The Role of the Shared Family Context in Differential Parenting

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This article examines the role of the shared family context in understanding differential parental treatment of children. Child-specific and family-context predictors of differential parental positivity and negativity were examined using multilevel modeling in a population of 8,476 children nested in 3,762 families. Child age was the strongest child-specific predictor of positivity and differential positivity. Lower socioeconomic status (SES), marital dissatisfaction, and larger family size were associated with higher levels of differential positivity. There was evidence of potentiation when risks were combined. Children’s temperament was associated with parental negativity and differential negativity. The strength of this association was moderated by SES. Mixed-gender sibling families with marital dissatisfaction and children in single-parent families received the highest levels of differential negativity. The findings are discussed in the context of shared and nonshared environmental influences on development.

Plomin and Daniels (1987) suggested in a seminal article that differential treatment by parents of children within the same family might account for why siblings are very different from one another both on adjustment indices and in personality. The article precipitated interest in the phenomenon of differential parental treatment and in the consequences of differential parental treatment for children’s development (Turkheimer & Waldron, 2000). Although equitable treatment of children within the same family has been put forward by early family theorists as the ideal (Parsons, 1942/1974), it is clear from recent studies of parent–child interaction that parents do treat siblings very differently. Two aspects of differential parental treatment have been investigated: differential positivity and differential negativity. differential positivity refers to one child in the family receiving more positive affect, engagement, and involvement from the parent than another child in the family. differential negativity refers to the parent directing more affectively negative behavior toward one child than toward another. The premise within this literature is that differential parental treatment of children is a negative phenomenon (Hetherington, Reiss, & Plomin, 1994).

The finding that differential positivity and negativity have been found to predict children’s adjustment (McGuire, Dunn, & Plomin, 1995; Pike, McGuire, Hetherington, Reiss, & Plomin, 1996; Reiss et al., 1995) and also to predict changes in adjustment over time (K. Conger & Conger, 1994) offers some support for the assumption that differential parental treatment is a negative process in families. Thus, if two children in a sibling pair are treated very differently from one another, the child receiving more negativity and less positivity from the parent will show an increase in disturbed behavior over time. It should be noted, however, that although differential parental treatment has been found to play some role in sibling differences, its effects have been relatively small (Turkheimer & Waldron, 2000).

Reconsidering Shared Family Context Effects

Our interest in the present study was in identifying how shared family context influences differential parental treatment of siblings. Critical to our investigation was the distinction between child effects and shared context effects. Child effects can be understood as child characteristics such as age, gender, or temperament that affect how the parent relates to the child (Bell & Harper, 1977; Lytton, 1990; Plomin, 1994). In contrast, shared family context effects are defined as characteristics of the parent or the family context, such as socioeconomic status (SES) or marital conflict, that are shared by all children in the family. The reason for focusing attention on shared family context in this study is that there is some debate concerning the meaning and importance of the shared family context. That is, recent studies in the developmental and behavioral genetics literatures emphasize the importance of nonshared, or child-specific, environments. The effects of shared environment, including shared family environment, on children’s adjustment are thought to be minimal.

Several explanations have been suggested for the consistent finding that children within the same family are very different from one another once genetic effects have been taken into account (Plomin & Daniels, 1987). One possibility is that aspects of the environment that are shared between children in the same family have differential effects (Goldsmith, 1993; Turkheimer & Waldron, 2000). Another is that only minimal aspects of the environment are truly shared between siblings—hence the interest in the difference between siblings’ experiences (Turkheimer & Waldron, 2000). Both explanations have led away from a focus on the shared environment. Another possibility is that shared environmental effects do not influence children directly but instead exert indirect effects via their influence on nonshared aspects of the environ-
ment, such as differential parental treatment. In other words, the family context may increase or decrease the likelihood that children will be treated differently by their parents. By examining the relationship between shared context effects and differential treatment, using a method of analysis that has not been used widely in the analysis of family data, we aimed to refocus attention on the shared environment.

Previous studies of the sources of differential parenting have used a difference score as the measure of differential treatment. One limitation of the difference score is that because it is an aggregate score at the family level (the treatment of one sibling minus the treatment of the other sibling), child-specific and family-level predictors cannot be examined simultaneously (without an overly cumbersome analysis strategy involving creation of residualized scores prior to the creation of a difference score). When shared context effects were previously identified, because the analytic technique did not allow for a simultaneous estimation of child-specific and shared context effects, it is possible that some of the effect attributed to shared context may actually have been attributable to child-specific factors. Multilevel modeling, the analytic technique used in the present study, allows for the simultaneous estimation of shared environmental effects and child-specific effects.

