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Sex Differences in the Longitudinal Relations Among Family Risk Factors and Childhood Externalizing Symptoms

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Abstract

Despite potential sex differences in base rates, predictors, and maintaining processes for children's externalizing behaviors, little prospective research has examined sex differences in the relations between concurrent, proximal family risk factors and children's externalizing behaviors. The current study examined the relations among maternal depressive symptoms, maternal parenting behaviors (i.e., negativity and low warmth), and child externalizing symptoms at 24 months and first grade in a community-based sample of 1,364 children enrolled in the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development. Structural equation modeling revealed that maternal depression and negative parental behaviors were associated with concurrent externalizing behaviors, though maternal depression may be differentially linked to boys' and girls' externalizing problems. The relation between depression and boys' externalizing symptoms was more pronounced at 24 months, and over time, the relation between maternal depression and boys' externalizing symptoms decreased in magnitude, whereas this relation increased among girls.

Numerous lines of inquiry have examined the relations between contextual factors and children's externalizing behaviors. Although these contextual factors have been operationalized at various levels, the family environment has received the lion's share of attention (e.g., Barton & Figueira-McDonough, 1985; Eddy, Leve, & Fagot, 2001; Patterson, 1982; Rothbaum & Weisz, 1994; Webster-Stratton, 1996). Generally speaking, children who are exposed to harsh, insensitive, unsupportive, or inconsistent parenting are at greater risk for externalizing problems than their peers. Moreover, the presence of parental psychological problems likely increases the effects of high negative and low positive parenting behaviors on child externalizing behaviors (e.g., Davies & Windle, 1997; Essex, Klein, Cho, & Kraemer, 2003). Coercion theory (Patterson, 1982) provides a model for jointly considering these processes. Specifically, children who are exposed to aversive social environments may be more likely to model parental aggressive and irritable behaviors. In the context of parental requests, children's display of externalizing behaviors may result in

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the removal of parental demands. These behaviors potentially reinforce both child externalizing behaviors and inconsistent parental behaviors. Parents who experience psychological problems may have fewer resources for providing supportive, consistent parenting as well as for addressing children's behavior problems. Over time, continued coercive interchanges lead to increasing levels of externalizing behaviors and problematic parenting behaviors.

Although much research has examined how externalizing behaviors and parenting interact across time, less attention has been given to whether and how the intrafamilial factors that contribute to the onset and maintenance of externalizing behaviors are similar among girls and boys. There is some evidence that familial risk factors may confer differential risk for boys and girls (Drabick, Beauchaine, Gadow, Carlson, & Bromet, 2006; Shaw, Keenan, & Vondra, 1994), but the literature is mixed (cf. Compton, Snyder, Schrepferman, Bank, & Shortt, 2003). More important, it is not known whether the greater prevalence of externalizing problems among boys than among girls is due to higher rates of exposure to these risk factors among boys or to boys' greater sensitivity to them (Rutter, Caspi, & Moffitt, 2003). It is quite possible that sex differences in psychological functioning (e.g., temperament, verbal abilities) may contribute to differences in sensitivity to contextual risk or that boys and girls are differentially susceptible at different points in development.

Although there is no reason to expect that coercive interchanges would differ in families of boys versus girls, the effect of these interchanges may differ according to sex. Specifically, because boys' engagement in externalizing behaviors at a young age may be deemed more acceptable than such behaviors in girls (Compton et al., 2003; Maccoby, 1998), differential reinforcement rates for boys and girls may emerge, and children's externalizing behaviors may differentially affect parental behaviors and parental psychological problems. If girls' externalizing symptoms are viewed as more distressing than boys', these behaviors may have a greater influence on maternal depressive symptoms or lead to more concerted parenting efforts aimed at decreasing externalizing behaviors among girls relative to boys. Alternatively, because boys exhibit higher levels of externalizing behaviors compared with girls (Maughan, Rowe, Messer, Goodman, & Meltzer, 2004), boys' more frequent and/or more severe behaviors may contribute differentially to maternal depressive symptoms or parenting behaviors. Thus, sex differences in prediction from these proximal family variables to externalizing problems are possible, but research is lacking. Prospective research that considers the transactional relations between parental variables and child externalizing behaviors is necessary to test these explanations.

The present study examined sex differences in the links between children's externalizing symptoms and maternal depression, maternal negativity, and low maternal warmth, all of which have been shown to confer risk for externalizing problems (Barton & Figueira-McDonough, 1985; Eddy et al., 2001; Rothbaum & Weisz, 1994; Webster-Stratton, 1996). Although these risk factors may be a proxy for, or correlated with, other contributors to children's externalizing problems (including paternal behavior, marital quality, socioeconomic status [SES], neighborhood influences on family functioning), interventions directed toward more proximal factors, such as maternal depression and parental behaviors, have been found to lead to decreases in child externalizing behaviors, particularly if implemented early in the child's development (Gardner, Burton, & Klimes, 2006; Webster-Stratton, 1998; Weissman et al., 2006). As such, these variables are key predictors for research targeted toward understanding whether these transactional processes operate differently among boys and girls.

Research on familial processes and externalizing behavior has traditionally focused on male samples; however, the need for further examination of externalizing behaviors among girls

has become more evident as a result of the increasing proportion of juvenile delinquency perpetrated by girls (Federal Bureau of Investigations, 2006) and the suggestion that early behavior problems may confer more risk for later deviant outcomes among girls than boys (Loeber & Keenan, 1994). Given that family variables may confer differential risk for externalizing behaviors among boys versus girls, examination of sex differences in these processes may prove fruitful for understanding sex differences in the etiology and treatment of behavior problems, particularly given evidence that trajectories of externalizing behaviors differ across sex (Broidy et al., 2003; Schaeffer et al., 2006).

