study

Although the effectiveness of parenting on child outcomes may be dependent on other contextual factors, few studies

have focused on the potential moderating effect of maternal stress on the relationship between parenting and youth externalizing behaviors. Moreover, these studies have primarily looked at one dimension of parenting and have found conflicting evidence. The current study seeks to understand how relationships between parental knowledge and maternal warmth with adolescent delinquency and aggression are impacted by maternal stress. This study is focused on the developmental period of adolescence, a key period during which significant changes in both parent-child relationships and problem behaviors occur. In addition, the study tests the moderating effect of maternal stress on two dimensions of parenting that are important during adolescent development—parental knowledge and maternal warmth. This study therefore adds to prior studies investigating how affectional dimensions of supportive parenting (e.g., maternal warmth, attunement, communication) buffer the adverse effects of family conflict on development. Based on the larger family systems literature, it is hypothesized that the positive effects of parenting on adolescent outcomes will be stronger among youth with higher levels of maternal stress.

Methods

Sample

Participants in this study took part in an in-lab family study at the University of Chicago. The sample was recruited from a larger community-based study of 3,582 urban and suburban youth in the greater Chicago area who had participated in a prior in-school survey of socioemotional behavior among middle school students (Chen et al., 2016). The in-lab study consisted of 378 youth aged 8 to 19 from 241 families, including 137 sibling pairs. More than 85% of families contacted for recruitment agreed to participate in the in-lab assessment, which occurred between March 2010 and August 2012. Exclusion criteria included the presence of severe physical, psychological, or neurological problems in children which would have interfered with study participation (<2% of families contacted) and/or a primary caregiver who could not read or write English (~6% of families contacted). The study protocol was approved by the University of Chicago Institutional Review Board. In accordance with the Declaration of Helsinki, a parent/legal guardian (79.4% biological mothers) provided written informed consent for themselves and their children and youth provided written informed assent. Participants were compensated for their time. Youth and a single caregiver were studied simultaneously in an on-campus research laboratory during a single 3–4-hour visit. Assessments included face-to-face interviews with caregivers and self-report instruments administered to both youth and caregivers.

Analyses were restricted to biological mothers and their children. This reduced the sample to 182 biological mothers ranging from 25 to 57 ($M_{\text{age}} = 43$, $SD = 6.93$) and their children, 287 youth, ranging in age from 10 to 19 ($M_{\text{age}} = 14$, $SD = 1.73$). The majority of the sample (72%) were early adolescents between ages 10 and 14. Of the 287 youth, there were 137 males and 150 females. The 182 families in this sample included $N = 105$ sibling pairs; thus, 210 children were studied with a sibling, and 77 were the only children in the family studied. There were approximately equal numbers of youth who identified as white ($N = 106$, 38.1%) or black ($N = 105$, 36.6%); there were also Hispanic youth ($N = 55$, 19.2%) and an “other” category for youth who identified as any other race that did not fall into the above categories, and/or who identified with multiple races ($N = 21$, 7.3%).

Measures

Demographic covariates

Youth gender Youth were asked to select whether they identified as male or female. In analyses male = 1 and female = 0.

Youth minority status Youth were asked whether they were of Hispanic origin and were asked to indicate their racial background. Youth could select more than one racial category. The distribution is described above. For analyses, a single variable for minority status was created where 0 = non-Hispanic, Caucasian and 1 = minority race or ethnicity.

Age Mothers reported on their birthdate and their child’s birthdate. Youth age and maternal age were calculated as the difference between the date of the lab visit and the respective birthdate.

Family socioeconomic status The Hollingshead four-factor index of socioeconomic status was used to measure socioeconomic status (SES), which ranges from 8 to 66, with 66 being the highest SES (Hollingshead, 1975). The average socioeconomic status in this sample was 44.60 ($SD = 13.46$).

Maternal stress

Mothers reported on current maternal stress levels measured by the Perceived Stress Scale (PSS; Cohen et al., 1983). The PSS is a validated scale that measures the degree to which situations in one’s life have been perceived as stressful during the past month. It is a 10-item questionnaire that has a 5-point response scale (e.g., 0 = Never, 1 = Almost never, 2 = Sometimes, 3 = Fairly often, 4 = Very often).