The choice of child-specific predictors in this study was driven by the goal of estimating child-specific effects as comprehensively as possible. This mitigates against the potential interpretation that shared family context effects might be attributable to child-specific effects that had not been estimated. The age of the child and age differences between siblings are some of the most important child factors explaining why children within the same family are treated differently (Dunn & Plomin, 1990; Dunn, Plomin, & Daniels, 1986). Child age is inversely related to parental warmth and involvement (Brody, Stoneman, & Burke, 1987; Stevenson, Leavitt, Thompson, & Roach, 1988). The effects of age on parent–child relationship quality, however, may not be constant across families. For example, in a study of siblings approximately 2 years apart in age, McGuire et al. (1995) found that the degree of differential treatment experienced by children was markedly different across families. This finding suggests that the effect of children’s age on parenting may be moderated by family context factors, an issue explored in the present study. Child gender has also been shown to affect diverse aspects of parenting, including how parents talk to children (Cervantes & Callanan, 1998), the activities that are shared (McHale, Crouter, & Tucker, 1999), and the amount of time spent together (Harris & Morgan, 1991).

Another child characteristic that has been shown to explain differential parental treatment is temperament. Child temperament, especially irritability or negative affectivity, is known to elicit negative behavior and inhibit positive behavior both from parents and from strangers (Anderson, Lytton, & Romney, 1986). Many studies, including those using genetically sensitive designs, have shown this effect (Deater-Deckard et al., 2001), although moderators have also been identified in this relationship (Brody et al., 1987). The significant but still modest correlations between temperament and parent–child relationship quality indicate that parents vary in the degree to which their behavior is affected by child temperament.

Biological relatedness is another factor that may explain differential parenting (Hetherington, Henderson, & Reiss, 1999). Henderson and Taylor (1999) reported that biological parents exhibited more positivity, negativity, and monitoring/control toward biological children than toward stepchildren. Furthermore, differences in parenting of adolescent siblings were most marked if the parent was biologically related to one child but not the other. In other words, findings from the Nonshared Environment in Adolescent Development study indicated that biological relatedness accounted for differential parenting of children.

Family Context Factors That Explain Differential Parent–Child Relationships

The relationship between parental stress and less optimal parenting has been well established (Wahler & Dumas, 1989). Here we were interested in exploring whether parental stress is associated with increased differential parental treatment of children. This hypothesis was previously articulated by Henderson, Hetherington, Mekos, and Reiss (1996): “Parents have a finite amount of resources in terms of time, attention, patience and support to give their children. In families in which most of these resources are devoted to coping with economic stress, depression and/or marital conflict, parents may become less consciously or intentionally equitable and more driven by preferences or child characteristics in their childrearing efforts” (p. 47). We operationalized the stress/resources hypothesis using four contextual variables: SES, single parenthood, large family size, and marital dissatisfaction.

With respect to SES, previous studies have found that when economic resources are low, parenting problems in relation to individual children increase (R. D. Conger, Conger, Elder, & Lorenz, 1992; Hoff-Ginsberg & Tardif, 1995; Sampson & Laub, 1994). Parents from lower socioeconomic backgrounds exhibit more controlling and harsh behavior in disciplining their children and are less warm and less involved than parents from higher socioeconomic backgrounds. We are aware of only one other study that has examined the role of socioeconomic factors in differential parental harshness and warmth: Crouter, McHale, and Tucker (1999) found that both financial and relationship stresses were associated with increased differential parental treatment of siblings.

Marital conflict is another stress that taxes parenting resources (Cummings & Davies, 1994; Osnat & Burman, 1995). Marital conflict is positively associated with harsher discipline, less involvement, and more negative parent–child interactions (Cummings & Davies, 1994; Jenkins & Smith, 1991; Osnat & Burman, 1995). The coparenting alliance is disturbed such that parents are less supportive of one another’s parenting efforts (Gable, Belsky, & Crnic, 1992). The hypothesis that differential parenting increases as marital conflict increases has been supported in several previous studies (Deal, 1996; McHale, Crouter, McGuire, & Updegraff, 1995; Volling & Elins, 1998). As a means of satisfying emotional needs in a problematic marriage, a parent may build an alliance with a particular child, excluding other members of the family. As one child is pulled toward the parent, the differential treatment between children grows (Kitzmann, 2000; Minuchin, 1981).

Single parenthood and family size are both family structural variables that would be expected to limit parenting resources and increase stress. Although there is evidence that children in single-parent families experience more negative and less positive parenting (Hetherington & Clingempeel, 1992), it is not known whether single parenthood is associated with increased differential parent-
ing. Similarly, larger family size has been found to be associated with negative psychosocial outcomes in children, particularly delinquency (Farrington & Loeber, 2000). This may be because limited parenting resources are shared between too many people. Given that both single-parent family structure and large family size have been found to increase problems in the parent–child relationship in studies of between-families variation, it follows that these factors may increase differential parenting within families.

In addition, we also examined whether these risks potentiate one another and increase differential parenting multiplicatively or additively. Psychosocial risks have been found to combine multiplicatively rather than additively in the prediction of childhood disturbance (Rutter, 1979; Sameroff, Seifer, & Bartko, 1997). We extended this hypothesis to the prediction of differential parenting.