Studies examining sex differences in the links between externalizing behaviors and various familial factors have evaluated parental responsiveness (Rothbaum & Weisz, 1994; Shaw et al., 1994), the quality of the parent–child relationship (Leadbeater, Kuperminc, Blatt, & Hertzog, 1999; Scaramella, Conger, & Simons, 1999), parental hostility and negativity (Gordis, Margolin, & John, 2001; Scaramella et al., 1999; Webster-Stratton, 1996), parental coercive behavior (Eddy et al., 2001; Fagot & Leve, 1998; Kim, Hetherington, & Reiss, 1999), and maternal depression (Essex et al., 2003; Webster-Stratton, 1996). Several studies, especially those of older children and community-based (as compared with clinic-based) samples, report no sex differences in the relation between familial factors and externalizing symptoms (e.g., Compton et al., 2003; Dekovic, Buist, & Reitz, 2004; Kim et al., 1999; Scaramella et al., 1999; Spoth, Neppel, Goldberg-Lillehoj, Jung, & Ramisetty-Mikler, 2006).

Of those studies that have found sex differences, most have involved younger children, rather than adolescents, and most have found stronger relations between family risk factors and externalizing behaviors among boys than among girls. More specifically, numerous studies have indicated that the absence of parental warmth is a relatively stronger predictor of externalizing behaviors among boys. In a meta-analysis of cross-sectional studies, Rothbaum and Weisz (1994) concluded that parental acceptance/responsiveness was more strongly inversely related to externalizing behaviors among boys than among girls, but only prior to adolescence. Consistent with this, in a longitudinal study following a sample of low-income children from the age of 12 months to 36 months, Shaw et al. (1994) concluded that maternal responsiveness observed at 12 months inversely predicted boys', but not girls', observed aggression at 24 months and parent-reported externalizing behaviors at 36 months, despite a lack of sex differences in overall levels of aggression and externalizing symptoms in this sample. Similarly, in a cross-sectional examination of the relation between parental warmth and child externalizing behaviors in a community-based sample of preschoolers oversampled for externalizing problems, Kerr, Lopez, Olson, and Sameroff (2004) found that higher levels of self-reported parental warmth were related to lower scores on the parent- and teacher-reported Externalizing scale of the Child Behavior Checklist (CBCL) among boys but not among girls. Thus, it appears that in early childhood, parental warmth is more strongly associated with lower levels of externalizing problems among boys than among girls.

Research examining negative parental behaviors (e.g., hostility, harshness) has also suggested differential effects among boys versus girls. On the basis of a cross-sectional study of a community sample ages 8 to 11 years, Gordis et al. (2001) concluded that levels of parent–child hostility had a stronger effect on boys' than on girls' parent-reported externalizing behaviors. Similarly, Webster-Stratton (1996) found that in a clinic-referred sample of children 3 to 7 years of age, maternal critical statements during an interaction task were related to parent-reported externalizing behaviors for both sexes but that physical negativity was related to externalizing behaviors among boys only. In the only longitudinal study reporting sex differences in the effect of negative parenting on externalizing behaviors, McFadyen-Ketchum, Bates, and Dodge (1996) examined relations among the quality of the observed mother–child relationship, peer-rated aggression, and teacher-

reported antisocial behavior, measured at four time points between kindergarten and third grade. Among boys, higher levels of coercion and lower levels of warmth were related to increases in aggression over time. Among girls, however, there was no relation between maternal warmth and changes in aggression, and higher levels of mother–daughter coercion were related to decreases in aggression over time.

Less is known about sex differences in the relation between maternal depressive symptoms and externalizing behaviors, although, as with other risk factors, the existence of sex differences varies depending on the type and age of the sample examined. In a study of clinic-referred children, no sex differences were found in the relation between maternal depression and externalizing behaviors (Webster-Stratton, 1996). In contrast, Essex et al. (2003) found that boys from highly conflictual families who were exposed to maternal depression in infancy were at risk for externalizing problems in kindergarten, whereas exposure to maternal depression among girls was more predictive of later internalizing problems. Finally, one study found relations between maternal depression and girls', but not boys', externalizing behaviors among children ages 10–12 years (Drabick, Beauchaine, et al., 2006).

Evaluating relations among variables over time is necessary for an examination of transactional processes of influence. As noted previously, coercion theory (Patterson, 1982) suggests the likelihood that parental behaviors and child externalizing symptoms interact with each other. For instance, negative parental behaviors may contribute to child externalizing behaviors through parental modeling of aggression, lack of appropriate examples for dealing with conflict, or lack of attending to and/or rewarding appropriate behaviors. In addition, children's externalizing problems may elicit negative parental behaviors, as children with behavior problems are more difficult to parent and may represent more of a challenge to parents' limited resources of patience than a child without such problems. In turn, increased negative parental behaviors may contribute to increased levels of difficult child behavior. Furthering this process, we speculate that higher levels of maternal depression may be linked to increased externalizing behaviors among children through several routes. Higher levels of child externalizing behaviors may contribute to increases in maternal depression, and depressed mothers may use less effective parenting strategies, provide less rewarding interactions with their children, and/or provide less positive feedback and attention for good behaviors (Compton et al., 2003; Drabick, Beauchaine, et al., 2006; Spence, Najman, Bor, O'Callaghan, & Williams, 2002). Although coercive parent–child cycles have been well documented (Patterson, 1982; Patterson, Reid, & Dishion, 1992), few studies have examined whether this transactional pattern operates differently among girls and boys, particularly among young children drawn from a community sample.

Taken together, the literature leaves several important gaps in current understanding of risk for externalizing problems among young children, which we sought to address in the present study. These gaps include concurrent consideration of multiple, proximal parental variables that may be amenable to intervention and child externalizing behaviors; the transactional relations between parental behaviors and externalizing problems and between maternal depression and externalizing problems; the differential effect of parental factors on externalizing problems at different points in development that may be particularly relevant to children's exhibiting externalizing behaviors; and the potentially differential effect of these factors based on child sex. Previous research that has examined these variables in isolation may have obfuscated a fuller picture of the ways in which these factors operate concurrently, which may have contributed to some of the apparently conflicting findings in the current literature. Moreover, the literature suggests that it may be particularly important to examine these issues in early childhood, as sex differences generally have been found in

this developmental period (Gordis et al, 2001; McFadyen-Ketchum et al., 1996; Shaw et al., 1994; Webster-Stratton, 1996).