Questions are positively framed (e.g., In the last month, how often have you felt that you were unable to control the important things in your life?) and negatively framed (e.g., In the last month, how often have you felt confident about your ability to handle your personal problems?), with negatively framed questions reverse coded so higher scores equate to higher stress levels. Responses were averaged to create a mean composite score with good internal reliability ($M = 1.41$, $SD = 3.4$, $\alpha = 0.87$).

Maternal warmth

Maternal warmth was measured from the perception of the adolescent with the parental bonding instrument (PBI) “care” scale (Parker et al., 1979). This is a 12-item subscale with a 4-point response scale ranging from 0 to 3 (e.g., 0 = very untrue, 1 = moderately untrue, 2 = moderately true, 3 = very true). Questions were positively framed (e.g., my mother speaks to me with a warm and friendly voice) and negatively framed (e.g., my mother does not help me as much as I need). Negatively framed questions were reverse coded, so higher scores reflect higher maternal warmth. Youth responses were summed to create a composite score with good reliability ($M = 27.88$, $SD = 6.24$, $\alpha = 0.86$).

Parental knowledge

Parental knowledge was assessed from the perception of the adolescent utilizing a standardized survey developed from established self-report measures in the Parental Monitoring Scale (Stattin & Kerr, 2000). Youth responded to a 5-item scale assessing how much their primary caregiver knew their whereabouts (e.g., how often does your caregiver know where you are on weekends?) with response options ranging from 1 to 5 (e.g., 1 = Never, 2 = Almost never, 3 = Some of the time, 4 = Most of the time, and 5 = Always). Responses were averaged to create a mean composite score, and the scale had good internal reliability ($M = 4.34$, $SD = 0.55$, $\alpha = 0.76$).

Youth aggression and delinquency

Youth outcomes were assessed using youth report on the Aggressive Behavior and Delinquency subscales from the Child Behavior Checklist (Achenbach, 1991). These subscales identify externalizing behavior problems among youth, with responses ranging from 0 to 3 for how true a statement is about the individual (i.e., 0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true). The aggressive behavior subscale is an 11-item scale composed of positively framed questions (e.g., I get in many fights), so higher scores demonstrate higher aggressive behavior. The aggressive subscale has good internal

reliability ($M = 0.30$, $SD = 0.28$, $\alpha = 0.85$). The delinquency subscale is a 15-item scale, and the questions are all positively framed (e.g., I drink alcohol without my parents’ approval), so a higher score demonstrates higher delinquency. The delinquency scale had good internal reliability ($M = 0.21$, $SD = 0.21$, $\alpha = 0.77$).

Analytic Plan

To test whether maternal stress moderates the associations between parenting and youth outcomes, data analyses were run using the Hierarchical Linear Models program. This program accounts for the nested nature of the data set due to sibling pairs, where youth variables are level 1 and maternal factors are level 2 (Raudenbush & Bryk, 2002). Because t-tests revealed significant differences in outcomes and predictors across gender and race/ethnicity, and there were significant correlations between youth age and socioeconomic status with outcomes, these variables were controlled in the models (results available from authors). Maternal age was also controlled for in the models. For comparison with prior studies, Model 1 included the covariates and the main effects of maternal stress, warmth, and parental knowledge. The interaction between each parenting practice and maternal stress was then tested in Model 2 (i.e., maternal warmth \times maternal stress, parental knowledge \times maternal stress). Regression coefficients for interaction terms that were significant at $p < 0.05$ were considered evidence of moderation. Youth outcomes and all continuous predictors were standardized to a mean of zero and a standard deviation of one in order to present standardized regression coefficients as indices of effect size. This also served to center the maternal stress and parenting variables prior to creating interaction terms.

Significant interactions were probed using Preacher’s online calculator, following published methods (Preacher et al., 2006). This calculator is specifically set up to interpret statistical interactions among multi-level data. Interpretation of each significant interaction followed two steps. First, the calculator was used to estimate the relationship between parenting and youth outcomes at conditional values of the moderator (i.e., ± 1 SD around the mean of maternal stress). In addition, post-hoc significant regions tests identified the levels of maternal stress for which the associations between parenting practices and adolescent externalizing problems were statistically significant.