The final shared family effect that was investigated, one that does not imply stress on parenting resources, was the gender composition of the sibship. Harris and Morgan (1991) found that girls with brothers received more paternal involvement than girls with sisters. McHale, Updegraff, Jackson-Newsom, Tucker, and Crouter (2000) found that differential parental warmth was greater in mixed-sex dyads than in single-sex dyads, with girls receiving more warmth than boys. There is also evidence from studies assessing 1 child per family that gender-based parental negativity may become more marked under stressful family circumstances. Boys have been found in some studies to react more negatively to parental marital conflict and parental divorce than have girls (Cummings & Davies, 1994; Smith & Jenkins, 1991). Two predictions were made on the basis of the gender composition of the sibship. First, we expected mixed-gender sibships to receive more differential parental treatment than single-gender sibships. Second, we expected this effect to be most marked under high-stress conditions.

Is Differential Parental Treatment Necessarily Pathogenic?

Although differential parental treatment holds a negative connotation—the origins of which lie in explanations of differential psychopathology among siblings—it may be that not all aspects of differential parental treatment are pathogenic. One indication that this may be so is the relatively small effect size for differential parental treatment in the explanation of differences in sibling adjustment (Turkheimer & Waldron, 2000). It may be that the small effect is attributable to the confounding of benign and pathogenic influences within the same measurement. A second indication is that children make a distinction between unfair and fair differential treatment by parents. Kowal and Kramer (1997) found that when differential treatment was perceived by children, 75% of the time it was not seen as unfair. Children gave justifications for differential treatment that involved factors such as age, personal attributes, and the differential needs of their siblings. Furthermore, McHale et al. (2000) found that children’s ratings of the fairness of differential parental treatment were stronger predictors of children’s outcomes than were ratings of the actual difference in treatment that they received. Finally, differential parental treatment may be pathogenic only when it is more severe and consistent across the family system (O’Connor, Hetherington, & Reiss, 1998). Although the focus of the present article is not on the effect of differential treatment, but rather on an identification of the sources of differential treatment, this distinction is relevant to our concern. Effects of differential parental treatment may be moderated by the factors that explain it. Identifying such factors is an important step in the process of differentiating benign and pathogenic effects of differential parental treatment.

Methodological Advantages of the Current Study

The design of the present study provided several advantages over previous investigations of the sources of differential parenting. First, previous studies of differential parenting have been based on modestly sized samples of convenience. The sample used in the present study was that from the National Longitudinal Survey of Children and Youth (NLSCY), a large, nationally representative sample of Canadian children. Second, we used multilevel modeling for our analysis (Bryk & Raudenbush, 1992; Goldstein, 1995). The aim of this technique is to partition variance into different levels such that individual-level effects and context effects can be differentiated. This has the following advantages for the investigation of differential parenting. The within-family variance estimate is used as the measure of differential parenting rather than the difference score that has been used previously (Rovine, 1994). The within-family variance estimate has the advantage over the difference score of allowing for the inclusion of unlimited numbers of children in a family. Furthermore, multilevel modeling allows for the simultaneous examination of child-specific and shared family context effects. This is particularly important for ensuring that shared family context effects are not the result of underestimated child-specific effects.

Our first aim was to identify child-specific factors, such as child age, gender, and temperament, that explain differential parental treatment. If the association between these child-specific factors and parent–child relationship quality was found to vary across families, our second aim was to determine whether there are family-level factors that explain such variation between families. We hypothesized that in more stressed families, both temperament and children’s age would be more strongly associated with parenting. Our third aim was to test the hypothesis that shared family context increases the risk of differential parenting even after child-specific effects are controlled. We investigated two kinds of shared family context effects: stressful family circumstances and the gender composition of the sibship. We also predicted that stressful family circumstances would potentiate one another when combined such that levels of differential parenting would be higher when risks occurred together.

Sample

The NLSCY is a survey of the health and well-being of approximately 22,800 children across Canada. This representative sample includes children ranging in age from newborn to 11 years old, and children are followed up every 2 years. A particularly novel feature of the Wave 1 sampling is that up to 4 children per family were involved in the study, although only a maximum of 2 children have been followed up in subsequent waves. Sampling was carried out using the Labour Force Survey and the National Population Health Survey. For details of the sampling, see

1 This survey is being carried out by Statistics Canada. The data set is available for use by developmental researchers. Although there have been published analyses dealing with family circumstances and children’s outcomes (Willms, 2002), differential parenting and determinants of differential parenting have not been a focus of investigation.
NLSCY (1995b). All children between 0 and 11 years old who resided in the household were included in the study up to a maximum of 4 children per family. The person most knowledgeable (PMK) about the child was interviewed in the home. In 92% of cases this was the mother. 2 Interviews lasted approximately 2 hr and covered a range of issues, from childhood behavior and physical health to parental employment, health, and other areas of family and individual well-being. For this study, children between 4 and 11 years of age were included in the analysis of differential parenting. This was the largest age range that it was possible to include, because measures for some key variables were different or nonexistent for children between infancy and 4 years of age. To be included in the subsample that made up the sample for this study, children had to have a sibling within the age range, be living with at least one biological parent, and be 4 years of age or older. 3 These criteria gave us a sample of 8,476 because measures for some key variables were different or nonexistent for behavior and physical health to parental employment, health, and other variables were not differentially affected, for the analyses presented all middle children were combined into one category. Youngest is treated as the reference category in the analyses.