The current study investigated whether longitudinal relations between parental behaviors, maternal depressive symptoms, and children's externalizing behaviors differed by sex in the community-based sample of children studied in the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development. The specific factors evaluated were warm parental behaviors (including positive regard for the child, respect for the child's autonomy, and supportive presence); maternal negativity (including intrusiveness, hostility, and harsh parenting); maternal depressive symptoms; and child externalizing symptoms. The conceptual model included several basic components that generally reflected prediction from parental variables to externalizing problems and from externalizing problems to parental variables (for an overview, see Figure 1). Though we recognize that other developmental periods are important to consider, the time points examined (24 months and first grade) were chosen to reflect developmental periods related to transitions. Specifically, we expected that increasing motoric skills, verbalizations, and bids for autonomy at 24 months, and the transition to full-time schooling at first grade, would provide sufficient heterogeneity in parent–child interactions to examine the behaviors of interest. Moreover, we focused on early childhood rather than middle childhood or adolescence, in light of evidence suggesting that early interventions to modify patterns of family interactions that contribute to children's externalizing behaviors may be especially effective.

Prior research indicates that low levels of maternal warmth are related to externalizing symptoms among both boys and girls; thus, we did not hypothesize that sex differences in the prediction from warmth to externalizing behaviors would emerge. However, previous work suggests that boys' externalizing symptoms are more affected by high levels of negative parenting during the developmental periods under consideration, perhaps because of socialization processes and/or differential reinforcement of externalizing behaviors during these developmental periods. We thus expected maternal negative behaviors to be more predictive of boys' externalizing behaviors. Previous research regarding maternal depression is mixed; however, given potential parental reactions to children's externalizing behaviors, we hypothesized that maternal depressive symptoms would be more closely associated with girls' externalizing behaviors than boys'.

Method

Participants

Data for the present study come from the NICHD Study of Early Child Care and Youth Development, a prospective longitudinal study of a large, geographically, ethnically, and economically diverse sample of children born in 1991 and their families. The data collected in the study include multiple measures of family, child-care, and school contexts, along with multiple measures of child characteristics and child psychological and behavioral outcomes (NICHD Early Child Care Research Network, 2001; <http://secc.rti.org>). The specific measures used in the present report are described below.

Participants were recruited from 24 hospitals located in or near Little Rock, Arkansas; Irvine, California; Lawrence and Topeka, Kansas; Boston, Massachusetts; Philadelphia, Pennsylvania; Pittsburgh, Pennsylvania; Charlottesville, Virginia; Morganton and Hickory, North Carolina; Seattle, Washington; and Madison, Wisconsin. A total of 1,364 families with healthy newborns were enrolled in the study, with approximately equal numbers of families at each site. The enrolled families varied in socioeconomic level, sociocultural background, and family composition; for example, at the time of enrollment in the study,

25% of the families were non-Caucasian, just over 10% of the mothers did not complete high school, and 14% of the mothers were single. Recruitment took place during the first 11 months of 1991. Families for whom English was not spoken in the home were excluded from the study. All study participants were included in the present analyses.

Procedure

Data were collected across the 10 sites by research assistants who attended a universal training meeting prior to visits at each time point. Each data collector passed certification procedures based on a common certifier's review of videotapes of the data collector's administration of the procedures. Investigators contacted mothers by telephone every 3 to 4 months to update information and keep in touch with participating families. The face-to-face assessments used in these analyses occurred at two time points, when the children were 24 months of age and when they were in the first grade. Children were observed in the home and laboratory, and mothers completed various questionnaires during the home visit. The mother and child also participated in a semi-structured interaction in a laboratory setting. A more extensive description of the data collection procedures can be found in NICHD Early Child Care Research Network (2001; <http://secc.rti.org>).

Measures

Study sites—Interviews were conducted at 10 study sites across the nation. Although there is no theoretical reason to suspect that location would affect the model of interest in the present study, controlling for site location partialled out any variance that might have been attributable to location. Nine dummy codes representing study site location were calculated and used as controls in all statistical analyses.

Externalizing behaviors—The CBCL (Achenbach, 1991) was completed by mothers when their child was 24 months and in first grade. This measure has been standardized on large samples of children in the United States and abroad. Items on the CBCL were rated on a scale ranging from 0 (*not true of the child*) to 2 (*very true of the child*). The T score of the Externalizing Problems scale was used as a measure of externalizing behaviors. This highly valid and reliable measure has been extensively used in research and clinical settings (NICHD Early Child Care Research Network, 2001). Scores range from 30 to 100, with higher scores indicating higher levels of externalizing behaviors.

Parenting behaviors at child's age of 24 months—An observational measure of maternal behavior was used to index aspects of warm and negative parental behaviors during a 15-min interaction in a laboratory setting when the child was 24 months and again when the child was in first grade. Qualities of mother–child interaction were rated from videotaped semistructured procedures in the laboratory. At 24 months, the mother was instructed to show her child age-appropriate toys hidden in three containers in a set order. The mother was instructed to have her child play with the toys in each of the three containers and to do so in the order specified. Subsequent to the mother–child interaction, observers completed thirteen 4-point global qualitative scales (1 = *not at all characteristic* to 4 = *highly characteristic*), which were adapted from the Qualitative Scales of the Caregiving Environment for this study (NICHD Early Child Care Research Network, 1993). The present analyses considered two indices from the mother–child interaction: (a) the mother's intrusiveness (Winer's, 1991, repeated measures reliability $r = .69$) and (b) the mother's positive regard for the child (Winer's, 1991, repeated measures reliability $r = .75$). These interrater reliability estimates were ratified by the NICHD Study of Early Child Care and Youth Development working group as having acceptable psychometric properties.