Results

Descriptive Statistics

The sample included 287 youth, but nine individuals were excluded from analyses due to missing data at the predictor

Table 1 Correlations between predictors and outcomes

	Youth age	Maternal age	SES	Youth aggression	Youth delinquency	Parental knowledge	Maternal warmth	Maternal stress
Youth age	1	–	–	–	–	–	–	–
Maternal age	0.15*	1	–	–	–	–	–	–
SES	–0.04	0.25**	1	–	–	–	–	–
Youth aggression	0.13*	–0.08	–0.12	1	–	–	–	–
Youth Delinquency	0.36***	–0.07	–0.10	0.67***	1	–	–	–
Parental knowledge	–0.27***	0.04	0.11	–0.42**	–0.47**	1	–	–
Maternal warmth	–0.07	0.13*	0.14*	–0.36**	–0.34**	0.39***	1	–
Maternal stress	–0.05	–0.13*	–0.01	0.07	0.07	–0.05	–0.15*	1

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

level, leaving a final sample of 278 youth, with a mean age of 14.05 (SD = 1.73) and with half the sample being female (53.2%). This was a diverse sample, with youth self-identifying as white (38.1%), black (37.1%), Hispanic (18.3%), and “Other” (6.5%). Correlations between study variables are shown in Table 1.

Hierarchical Linear Models between Maternal Stress and Parenting on Youth Outcomes

Tables 2 and 3 show the results for the hierarchical linear models for delinquency and aggression, respectively. For the main effects models (Model 1), both maternal warmth and monitoring were significantly associated with both youth outcomes. Maternal stress was not significantly related to either outcome. In the moderator models (Model 2), interactions were significant for both parental knowledge and maternal stress ($\beta = -0.13$, SE = 0.05, $p = 0.006$) and maternal warmth and maternal stress for aggression ($\beta = +0.12$, SE = 0.05, $p = 0.006$). The interaction between maternal warmth and maternal stress was also significant for delinquency ($\beta = +0.10$, SE = 0.04, $p = 0.035$).

Figure 1a shows the relationship between maternal warmth and delinquency at two conditional values of maternal stress. The relationship between maternal warmth and delinquency was significant at lower levels of maternal stress (i.e., one standard deviation below the sample mean; $b = -0.25$, $p < 0.001$), but not higher levels of maternal stress (i.e., one standard deviation above the sample mean; $b = -0.06$, $p = 0.372$). Figure 1b shows the parameter estimates for the relationship between warmth and delinquency across the full range of maternal stress, along with the 95% confidence bands. The critical value at which the estimate for warmth becomes significantly associated with delinquency is when maternal stress (standardized) = 0.49. Estimates to the left of this value are all statistically significant, indicating that the relationship between maternal

Table 2 Hierarchical linear models for parenting characteristics and maternal stress on youth delinquent behaviors

	Model 1	Model 2
Intercept	–0.21 (0.17)	–0.19 (0.17)
Gender	0.09 (0.10)	0.09 (0.10)
Minority	0.13 (0.12)	0.11 (0.12)
Youth age	0.26*** (0.06)	0.25*** (0.06)
Maternal age	–0.04 (0.06)	–0.03 (0.06)
SES	0.00 (0.06)	0.00 (0.06)
Maternal stress	0.04 (0.05)	0.04 (0.05)
Maternal warmth	–0.15** (0.05)	–0.16** (0.05)
Parental knowledge	–0.31*** (0.06)	–0.30*** (0.06)
Maternal warmth × maternal stress	–	0.10* (0.04)
Parental knowledge × maternal stress	–	–0.08 (0.05)
Deviance	708.59	712.68
χ^2		4.09

All numbers presented are standardized betas and standard errors.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

warmth and delinquency was significant for approximately average and below average levels of maternal stress.