Children’s negative affectivity. Temperament assessed with a traditional temperament measure was available only for infants in the NLSCY database. However, questions about negative affectivity were asked of the PMK about all children between 4 and 11 years of age. The PMK was asked the following six questions: “How often would you say that [child’s name] ... is not as happy as other children?” “... is too fearful and anxious?” “... is worried?” “... is unhappy, tearful, or distressed?” “... is nervous, high-strung, or tense?” Replies were rated on a 3-point scale (never or not true, sometimes or somewhat true, and often or very true). The final negative affectivity item was “When another child accidentally hurts [him or her], such as bumping into [him or her], how often would you say that [child’s name] assumes that the other child meant to do this and then reacts with anger and fighting?” This item was rated on a 3-point scale as described above. Internal consistency was .77. Fewer than 3.2% of cases were missing data, and they were replaced by the mean score. The mean for the scale was 1.35 (SD = 0.33), and the scale was centered for all analyses.

Biological relatedness to mother and father. The mother’s and the father’s biological relationship to the child were coded on the basis of the PMK’s report. There were 149 children living with their nonbiological mothers and 1,336 children living with their nonbiological fathers. SES. This variable was calculated by Statistics Canada and was based on the education and occupation of the PMK and spouse (if relevant) and on household income (NLSCY, 1995b). These data are presented as z scores. Values below −2 at the lower end and of 1.75 at the upper end were recoded to −2 and 1.75 by Statistics Canada to reduce the possibility that individual families could be identified. Fewer than 1.3% of cases were missing data.

Marital dissatisfaction. PMKs were asked, “All things considered, how satisfied or dissatisfied are you with your marriage or relationship with your partner?” Responses were rated on an 11-point scale ranging from completely dissatisfied (0) to completely satisfied (11). The distribution was highly skewed. Over 91% of the scores were between 8 and 11, with very low frequencies for scores from 7 down to the lowest value. The scale was recoded into a dichotomous variable coding the bottom 9%.

Positive and negative parenting. In the NLSCY, the PMK was asked to rate himself or herself on a 5-point scale (1 = never, 5 = many times each day) on a range of parenting variables describing affection in the parent–child relationship, positive interaction, punishment, and hostility. These original items were drawn from existing parenting instruments (NLSCY, 1995a). These items were factor analyzed, and three factors emerged that accounted for approximately 40% of the variance: Hostile/Ineffective, Consistency, and Warmth/Involvement (NLSCY, 1995b). The factor score was derived using the weighted items outlined below. This article deals with the Hostile/Ineffective scale, which we subsequently refer to as the Negativity scale, and the Warmth/Involvement scale, which we refer to as the Positivity scale.

The Positivity scale was based on the following items: “praises child,” “talks or plays while focusing attention on child for 5 min or more,” “laughs with child,” “does something special together that child enjoys,” and “plays sports or hobbies together.” The internal consistency (α) of this scale was .81.

The Negativity scale was based on the following items: “gets annoyed with child for disobedience,” “propagation of praise when talks to child” (reverse scored), “propagation of disapproval when talks to the child,” “gets angry when punishing child,” “feels type of punishment depends on mood,” “has problems managing the child in general,” and “has to discipline repeatedly for the same thing.” The internal consistency (α) of this scale was .71.

Both the Negativity and Positivity scales are based only on questionnaire measurement, and information was collected from only 1 informant, as has been done in many of the large survey studies (Glasgow, Dornbusch, Troyer, Steinberg, & Ritter, 1997). The parenting scales have been found to relate to other aspects of child and parent functioning as expected. For instance, parental negativity has been found to relate to children’s reports of delinquent behavior (Sprott, Jenkins, & Doob, 2001) as well as to teacher reports of children’s behavioral problems, both contemporaneously and over time (O’Connor & Jenkins, 2000).

Children’s age. Children’s age was reported in years and was obtained from PMK report. The mean age of the children was 7.46 years (SD = 2.19), and age is centered for the analyses.

Sibling position in the family. The following dummy codes were derived from the household information about the children who were in the family. Oldest refers to children who had no older sibling living in the household, youngest to children who had no younger siblings, and middle to children in 3- or 4-child families who had both an older and a younger sibling. Middle youngest and middle oldest were maintained as separate categories for the initial analyses, but because children in these sibling positions did not differ from one another and because relationships with other variables were not differentially affected, for the analyses presented all middle children were combined into one category. Youngest is treated as the reference category in the analyses.

2 Preliminary analyses comparing the family characteristics of maternal and nonmaternal PMKs revealed that families of nonmaternal PMKs had higher SES and smaller families than did families of paternal PMKs. To ensure that the inclusion of data from nonmaternal PMKs did not alter our conclusions, we re-ran the analysis excluding families for whom the parental informant was not the mother. Substantive results for all fixed and random effects for positivity and negativity were the same with one exception, which is described in Footnote 6. Because the sample including nonmaternal parental informants was more representative than the sample excluding these families, the main results are reported for maternal and nonmaternal parental informant combined.