Parenting behaviors at first grade—Observations were conducted again at first grade and involved three activities. The first mother–child interaction activity involved mother and child operating an Etch-A-Sketch together to draw a picture of a house and a tree on the screen. The task was challenging because one person was told to control the vertical knob and the other was told to control the horizontal knob, which consequently required their coordinating their movements to draw these pictures. The second activity involved using different-shaped parquet pattern blocks to fill in three geometric cutout frames. The third activity was a card game called One-Up/One-Down, a modification of Slapjack. For this game, mother and child successively laid cards face up on a growing pile and then raced to slap and claim the growing pile of cards when the card laid on the pile was either one higher or one lower than the previous card. This activity was included to provide an opportunity to observe expressions of affect from mother and child and the child's emotional regulation with mother in a potentially exciting and/or frustrating activity.

For ratings at first grade, observers used 7-point global qualitative scales (1 = *very low* to 7 = *very high*) to rate aspects of maternal behavior. In the present analyses, we considered three of these qualitative rating scales: Hostility, Supportive Presence, and Respect for the Child's Autonomy. Interrater reliability estimates were moderate to high and ranged across all observations from .67 to .86.

In addition to the observations at first grade, mothers completed the Raising Children Questionnaire, an extensive revision of Greenberger's Raising Children Checklist (Shumow, Vandell, & Posner, 1998). The instrument contains 28 items, which describe mothers' strategies for rearing children, which are rated on a scale ranging from 1 (*definitely no*) to 4 (*definitely yes*). This measure is designed to assess parenting strategies along three dimensions: harsh, firm, and lax. The Harsh Parenting subscale, which corresponds to the authoritarian style outlined by Baumrind (1968), was used to index harsh control (6 items; e.g., "Do you give your child a chance to explain before punishing him/her?" [reverse scored]; $\alpha = .69$).

Maternal depression—The Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) was administered to assess maternal depressive symptoms. This 20-item scale is one of the most widely used and validated measures of depressive symptomatology in a nonclinical population (sample items: "I feel sad"; "I feel that everything I do is an effort"). Scores range from 0 to 60, with higher scores indicating more depressive symptomatology (24-month $\alpha = .91$; first-grade $\alpha = .91$). At both time points, the CES-D was administered to mothers after the other questionnaires that were used in the present analyses.

Data Analyses

Longitudinal data are often plagued by the problem of missing data. Typically, researchers have utilized a number of different analytic strategies to address missing data, such as complete case-wise analysis (listwise deletion), complete case analyses (pairwise deletion), nonresponse weighting, and mean imputation. However, use of these strategies may bias an analytic sample by including more positively functioning children (e.g., those most likely to provide information across time in longitudinal data collection). Indeed, in the present analyses, the sample of families for whom full data were available tended to have higher SES and higher levels of maternal education than families for whom data were missing, suggesting that the sample with full data available may be, on average, less at risk than the full Study of Early Child Care and Youth Development sample. Because of this discrepancy, it was especially important to use the maximum amount of data and to avoid omitting participants with missing data from the analyses. Other methods for working with missing

data, such as multiple imputation (MI), allowed us to maximize the sample size and guard against bias in the analytic sample.

MI is an analytic technique that fills in missing data with predicted values on the basis of available data (thus, individuals must provide at least some data in order to ensure MI accuracy). Using all available data, MI imputes values for all missing data (Rubin, 1987; Schafer, 1997). The analytic benefit of MI over other types of imputation (e.g., single imputation) is that MI imputes several values for each missing value, allowing for variability resulting from both sampling error and model uncertainty.¹ Thus, MI creates several completed data sets. Analyses subsequently are conducted on each of these imputed data sets, and results are averaged to derive a final estimate of effects (Rubin, 1987). MI was particularly well suited to the current analyses because it (a) accommodates many different patterns of missing data, (b) reflects uncertainty in missing values, and (c) assumes that two people have the same probability of having missing data on a variable only if they have the same values for all other variables (also referred to as the missing at random assumption; Little & Rubin, 2002). Thus, utilizing MI eliminates the need to make implausible assumptions about the missing data mechanism, assumptions that would bias coefficient estimates and standard errors.

MI (SAS Proc MI; SAS Institute Inc., 2006) was used to deal with missing data in the current sample, and structural equation models (Mplus Version 5.0; Muthén & Muthén, 2007) were used to examine the relations among maternal depressive symptoms, parental behaviors, and externalizing symptoms over time. Given our a priori hypotheses involving sex differences, we conducted a multiple group analysis comparing patterns of relations among variables in the subsamples of families with boys compared with families with girls. In the first stage of analysis, models were tested in which coefficients were unconstrained across sexes. In the second stage, coefficients of interest were constrained to be equal across sexes. We used the chi-square statistic as an index of model fit; however, because chi-square statistics tend to be large when the sample size is large, two additional goodness-of-fit indices are reported: the comparative fit index (CFI; values >.95 are desired; Bentler, 1990; Byrne, 2001) and the root mean square error of approximation (RMSEA; values <.08 are acceptable; Byrne, 2001). Comparing fit across models, we conducted a chi-square difference test ($\chi^2_{\text{Model 1}} - \chi^2_{\text{Model 2}}, df_{\text{Model 1}} - df_{\text{Model 2}}$). If the fit of the model differed, we then tested for sex differences in the relevant paths using a one degree-of-freedom chi-square difference test (i.e., fixing a specific path to be equal for boys and girls and then examining the chi-square difference across models to determine whether the specific estimate was different among boys and girls).