Similar interaction patterns between maternal warmth and maternal stress were found for aggression. Figure 2a shows that the relationship between maternal warmth and aggression is significant at lower levels of maternal stress ($b = -0.31$, $p < 0.001$), but not at higher levels of maternal

Table 3 Hierarchical linear models for parenting characteristics and maternal stress on youth aggression

	Model 1	Model 2
Intercept	−0.77*** (0.17)	−0.74*** (0.17)
Gender	0.45*** (0.10)	0.45*** (0.10)
Minority	0.14 (0.13)	0.12 (0.13)
Youth age	0.04 (0.05)	0.04 (0.05)
Maternal age	0.00 (0.06)	0.02 (0.06)
SES	−0.04 (0.07)	−0.03 (0.06)
Maternal stress	0.02 (0.05)	0.03 (0.05)
Maternal warmth	−0.18** (0.06)	−0.19*** (0.05)
Parental knowledge	−0.30*** (0.06)	−0.27*** (0.06)
Maternal warmth × maternal stress	–	0.12** (0.04)
Parental knowledge × maternal stress	–	−0.13** (0.05)
Deviance	728.33	727.96
χ^2		0.37

All numbers presented are standardized betas and standard errors.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

stress ($b = -0.07$, $p = 0.355$). The relationship between maternal warmth and aggression is significant when maternal stress (standardized) is less than or equal to 0.57 (Fig. 2b).

The opposite pattern emerged for the interaction between parental knowledge and maternal stress on aggression. The relationship between parental knowledge and aggression was significant at higher levels of maternal stress ($b = -0.40$, $p < 0.001$), but not lower levels ($b = -0.15$, $p = 0.072$). Figure 3b shows the parameter estimates for the relationship between parental knowledge and aggression across the range of maternal stressors, along with the 95% confidence bands. Relationships between parental knowledge and aggression are significant when maternal stress (standardized) is greater than or equal to -0.93 , indicating that parental knowledge is more important at average and above-average levels of maternal stress.

Discussion

The effects of parenting are not the same for all youth. Nevertheless, many studies do not consider how contextual

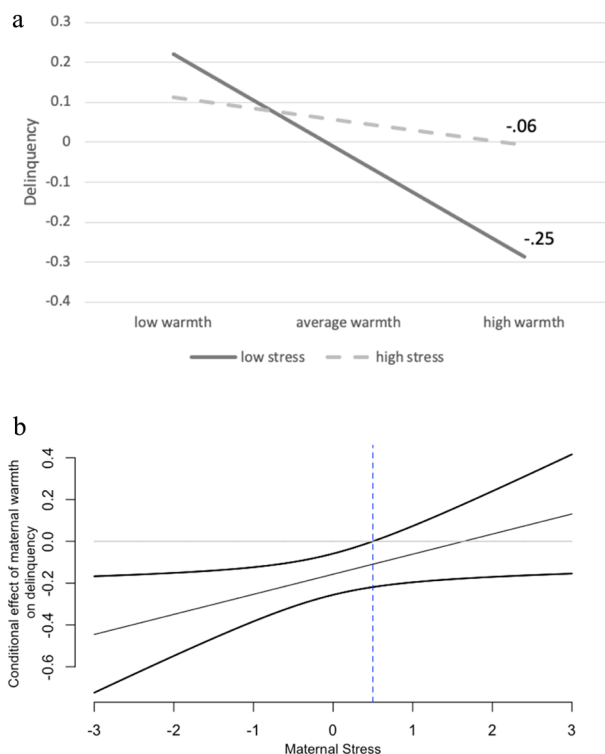


Fig. 1 a Relationships between maternal warmth and delinquency at low and high maternal stress levels. b Confidence intervals around parameter estimates. Note. Parameter estimates and 95% confidence intervals for associations between maternal warmth and delinquency across conditional values of maternal stress, as estimated by the online Preacher calculator (Preacher et al., 2006). The dotted line represents the area of significance; parameter estimates to the left of the dotted line are all statistically significant

characteristics may moderate associations between parenting and child outcomes. Only a handful of studies have specifically looked at the interactive effect of parenting and maternal stress on child outcomes and results have been inconsistent, perhaps because these studies focused only on a single dimension of parenting. The current study extended previous research by examining the moderating effect of maternal stress on the two dimensions of parenting that are most strongly linked to adolescent externalizing behaviors in a socioeconomically diverse community sample. Results indicated that both parental knowledge and maternal warmth interacted with current maternal stress and youth outcomes, but in unique ways. Parental knowledge attenuated the risk of youth outcomes in the context of high maternal stress, while maternal warmth led to better youth outcomes in the context of low maternal stress.