3 The sample that we investigated was higher in SES, (z = 4.6, p < .001), had fewer single parents, χ²(1, N = 22,831) = 35.5, p < .001, and had more children living with both biological parents, χ²(1, N = 22,831) = 14.7, p < .001, than the group excluded from the sample. This finding is expected with inclusion criteria that involve older children and larger families.
(values from 1 through 7) as dissatisfied and the rest as satisfied (91%). This cut-off point was used because it followed the natural cut of the distribution and allowed for the identification of an extreme group. All single parents were missing a score for marital dissatisfaction. In order to include these families in the analysis, we assigned them a code of 0 for marital dissatisfaction.

**Family size.** Interviewers asked about the number of children living in the home. All families with 4 or more children were recoded to a maximum value of 4 by Statistics Canada to reduce the chance that any individual family could be identified (NLSCY, 1995b).

**Single-parent status.** Single-parent status was coded as 1 if the PMK was living without a partner and as 0 if the PMK had a partner. There were 1,048 children living with single parents.

**Children's gender composition:** Boy sibships, girl sibships, and mixed sibships. Gender composition of the sibship was dummy coded into all-boy, all-girl, and mixed-gender sibships. All-boy families were treated as the reference category for all analyses. There were 1,969 boys in all-boy sibships and 1,760 girls in all-girl sibships.

**Missing Data**

Two sets of analyses were carried out to determine whether missing data had any effect on substantive results. First, because for many of our variables there were no missing data (family size, birth order, child age), and because for other variables data were missing in fewer than 5% of cases, we conducted analyses that included only those families for whom we had complete data. This resulted in a loss of approximately 4% of eligible cases (positivity analyses were missing 380 children; negativity analyses, 402 children). In the second set of analyses, mean values were substituted for missing data. No substantive differences in results were found between these two ways of handling missing data, and so the results are presented for families for whom no data were missing.

**Results**

The multilevel models were run using Mlwin, version 1.10.0006 (Rasbash et al., 2000). The aim of multilevel modeling is to be able to account for variance at different levels of effect. In this case we have two levels of effect. The Level 1 unit of analysis is the parental informants' positivity or negativity toward one particular child. The Level 1 variance estimate is an estimate of how differently children are treated within a family, and we refer to this subsequently as differential positivity or negativity. Higher values indicate more differential parental treatment of children within the family. The Level 2 unit of analysis is the parents’ mean score (for the parenting of all children in the family) for positivity or negativity. The Level 2 variance estimate indicates how parenting differs across families (between-families variance). Predictor variables are also categorized into Level 1 (child-specific) and Level 2 (family-level) predictors on the basis of how they were assessed. For Level 1 predictors, each child in the family has a unique score. For Level 2 predictors, all children in the family have the same score. Two kinds of effects are estimated in the models: fixed and random effects (described below). In the sections that follow we fit a series of models of increasing complexity to the data. Each model is compared with the previous model (using change in the log likelihood) to determine whether the addition of the new parameter(s) improves the fit of the model. Results for increasingly complex models (Models 1–7) can be found in Tables 1 and 2 for positivity and negativity, respectively. Fixed effects (divided into Level 1 and Level 2) are presented in the top part of the tables. Random parameters are listed in the bottom part of the tables and they are also divided into Level 1 (denoted with a w) and Level 2 (subscripted with a u). Significant parameters are marked with an asterisk.

**Positivity**

Model 1 is the null model (see Table 1, column 2). There are no predictor variables in this model. It simply shows us how much of the variance is at Level 1 (the within-family level) and how much is at Level 2 (the between-families level). If the null model reveals that the variance estimates are significant at Level 1 and Level 2, then it is important to try to model (and explain) the variance at both levels. The intercept value in Model 1 (see Table 1, Fixed effects, Intercept) indicates that the mean for positivity across the sample is 12.51. In Table 1, the variance attributable to Level 2 (see Random parameters, Level 2) is labeled Intercept/intercept, and the Level 1 variance (see Random parameters, Level 1) is labeled Intercept/intercept. These estimates show how the variance is partitioned into Level 1 and Level 2. Fifty-seven percent of the variance in parenting is at Level 2, or between families (Level 2/Level 2 + Level 1 variance = 5.13/8.93), and 43% is at Level 1, or within families. Given this result it is clear that parents in different families differ considerably from one another, but it is also evident that within families, children are treated very differently.

In Model 2, Level 1 predictors (i.e., child-specific) were entered into the model as fixed effects (age, negative affectivity, child gender, biological relationship to mother and father, child position). The fixed effects demonstrate the average relationship between the predictors and the dependent variable and can be interpreted as coefficients in a multiple regression. Two questions are answered in this model. First, which Level 1, or child-specific, predictors predict positivity? This can be determined by examining the estimates and standard errors for Level 1 predictors. The coefficient is significant when it is approximately twice the size of the standard error. Age, the quadratic function for age, negative affectivity, not living with a biological father, and being a middle sibling were associated with significantly lower levels of positivity. For each 1 year of age, for instance, children received 0.49 fewer points on the positive parenting scale. Being an older child was associated with a significant increase in positivity.