Results

Descriptive Statistics

The MI method was used to create five imputed data sets (see the Appendix for means and standard deviations from listwise and MI data sets on all variables). Bivariate correlations for all study variables are presented separately for boys and girls in Table 1. Patterns of correlations between variables were consistent with prior research. Independent sample *t* tests and Levene's homogeneity of variance tests were performed for all variables. In

¹MI bases imputation on all variables within the data set. Thus, all variables to be used in analyses must be included prior to imputation. Because we were interested in sex differences, sex was included in the imputed data set. Although no individuals were missing data on sex, including this variable in the data set ensured that a child's sex, and how that might affect patterns of parenting behaviors, maternal depression, and externalizing behaviors, is accounted for during the imputation. Furthermore, by using MI for both boys and girls simultaneously, we were able to compare boys and girls in the same structural equation model and thus conduct a statistical test of whether boys and girls differed from each other.

comparison with girls, boys were rated as having higher levels of externalizing symptoms at first grade, $t(1364) = 2.00, p < .01, d = .11$; higher levels of maternal intrusiveness at 24 months, $t(1364) = 5.07, p < .01, d = .27$; and higher levels of maternal supportive presence in first grade, $t(1364) = 2.57, p < .01, d = .14$. In first grade, girls experienced higher levels of maternal hostility, $t(1364) = 2.42, p < .01, d = .13$.

Relations Among Parental Variables and Child Externalizing Problems

We conducted a multiple-group analysis (boys vs. girls) using structural equation modeling to evaluate relations among the seven parental variables (at 24 months: maternal depressive symptoms, intrusiveness, and positive regard; at first grade: maternal depressive symptoms, harsh control, hostility, respect for the child's autonomy, and maternal supportive presence) and externalizing symptoms at both time points. The basic conceptual model is presented in Figure 1. With respect to concurrent prediction, paths from depressive symptoms, positive regard, and intrusiveness at 24 months to externalizing at 24 months were included, as were paths from depressive symptoms, harsh control, hostility, respect for the child's autonomy, and supportive presence in first grade to externalizing in first grade. In addition, given hypothesized transactional effects between child externalizing and parental variables, we included paths from child externalizing symptoms at 24 months to (a) maternal depressive symptoms at first grade and (b) maternal harsh control at first grade. However, given that many of these processes are operating concurrently and are likely associated with each other, our final model included additional paths (described below and presented in Figure 2).

In terms of including paths for the final model, we expected, and thus modeled, stability in parental behaviors and symptomatology over time (see Figure 2). The final model thus included paths linking variables that were conceptually consistent across measurement periods (i.e., maternal depression, negative parental behaviors, and positive parental behaviors). Specifically, we included paths from maternal depression at 24 months to maternal depression at first grade, from intrusiveness at 24 months to both harsh control and hostility at first grade, and from positive regard at 24 months to both respect for autonomy and supportive presence at first grade.

Given that aspects of parental behaviors are likely to be highly correlated within a given time point, we allowed all assessments of parental behaviors at the same time point to covary. We chose to allow these variables to covary rather than create a latent construct, given that the variables were assessed with different methods and reporters (e.g., observation, parent report) and operationalized with regard to different periods of time. Thus, at 24 months, intrusiveness and positive regard were allowed to correlate. At first grade, we allowed correlations between (a) harsh control and respect for child autonomy, (b) harsh control and supportive presence, (c) harsh control and hostility, (d) hostility and respect for child autonomy, (e) hostility and supportive presence, and (f) respect for child autonomy and supportive presence. Last, given that we expected that mothers who were rated as high on intrusiveness at 24 months would be likely to exhibit lower levels of parental warmth behaviors at first grade, we added paths from intrusiveness at 24 months to (g) respect for child autonomy and (h) supportive presence. In all models, nine dummy codes reflecting site of data collection were entered as controls.

In the first multiple-group model, paths were constrained to be equal for both boys and girls to examine whether the model fit was equivalent for boys and girls. This constrained model provided a good fit, $\chi^2(176) = 470.07, SD = 26.72, p < .01; CFI = .92, SD = <.01; RMSEA = .05, SD = .01$ (note that standard deviations reflect the variance around the chi-square and fit statistics across imputed data sets). A second model was tested in which path coefficients were unconstrained across sexes. The unconstrained model also provided a good fit (see Figure 2), $\chi^2(140) = 405.33, SD = 26.32, p < .01; CFI = .92, SD = .01; RMSEA = .05, SD$

= .01. Although both models fit the data, the test of the difference between the models with unconstrained and constrained path coefficients was significant, $\chi^2(36) = 64.74, p < .01$, indicating that the relations among variables were significantly different among families of boys versus families of girls. Next, the predictive paths between the parental variables and externalizing symptoms among boys and girls were examined to test hypothesized sex differences in these paths. To determine whether path coefficients differed by sex, we tested the equivalence of these paths across sex using one degree-of-freedom chi-square difference tests. Specifically, for each parameter of interest, we compared a fully unconstrained model with a model where one parameter was fixed across boys and girls. We then examined the change in chi-square to determine whether the parameters were significantly different. Notably, there were no differences by study site location (see Table 2).

Consistent with prediction, we found no sex differences in the relations between parental warm behaviors (positive regard at 24 months, respect for the child's autonomy, and supportive presence at first grade) and externalizing symptoms at 24 months and at first grade. Contrary to past findings, however, these parental warm behaviors also were unrelated to externalizing behaviors among boys and girls at 24 months and at first grade.

Among boys and girls, maternal depressive symptoms at 24 months predicted externalizing symptoms at 24 months, and depressive symptoms at first grade predicted externalizing symptoms at first grade. Interestingly, this relation was significantly different among boys versus girls at 24 months but not at first grade. At 24 months, maternal depression predicted boys' externalizing symptoms more strongly than girls' symptoms, $\chi^2(1) = 6.55, p < .01$. Thus, whereas maternal depression was a significant predictor of externalizing symptoms among boys and girls at 24 months and first grade, the magnitude of that prediction was stronger among boys than among girls at 24 months.