Both parental knowledge and maternal warmth predicted lower behavioral problems when the mother's contextual factors were not considered. These main effects of parenting have been robustly supported by prior literature (e.g., Hoskins, 2014; Racz & McMahon, 2011; Yun & Cui, 2020); However, the current study also found evidence for

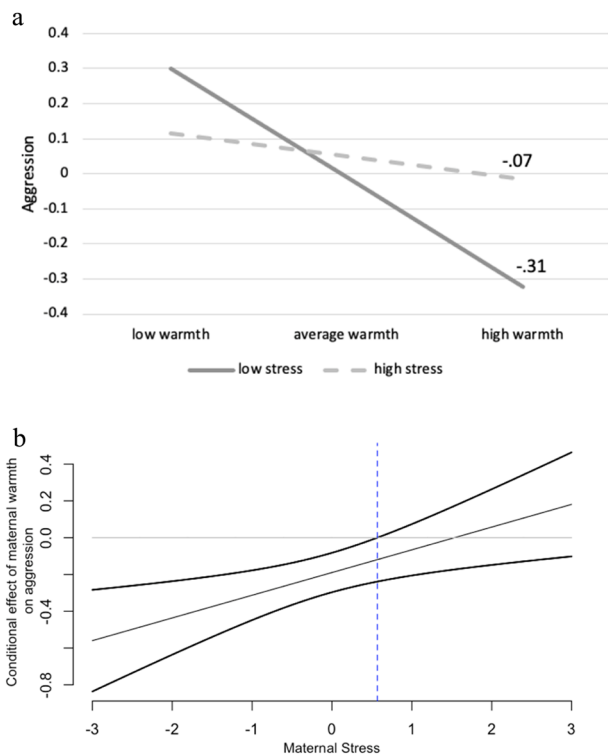


Fig. 2 **a** Relationships between maternal warmth and aggression at low and high maternal stress levels. **b** Confidence intervals around parameter estimates. Note. Parameter estimates and 95% confidence intervals for associations between maternal warmth and aggression across conditional values of maternal stress, as estimated by the online Preacher calculator (Preacher et al., 2006). The dotted line represents the area of significance; parameter estimates to the left of the dotted line are all statistically significant

significant interactions between maternal stress with each parenting dimension. As hypothesized, when maternal context was considered, the relationship between higher levels of parental knowledge and lower levels of aggressive behaviors was strongest at higher levels of maternal stress. However, at lower levels of maternal stress, parental knowledge had a nonsignificant impact on youth aggression. This finding is consistent with prior studies showing that the impact of positive parenting characteristics on child outcomes was stronger among children with higher levels of risk, such as maternal psychopathology or community violence exposure (Kujawa et al., 2015; Bacchini et al., 2011). Moreover, this finding supports Bronfenbrenner's bioecological model proposing that the impact of parenting is greatest for the group that is most in need (Bronfenbrenner, 1999).

In contrast, the findings for maternal warmth did not support the hypothesis that effective parenting would attenuate youth outcomes in the context of higher maternal stress. These results are in opposition to the interpersonal acceptance-rejection theory (Rohner & Lansford, 2017; Rohner, 2021), which posits that maternal warmth should