The second question addressed by this model is the extent to which differential parenting is explained by the Level 1 (child-specific) predictors in the model. The Level 1 variance drops from 3.80 to 2.74, a drop of 27.8%. To determine which was the largest child-specific predictor of differential parenting, we entered each variable into the model separately and examined the drop in differential parenting (Level 1 variance). The drop in differential parenting was mainly accounted for by age (24% of the variance) and only weakly by other variables (e.g., 3% of the drop was attributable to child negative affectivity). It is notable that Level 1 variance diminished very little with the addition of the sibling position variables because within a family, child position and age are directly overlapping constructs.

In Model 3, we examined whether the relationship between child age and parental positivity varied across families. This analysis is best understood by imagining a regression line for each

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4 Output from these models has been posted on Jennifer M. Jenkins’s website: http://fcis.oise.utoronto.ca/~jjenkins.
Table 1

Fixed Effects Estimates (Top) and Variance–Covariance Estimates (Bottom) for Models of the Predictors of Positive Parenting

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
<th>Model 7</th>
</tr>
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<tbody>
<tr>
<td>Intercept</td>
<td>12.51 (0.04)</td>
<td>12.23 (0.07)</td>
<td>12.23 (0.07)</td>
<td>12.23 (0.07)</td>
<td>12.64 (0.11)</td>
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<td>-0.48* (0.02)</td>
<td>-0.44* (0.03)</td>
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<tr>
<td>Negative affectivity</td>
<td>-0.56* (0.08)</td>
<td>0.06* (0.01)</td>
<td>0.06* (0.01)</td>
<td>0.06* (0.01)</td>
<td>0.06* (0.01)</td>
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<tr>
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<td>0.05 (0.05)</td>
<td>0.04 (0.05)</td>
<td>0.07 (0.05)</td>
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<td></td>
</tr>
<tr>
<td>Not bio. mother</td>
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<td>-0.28 (0.26)</td>
<td>-0.28 (0.26)</td>
<td>-0.30 (0.28)</td>
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<tr>
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<td>0.37* (0.07)</td>
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<td>Middle sibling</td>
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<td>Level 2 (family)</td>
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<td></td>
<td>0.18* (0.06)</td>
<td>0.19* (0.06)</td>
<td>0.19* (0.06)</td>
</tr>
<tr>
<td>Marital dissatisfaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.43* (0.14)</td>
<td>-0.43* (0.14)</td>
<td>-0.43* (0.14)</td>
</tr>
<tr>
<td>Family size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.41* (0.08)</td>
<td>-0.42* (0.08)</td>
<td>-0.42* (0.08)</td>
</tr>
<tr>
<td>Single parent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.09 (0.19)</td>
<td>0.12 (0.19)</td>
<td>0.11 (0.19)</td>
</tr>
<tr>
<td>All-girl sibship</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.20 (0.13)</td>
<td>-0.18 (0.13)</td>
<td>-0.18 (0.13)</td>
</tr>
<tr>
<td>Mixed-gender sibship</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.25* (0.10)</td>
<td>-0.24* (0.10)</td>
<td>-0.24* (0.10)</td>
</tr>
<tr>
<td>Family Size × Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.06* (0.03)</td>
</tr>
<tr>
<td>Level 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept/intercept (σ_u0^2)</td>
<td>5.13* (0.17)</td>
<td>4.87* (0.15)</td>
<td>4.92* (0.15)</td>
<td>4.86* (0.15)</td>
<td>4.79* (0.14)</td>
<td>4.78* (0.14)</td>
<td>4.78* (0.14)</td>
</tr>
<tr>
<td>Age/age (σ_u1^2)</td>
<td>0.09* (0.01)</td>
<td>0.09* (0.01)</td>
<td>0.09* (0.01)</td>
<td>0.09* (0.01)</td>
<td>0.09* (0.01)</td>
<td>0.09* (0.01)</td>
<td>0.09* (0.01)</td>
</tr>
<tr>
<td>Age/intercept (σ_u10)</td>
<td>-0.04 (0.03)</td>
<td>-0.05 (0.03)</td>
<td>-0.05 (0.03)</td>
<td>-0.06* (0.03)</td>
<td>-0.06* (0.03)</td>
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<td></td>
</tr>
<tr>
<td>Neg. affect/neg. affect (σ_u33)</td>
<td>1.51* (0.46)</td>
<td>1.51* (0.46)</td>
<td>1.48* (0.45)</td>
<td>1.50* (0.45)</td>
<td></td>
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</tr>
<tr>
<td>Neg. affect/intercept (σ_u30)</td>
<td>-0.03 (0.20)</td>
<td>-0.02 (0.20)</td>
<td>-0.04 (0.19)</td>
<td>-0.04 (0.19)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neg. affect/age (σ_u11)</td>
<td>0.00 (0.05)</td>
<td>0.00 (0.05)</td>
<td>0.01 (0.05)</td>
<td>0.00 (0.05)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (w_0)</td>
<td>3.80* (0.08)</td>
<td>2.74* (0.06)</td>
<td>2.30* (0.07)</td>
<td>2.19* (0.07)</td>
<td>2.18* (0.07)</td>
<td>1.84* (0.10)</td>
<td>1.83* (0.10)</td>
</tr>
<tr>
<td>SES/intercept (w_1)</td>
<td>-0.23* (0.04)</td>
<td>-0.23* (0.04)</td>
<td>-0.23* (0.04)</td>
<td>-0.23* (0.04)</td>
<td>-0.23* (0.04)</td>
<td>-0.23* (0.04)</td>
<td>-0.23* (0.04)</td>
</tr>
<tr>
<td>SES/SES (w_2)</td>
<td>-0.17* (0.07)</td>
<td>-0.17* (0.07)</td>
<td>-0.17* (0.07)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital/intercept (w_3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.23* (0.10)</td>
<td>0.24* (0.10)</td>
<td>0.24* (0.10)</td>
</tr>
<tr>
<td>Marital/SES (w_4)</td>
<td>-0.29* (0.13)</td>
<td></td>
<td></td>
<td></td>
<td>-0.29* (0.13)</td>
<td>-0.29* (0.13)</td>
<td>-0.29* (0.13)</td>
</tr>
<tr>
<td>Family size/intercept (w_5)</td>
<td>0.11* (0.05)</td>
<td></td>
<td></td>
<td></td>
<td>0.11* (0.05)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>−2log likelihood</td>
<td>38,869.7</td>
<td>37,001.9</td>
<td>36,919.6</td>
<td>36,899.8</td>
<td>36,849.4</td>
<td>36,771.3</td>
<td>36,764.9</td>
</tr>
</tbody>
</table>