Maternal intrusiveness at 24 months predicted externalizing symptoms at 24 months among boys and girls. As expected, the link between harsh control and externalizing symptoms at first grade was significant among boys; although prediction from harsh control to externalizing symptoms was not significant among girls, the difference in these paths for boys and girls was not significant. Unexpectedly, however, there was no link between maternal hostility and externalizing symptoms at first grade, though the link between hostility and externalizing symptoms differed by sex, $\chi^2(1) = 4.97, p < .01$, indicating that the relation between maternal hostility and externalizing symptoms at first grade was stronger (though not significant) among girls than boys.

Contrary to our hypothesis, children's externalizing symptoms at 24 months predicted mothers' harsh control at first grade equally well among boys and girls. The relation between child externalizing symptoms at 24 months and maternal depressive symptoms at first grade differed between the sexes. For both sexes, externalizing symptoms predicted greater maternal depression, with girls' externalizing behaviors predicting mothers' subsequent depressive symptoms more strongly than boys' behaviors, $\chi^2(1) = 5.40, p < .01$. One final sex difference emerged. As expected, maternal intrusiveness at 24 months predicted maternal hostility in first grade; however, the magnitude of this effect was stronger among girls than among boys, $\chi^2(1) = 6.80, p < .01$.

Although not central to the focus of this report, we conducted a second multiple-group analysis comparing Caucasian versus non-Caucasian children to determine whether the fit of the model differed as a function of ethnicity. In the first multiple-group model, path coefficients were unconstrained across groups. The unconstrained model provided a good fit, $\chi^2(176) = 493.59, SD = 25.79, p < .01$; $CFI = .92, SD = <.01$; $RMSEA = .05, SD = .01$. To examine whether the model fit was equivalent for Caucasian and non-Caucasian

children, we tested a second model in which the predictive paths were constrained to be equal for both groups. This constrained model provided a good fit, $\chi^2(140) = 444.17$, $SD = 20.47$, $p < .01$; $CFI = .91$, $SD = .01$; $RMSEA = .05$, $SD = .01$. The chi-square difference between the models was not significant, $\chi^2(36) = 49.73$, $p > .05$, suggesting that there were no differences in the model based on ethnicity.

Discussion

Although parental factors are important in predicting both boys' and girls' externalizing symptoms, the findings of the present study suggest that there are some noteworthy differences in the nature of these relations among young children. First, mothers' depressive symptoms at 24 months had more of an effect on boys' than girls' concurrent externalizing behaviors. Second, the relation between externalizing symptoms at 24 months and mothers' depressive symptoms at first grade was stronger among girls than among boys. Last, though not significant, the relation between mothers' hostility at first grade with concurrent externalizing symptoms was stronger among girls than among boys.

The longitudinal relations between maternal depressive symptoms and child externalizing symptoms in the current study suggest sex differences in the links between these variables over time. Although maternal depressive symptoms predicted externalizing symptoms among children of both sexes at 24 months, the relation between concurrent maternal depressive symptoms and child externalizing was significantly stronger among boys at this age. Moreover, whereas the relation between maternal depressive symptoms and boys' externalizing symptoms decreased over time, this relation became stronger among girls. These results suggest that girls and boys may be differentially sensitive to mothers' depressive symptoms at different ages, with younger boys (24 months) and older girls (first grade) more sensitive to or affected by mothers' affective symptoms. These results suggest that research on sex differences in predictors of externalizing behaviors must pay special attention to the ages of the children studied. This is consistent with literature on the effects of divorce on child psychopathology, which similarly indicates that the age and the sex of the child are important to consider when examining relevant outcomes. Specifically, adolescent girls of divorced parents may be more likely to experience depressive symptoms, and boys may be more likely to exhibit externalizing behaviors, but these effects are dependent on the age of the child when the divorce occurs (Malone et al., 2004; McCabe, 1997). Combined with these results from other areas of research, our findings underscore the importance of examining the longitudinal relations between risk factors and psychopathology separately by sex.

Our results suggest that girls' sensitivity to maternal depressive symptoms is particularly important to consider given that maternal depression appears to confer risk at multiple developmental points. Girls' increasing sensitivity to mothers' depressive symptoms over time could result from increased identification of girls with their mothers as their gender identity solidifies with development. Additionally, girls' externalizing symptoms were more strongly associated with mothers' depressive symptoms at first grade than were boys' externalizing symptoms, suggesting that girls' externalizing symptoms may exacerbate or contribute to the development of maternal depressive symptoms prospectively. These findings highlight the transactional nature of the relation between parental and child symptomatology. Rearing a daughter with externalizing symptoms may be more distressing to mothers over time than rearing a son with similar behavioral problems, perhaps because the former is more unusual and therefore potentially more salient, more upsetting, or both (Pettit, Laird, Dodge, Bates, & Criss, 2001). Last, maternal depression may influence familial processes that confer differential risk for externalizing problems among girls and thus serve as a more distal risk factor for externalizing behaviors over time. For example,

family-level conflict may be exacerbated by maternal depression (particularly if it is chronic) and may moderate the effect of maternal depression on girls' externalizing symptoms (Drabick, Beauchaine, et al., 2006; Spence et al., 2002). Future research that considers the effects of paternal depression would be important for determining whether there are sex-specific mechanisms associated with child externalizing symptoms and paternal depression as well, given that paternal depression is associated with lower levels of father–child engagement, higher paternal parenting stress, and lower quality mother–father relationships (Bronte-Tinkew, Moore, Matthews, & Carrano, 2007).

Contrary to our hypotheses and previous research, maternal hostility in first grade was related more strongly to concurrent externalizing symptoms among girls than among boys, though the paths were not significant. This discrepancy may be related to our use of a longitudinal design with a community-based sample, as one of the previous studies reporting the reverse pattern used a clinic-referred sample (Webster-Stratton, 1996) and the other was a cross-sectional examination of a slightly older sample than the one evaluated in the present analyses (Gordis et al., 2001). In addition, findings on the extent and nature of sex differences in influences on externalizing behaviors may vary as a function of the clinical status of the sample. As externalizing behaviors are likely to be attenuated in community samples, it is reasonable to expect that different patterns of relations between risk factors and symptomatology might be found in different types of samples. It may be the case that coercive interchange models apply more to high-risk or clinic-based samples of boys than girls; these, in fact, are the very samples in which coercive interchange models have been most systematically examined (e.g., Compton et al., 2003; Drabick, Gadow, & Sprafkin, 2006; Patterson, DeGarmo, & Knutson, 2000).