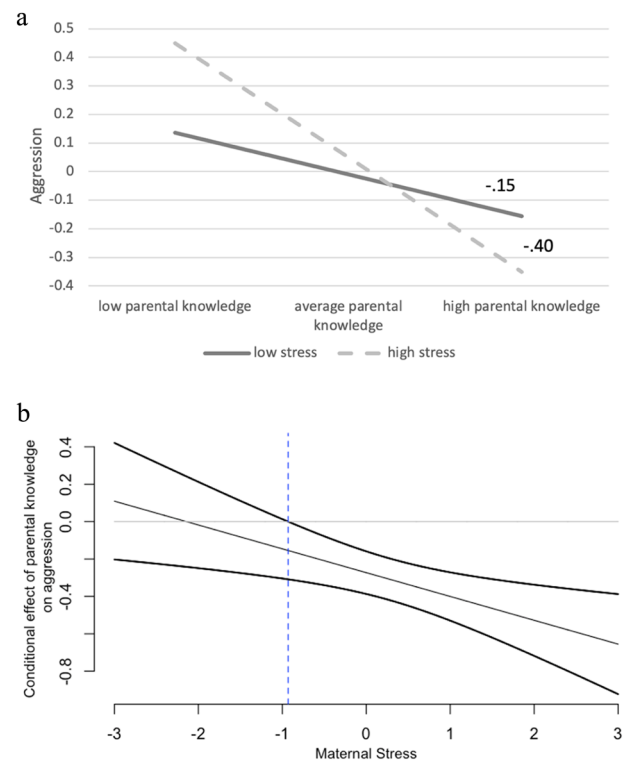


Fig. 3 **a** Relationships between parental knowledge and aggression at low and high maternal stress levels. **b** Confidence intervals around parameter estimates. Note. Parameter estimates and 95% confidence intervals for associations between parental knowledge and aggression across conditional values of maternal stress, as estimated by the online Preacher calculator (Preacher et al., 2006). The dotted line represents the area of significance; parameter estimates to the right of the dotted line are all statistically significant

have universal protective effects. In the current study, maternal warmth was only significantly associated with lower levels of aggression and delinquency among conditions of low-to-average maternal stress. These results are inconsistent with a prior study of 8–12-year-old children, which reported that the relationship between maternal attunement and lower child internalizing problems was strongest at higher levels of stress (Arbel et al., 2020). However, the results are consistent with a previous study on the interaction between mother-child attachment and marital conflict, such that under conditions of high marital conflict, mother-child attachment had no effect on child externalizing problems in middle childhood (El-Sheikh & Elmore-Staton, 2004). A similar result was also found when looking at maternal attunement and maternal depression on internalizing problems in females, such that under conditions of high maternal depression, there was no relationship between maternal sensitivity and internalizing problems (Garai et al., 2009). Moreover, there are other studies which have suggested that under high levels of maternal distress, greater parent-child attachment or affection may lead to mothers to disclose signs of their distress to

the child while simultaneously trying to form an emotional bond, which could lead to confusion on the child's part and result in greater internalizing and externalizing problems (Silinskas et al., 2020; Aunola & Nurmi, 2005). Because this study did not find that higher levels of maternal warmth actually increased behavioral problems at higher levels of maternal stress, this hypothesis needs to be further evaluated.

Clinical and Policy Implications

This study suggests that maternal stress is an important context to consider when evaluating the impact of parenting on youth outcomes. Differential patterns of interactions with maternal stress depending on parenting dimension were found, which may explain why recent studies on maternal stress have reported inconsistent patterns of results (Arbel et al., 2020; Silinskas et al., 2020). Nevertheless, taken together, these studies examining moderating effects suggest that parenting interventions may need to be tailored to the contextual factors impacting parents. Many parenting intervention programs that focus on parent-child involvement have not been proven to be effective for adolescent outcomes (Terzian & Mbwana, 2009). These programs attempt to increase the maternal bond with the child by increasing maternal warmth; however, the results of this study indicate that attempts to increase warmth among mothers with high levels of stress or other vulnerabilities, such as depression (Goodman & Garber, 2017), should be approached with caution. Moreover, there are examples of parenting interventions that specifically target parental monitoring, such as the Enhanced Triple P-Positive Parenting Program (Sanders, 1999; Sanders et al., 2003), the Parent Management Training-Oregon Model (PMTO; Patterson et al., 2010), and the Informed Parents and Children Together (ImPACT; Li et al., 2002; Stanton et al., 2000) program. These interventions have shown significant improvements in child behavior, parenting skills, and general family functioning. Notably, findings from the PMTO provide evidence that improvements in parental monitoring and appropriate discipline are more effective when compared to other parenting domains (Patterson, 2005). The results of the current study further suggest that enhancing parental knowledge may be particularly effective among families experiencing high levels of stress.