Note. Standard errors are in parentheses. Not bio. mother = not living with the biological mother; Not bio. father = not living with the biological father; SES = socioeconomic status; Neg. affect = negative affectivity; Marital = marital dissatisfaction.

*p < .05.

ith individual family that demonstrates the degree of relationship between age of children in the family and parental positivity. In this model, families differ not only in their intercepts, but they also differ in their slopes. In Tables 1 and 2, these effects are outlined under Random parameters, Level 2, and they are subscripted with a u. In Table 1, the parameter labeled Intercept/intercept (or σ_u0^2) shows the variation across the families’ summary line in their intercepts. The parameter labeled Age/age (or σ_u3^2) shows the variation across the families’ summary line in their slopes. The parameter labeled Age/intercept (or σ_u10) shows the family-level intercept/slope covariance. Standard errors are given in parentheses. The slope variance was significant, showing that families varied in the strength of the relationship between children’s age and parenting. For some families, a difference of, for instance, 3 years of age meant a sharp differential in the positive parenting that children within the family received. For others, the same age difference meant only a small differential in how the children were treated. The relationship between slope and intercept was not significant, indicating that families with steeper slopes did not also show lower or higher mean levels of positivity. The next issue addressed by this model tells us about differential parenting. The differences in child age/positivity slopes across families did explain a significant amount of differential parenting, as indicated by the 16% drop (0.44/2.74) in the Level 1 variance.

In Model 4, the coefficient for negative affect was also allowed to vary at Level 2 (the family level). In Table 1, under Random parameters, Level 2, the parameter labeled Neg. affect/neg. affect (or σ_u33) shows the variation across the families’ summary line in their slopes. We see from this that the relationship between children’s negative affectivity and parental positivity does vary significantly between families. The addition of the random parameter for negative affectivity does improve the fit of the model, which can be seen by comparing the change in the log likelihood at the bottom of Table 1 for Model 3 and Model 4. Within-family variance was reduced by 4.7%, demonstrating that allowing the association between negative affectivity and positive parenting to
In Model 5, the family-level predictors of SES, family size, and mixed-gender sibships significantly predicted the Level 1 variance estimate. The Level 1 variance estimate was a function of the family context and 2*log likelihood 42,689.7 41,303.2 41,254.3 41,240.4 41,178.1 41,170.7

Table 2: 
Fixed Effects Estimates (Top) and Variance–Covariance Estimates (Bottom) for Models of the Predictors of Negative Parenting