Contrary to expectations and past research (Kerr et al., 2004; Rothbaum & Weisz, 1994; Shaw et al., 1994), warm parental behaviors were not related to children's externalizing symptoms among boys or girls. Several explanations for this apparent discrepancy are possible. First, when warm parental behaviors, negative parental behaviors, and maternal depressive symptoms are considered simultaneously (which they rarely are), the effects of positive parental behaviors may not account for much additional variance in the prediction of externalizing problems beyond that associated with negative parental behaviors or maternal depression. Second, whereas the present study used an observational measure of warmth, previous research typically has examined parent-reported warmth. Further research involving influences on children's externalizing behaviors that concurrently examines self-reported as well as observed indices of positive and negative parenting is necessary to distinguish among these competing accounts.

One of the strengths of this study was the use of a large community sample in a prospective design that allowed an examination of relations among family risk factors and externalizing symptoms over time. The finding that these risk factors differentially predicted externalizing symptoms at two different time points underscores the importance of employing longitudinal designs in research on developmental psychopathology. The prospective design also allowed for examination of the transactional effects of maternal and child factors.

Another strength of the present study was the use of observational measures of parental behaviors to predict parent reports of externalizing symptoms. Because many of the negative parental behaviors and the warm parental variables were not derived from parent report, this methodology minimized artifactual relations between parental behaviors and externalizing variables attributable to single-method or single-reporter effects. Although harsh parenting, child externalizing symptoms, and maternal depressive symptoms were indexed with a self-report measure (and may have been influenced by social desirability biases), the different magnitudes of prediction from depressive symptoms to externalizing symptoms as a

function of child sex and time point suggests that these relations cannot be fully accounted for by methodological biases.

Despite these strengths, there are several limitations to the present work that must be noted. First, although the use of structural equation modeling allowed for direct comparison of the independent and over-time contribution of each parenting variable examined, the findings reported here are correlational, and caution is warranted in drawing any causal inferences from these data. Nevertheless, we chose to examine these questions using structural equation modeling because it permitted us to posit both concurrent and prospective paths and to test multiple predictors simultaneously based on our a priori model. Second, we acknowledge that children's externalizing behaviors are influenced by a wide range of intra- and extrafamilial factors, only a small subset of which were studied here. Our focus on maternal depression and parental behaviors should not be taken as indicative of a belief that mothers are the only important, or even the most important, influence on the development of psychopathology during childhood or that their role is more important than that of fathers. Given the far more extensive literature on maternal than on paternal contributions to children's emotional and behavioral problems, this seemed to be a logical starting point for the examination of sex differences in potential sources of influence. At the present time, there is a dearth of literature examining fathers' roles in the development of symptoms among boys or girls, and this is an important area to address in future research (cf., Bronte-Tinkew et al., 2007). It is especially important in the study of sex differences to examine both mothers' and fathers' behaviors, as the sex of the parent and the sex of the child likely interact to influence the relation between parenting and children's development (Kim et al., 1999; Webster-Stratton, 1996).

The current study is also limited by its focus on the family. We elected to examine several family-based risk factors for which there is evidence of amenability to intervention to ask whether such interventions should be differentially targeted among boys versus girls. We recognize, of course, that there are multiple points of potential intervention in the treatment and prevention of children's externalizing behaviors, including other aspects of maternal behavior, such as monitoring (Dishion, Bullock, & Granic, 2002; Pettit et al., 2001), fathers' parenting and psychopathology (Bronte-Tinkew et al., 2007; Kim et al., 1999; Webster-Stratton, 1996), marital discord or conflict (Drabick, Beauchaine, et al., 2006; Grych, Fincham, Jouriles, & McDonald, 2000; Spence et al., 2002), children's relations with peers (Diener & Kim, 2004; Luthar & D'Avanzo, 1999; Mrug, Hoza, & Bukowski, 2004; Prinstein, Boergers, & Vernberg, 2001; Rudolph & Heller, 1997; Werner & Silbereisen, 2003), and the school and neighborhood contexts in which children develop (Gorman-Smith & Loeber, 2005; Kroneman, Loeber, & Hipwell, 2004; Mears, Ploeger, & Warr, 1998). Future research that examines alternative contextual processes could speak to the relative merits of considering proximal familial versus more distal contextual processes as predictors of childhood externalizing problems.

In addition, although we considered transactional processes among externalizing problems and parental variables, these processes operate concurrently and are intertwined. Thus, future research should evaluate alternative processes that may underlie or interact with the family variables considered herein. For example, child temperament likely influences maternal behaviors, although both temperament and maternal behaviors may be linked through passive genotype–environment correlations (Belsky, Hsieh, & Crnic, 1998; Reiss & Neiderhiser, 2000). In addition, maternal psychological problems are associated with other discordant family processes that may influence children's externalizing behaviors (Drabick, Beauchaine, et al., 2006), which suggests that maternal depression may influence children's behaviors through its effect on other aspects of family functioning. Indeed, child factors (e.g., temperament, genetic vulnerability) and contextual factors have been shown to interact

in predicting symptomatology (Bates, Pettit, Dodge, & Ridge, 1998; Steinberg & Avenevoli, 2000).

Parent–child interactions emerge at birth and have important effects on children’s behaviors over time; thus, developmentally sensitive operationalization and measures of these interactions are critical for understanding the influence of parent–child processes on children’s externalizing behaviors. Future research should consider alternative developmental time points along with developmentally relevant mechanisms. Consideration of these processes over time could inform our understanding of the complex processes that confer risk for externalizing symptoms as well as facilitate identification of alternative points of intervention.