Strengths and Limitations

The present study examined the moderating effects of maternal stress on two different types of parenting practices—maternal warmth and parental knowledge—that have strong and independent effects on adolescent development. The fact that the present study finds different patterns of

interactions across parenting practice may account for some of the inconsistencies in prior studies. Another major strength of this study is the use of multi-informants; the mother reported on her own stress levels and youth reported on their own behavioral problems using validated scales. This is especially important in stress research as the literature has shown that maternal psychological stressors can lead to inflation of parent-reported child behavioral problems (Gartstein et al., 2009). This study also used youth reports of parenting behaviors, rather than observations of the parent-child interactions or parent reports. Prior research has reported that while child reports of parenting practices are strong predictors of child externalizing and internalizing problems up to three years later, parent reports on parenting do not show the same associations (Barry et al., 2008; Nichols & Tanner-Smith, 2022). Moreover, the fact that different reporters for maternal stress and parenting practices were utilized suggests that the results of this study are unlikely to be biased by common method variance (Siemsen et al., 2010). Indeed, it is unlikely that any methodological issues could account for the different patterns of results found.

This study had several limitations. One limitation is that paternal stress was not assessed, as this would have restricted analyses to children living in two-parent households, which would have resulted in a significant reduction in sample size and would have limited generalizability. Likewise, the type of household (i.e., single, or joint parent) was not considered. Inadequate parental knowledge is more common in single-mother households (Fisher et al., 2003) and the impact of parental monitoring on adolescent behaviors has been shown to be stronger when mothers work full time (Jacobson & Crockett, 2000). It could be that in two-parent households with maternal stressors, the other caregiver can provide the parenting characteristics for the child. More research is needed to investigate whether the moderating effects of maternal stress on parenting practices replicate across diverse household structures.

There was not a large enough sample to examine three-way interactions, such as interactions between parenting, maternal stress, and child gender. Research shows that maternal stressors can impact child outcomes differently based on gender (Goodman et al., 2011; Cummings et al., 2005). One study found a three-way interaction between child gender, maternal sensitivity, and maternal depression on internalizing problems, such that the two-way interaction between maternal sensitivity and depression was significant for females but not males (Garai et al., 2009). In light of this, more research with larger samples is needed to see if patterns of interactions between maternal stress and parenting are similar across gender. Similarly, the majority of the sample was in early adolescence. The specificity principle states that different settings or periods may elicit

different ontological development (Bornstein, 2017). Thus, a different pattern of results may emerge among samples of younger children or older adolescents.

Finally, the authors note that as this was a cross-sectional study, causality is unclear. Research shows that stressors can impact internalizing and externalizing problems (Bagner et al., 2009; Goodman et al., 2011), but internalizing and externalizing problems of children can, in turn, impact current maternal stressors (Bagner et al., 2013; Cherry et al., 2019; Goodrum et al., 2021). Future studies should look at the differential impact of parenting characteristics in a longitudinal study to see if there are changes based on the bidirectional effects of maternal stress and child outcomes.

Conclusion

Few studies to date have explored the moderating effect of maternal stress on parenting and child outcomes. The results have been inconsistent and primarily focused on one dimension of parenting. This study adds to a growing body of work seeking to identify sources of heterogeneity in the effects of parenting on youth outcomes by exploring the role that maternal stress plays in determining the effectiveness of two independent parenting dimensions on youth externalizing behaviors. The results of this study showing different patterns of interactions for different parenting practices illustrate the complexities in how contextual factors can influence family dynamics. Additionally, results suggest directions for future empirical studies that can lead to refinements of theoretical models on stress and family processes across development.

Data Availability

Under the IRB protocol, individual level data are not allowed to be shared with anyone outside of the original investigative team. Copies of aggregate statistics, data analytic code, and copies of all results output are available upon request. Please send an email to Dr. Kristen Jacobson at kjacobso@bsd.uchicago.edu.

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Authors' Contributions K.N.M. performed the statistical analyses and drafted the manuscript; K.C.J. participated in the design and coordination of the study and helped to draft the manuscript. All authors read and approved the final manuscript.

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Compliance with Ethical Standards

Conflict of Interest The authors declare no competing interests.

Ethical Approval The study protocol was approved by the University of Chicago Institutional Review Board. In accordance with the Declaration of Helsinki, a parent/legal guardian (79.4% biological mothers) provided written informed consent for themselves and their children and youth provided written informed assent.

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