A final limitation of the present study is the use of the broadband externalizing scale of the CBCL as the outcome of interest. Because this scale combines aggressive, destructive, and oppositional behaviors, we did not test whether there is specificity in predicting aggression versus other types of externalizing behaviors or in predicting particular types of externalizing behaviors, such as overt versus covert aggression or physical versus relational aggression. Future research should examine sex differences in the prediction of particular types of externalizing behaviors to determine whether there is specificity in prediction. In addition, the current analyses do not permit us to determine whether the sex differences seen here are specific to externalizing symptoms or might be representative of more general patterns of relations between parenting and child psychopathology. To distinguish between these two accounts, future research should examine sex differences in the relations among maternal depressive symptoms, parental behaviors, and other types of child psychopathology.

In conclusion, the results of the present analyses suggest both similarities and differences between boys and girls in the associations between maternal variables and child externalizing problems and indicate that sex differences are linked to particular developmental periods. For example, as children developed, there was a decrease in the effect of maternal depressive symptoms on boys’ externalizing symptoms and an increase in these effects among girls. Additionally, girls’ early externalizing symptoms were more strongly related to mothers’ later depressive symptoms than were boys’ early externalizing symptoms, highlighting the transactional relation between parent and child symptomatology. These results imply that the specific processes through which externalizing symptoms develop, and the ages at which children are vulnerable to risks, may differ in important ways among boys and girls.

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Appendix

Means and Standard Deviations of Key Variables From Listwise Deletion and Multiple Imputation of Data

Variable	Boys		Girls	
	Listwise deletion (<i>N</i> = 440)	Multiple imputation (<i>N</i> = 3,525)	Listwise deletion (<i>N</i> = 447)	Multiple imputation (<i>N</i> = 3,295)
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
Externalizing ^a	52.67 (8.36)	52.84 (8.47)	51.75 (8.30)	51.92 (8.38)
Intrusiveness ^a	1.50 (0.75)	1.59 (0.77)	1.33 (0.60)	1.40 (0.65)
Positive regard ^a	2.84 (0.70)	2.78 (0.70)	2.89 (0.69)	2.85 (0.71)
Depressive symptoms ^a	9.12 (8.74)	9.95 (8.73)	9.63 (8.29)	10.01 (8.17)
Externalizing ^b	48.05 (9.88)	48.62 (9.72)	49.04 (9.80)	49.15 (9.75)
Harsh control ^b	21.37 (3.13)	21.75 (3.25)	21.36 (3.38)	21.51 (3.38)
Hostility ^b	1.45 (0.79)	1.52 (0.83)	1.60 (1.04)	1.64 (1.00)
Respect for autonomy ^b	5.30 (1.09)	5.20 (1.14)	5.30 (1.20)	5.21 (1.20)
Supportive presence ^b	5.33 (1.26)	5.21 (1.32)	5.08 (1.46)	5.01 (1.44)
Depressive symptoms ^b	7.97 (8.31)	9.15 (8.34)	8.39 (8.37)	8.94 (8.09)

^a 24 months.

^b Grade 1.

Figure 1.

Proposed conceptual model of the relations among parental variables, maternal depressive symptoms, and child externalizing symptoms at 24 months and first grade. Autonomy = observer's rating of maternal respect for the child's autonomy; support = observer's rating of maternal supportive presence.

Figure 2.

Relations among parenting variables, maternal depressive symptoms, and child externalizing symptoms at 24 months and first grade. Unstandardized path coefficients for boys (and girls) are reported; lines in boldface represent significant sex differences. Error terms and covariances have been omitted for simplicity. Autonomy = observer's rating of maternal respect for the child's autonomy; support = observer's rating of maternal supportive presence; control variables = study site location. * $p < .05$. ** $p < .01$.

Table 1

Bivariate Correlations Among Study Variables

Variable	1	2	3	4	5	6	7	8	9	10
1. Externalizing ^a		.16**	-.12**	.33**	.45**	.17**	.10**	-.18**	-.16**	.23**
2. Intrusiveness ^a	-.11**		-.31**	.22**	.16**	.26**	.27**	-.37**	-.31**	.20**
3. Positive regard ^a	.73**	-.13**		-.19**	-.07**	-.18**	-.18**	.25**	.33**	-.13**
4. Depressive symptoms ^a	-.65**	-.59**	.12**		.27**	.20**	.14**	-.25**	-.20**	.50**
5. Externalizing ^b	.24**	-.31**	-.32**	.13**		.25**	.07**	-.17**	-.13**	.27**
6. Harsh control ^b	.21**	.15**	-.18**	-.14**	.33**		.23**	-.35**	-.36**	.17**
7. Hostility ^b	.20**	.18**	.09**	-.20**	-.14**	.49**		-.55**	-.53**	.14**
8. Autonomy ^b	-.16**	-.04*	-.12**	-.19**	.27**	.32**	-.14**		.68**	-.18**
9. Support ^b	-.27**	.20**	.14**	.27**	.32**	-.37**	-.28**	.17**		-.11**
10. Depressive symptoms ^b	.17**	-.11**	.18**	.49**	.19**	.06**	-.14**	-.15**	.28**	

Note. Correlations for boys are below the diagonal, and correlations for girls are in boldface and above the diagonal.

^a24 months.

^bGrade 1.

* $p < .05$.

** $p < .01$.

Table 2

Effects of Study Site on Externalizing Behaviors in First Grade

Site location	<i>B</i>	
	Boys	Girls
1	−0.88	−1.09
2	0.81	0.92
3	−1.77	−2.69
4	−2.93	−1.28
5	−3.42	−1.76
6	−2.90	−1.85
7	−1.81	−1.24
8	−1.16	−0.64
9	0.92	0.89

Note. No effects of study site location on externalizing behavior were significant.