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>9.00* (0.05)</td>
<td>9.27* (0.08)</td>
<td>9.27* (0.08)</td>
<td>9.14* (0.12)</td>
<td>9.15* (0.12)</td>
<td>9.15* (0.12)</td>
</tr>
<tr>
<td>Level 2 (child-specific)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>−0.08* (0.02)</td>
<td>−0.08* (0.02)</td>
<td>−0.08* (0.02)</td>
<td>−0.08* (0.02)</td>
<td>−0.08* (0.02)</td>
<td>−0.08* (0.02)</td>
</tr>
<tr>
<td>Positive affectivity</td>
<td>4.03* (0.11)</td>
<td>4.01* (0.12)</td>
<td>3.99* (0.12)</td>
<td>4.00* (0.12)</td>
<td>3.89* (0.13)</td>
<td></td>
</tr>
<tr>
<td>Negative affectivity</td>
<td>−0.68* (0.06)</td>
<td>−0.68* (0.06)</td>
<td>−0.69* (0.07)</td>
<td>−0.67* (0.07)</td>
<td>−0.66* (0.07)</td>
<td></td>
</tr>
<tr>
<td>Girl</td>
<td>−0.59 (0.32)</td>
<td>−0.64 (0.32)</td>
<td>−0.56 (0.35)</td>
<td>−0.55 (0.35)</td>
<td>−0.55 (0.35)</td>
<td></td>
</tr>
<tr>
<td>Not bio. mother</td>
<td>0.49* (0.12)</td>
<td>0.45* (0.13)</td>
<td>0.55* (0.19)</td>
<td>0.58* (0.19)</td>
<td>0.56* (0.19)</td>
<td></td>
</tr>
<tr>
<td>Not bio. father</td>
<td>−0.15 (0.09)</td>
<td>−0.14 (0.09)</td>
<td>−0.13 (0.09)</td>
<td>−0.14 (0.09)</td>
<td>−0.13 (0.09)</td>
<td></td>
</tr>
<tr>
<td>Middle sibling</td>
<td>0.03 (0.09)</td>
<td>0.03 (0.08)</td>
<td>0.04 (0.09)</td>
<td>0.02 (0.09)</td>
<td>0.03 (0.09)</td>
<td></td>
</tr>
<tr>
<td>Level 2 (family)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SES</td>
<td>0.07 (0.07)</td>
<td>0.06 (0.07)</td>
<td>0.04 (0.04)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital dissatisfaction</td>
<td>0.56* (0.17)</td>
<td>0.58* (0.17)</td>
<td>0.58* (0.17)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single parent</td>
<td>−0.05 (0.23)</td>
<td>−0.07 (0.23)</td>
<td>−0.08 (0.23)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All-girl sibship</td>
<td>0.03 (0.16)</td>
<td>0.00 (0.16)</td>
<td>−0.01 (0.10)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed-gender sibship</td>
<td>0.13 (0.12)</td>
<td>0.11 (0.12)</td>
<td>0.11 (0.12)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SES × Negative Affectivity</td>
<td>−0.44* (0.16)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

Random parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 2 Intercept/intercept</td>
<td>7.72* (0.26)</td>
<td>5.91* (0.21)</td>
<td>5.83* (0.21)</td>
<td>5.80* (0.21)</td>
<td>5.81* (0.21)</td>
<td>5.81 (0.21)</td>
</tr>
<tr>
<td>Negative affectivity</td>
<td>3.92* (0.94)</td>
<td>3.90* (0.94)</td>
<td>3.93* (0.94)</td>
<td>3.89* (0.94)</td>
<td>3.82* (0.93)</td>
<td></td>
</tr>
<tr>
<td>Single parent</td>
<td>−0.01 (0.10)</td>
<td>0.00 (0.10)</td>
<td>−0.01 (0.10)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All-girl sibship</td>
<td>0.13 (0.12)</td>
<td>0.11 (0.12)</td>
<td>0.11 (0.12)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed-gender sibship</td>
<td>1.31* (0.59)</td>
<td>1.31* (0.60)</td>
<td>1.31* (0.60)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SES × Negative Affectivity</td>
<td>−0.44* (0.16)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Standard errors are in parentheses. Not bio. mother = not living with the biological mother; Not bio. father = not living with the biological father; SES = socioeconomic status; Neg. affect = negative affectivity; Marital = marital dissatisfaction.

*p < .05.

Vary across families explained a significant amount of differential parenting. The covariance between negative affectivity and age (see Random parameters, Level 2, Neg. affect/age, or $\sigma^{2}_{a_{\text{age}}}$) was not significant.

In Model 5, the family-level predictors of SES, family size, marital dissatisfaction, and single parenthood were entered into the model as fixed effects. We also entered the dummy variables for mixed-gender sibships and all-girl sibships (all-boy sibship was the reference category). The resulting coefficients are listed in Table 1 under Fixed effects, Level 2, SES, marital dissatisfaction, family size, and mixed-gender sibships significantly predicted positivity. For example, for a 1-unit increase in SES, positivity increased by 0.18 points. Children living with parents who were dissatisfied in their marriages received 0.43 fewer points on the positive parenting scale than did children whose parents were satisfied in their marriages. Also, children with only 1 sibling received 0.41 more points on the positive parenting scale than did children with 2 or more siblings. When mixed-gender sibship was compared with the reference category of all-boy sibship, mixed-gender sibships received 0.25 fewer points on the positive parenting scale. Girl sibships were not found to differ significantly from boy sibships in the positivity that they received. Single parenthood was not associated with level of positivity.

In Model 6, we explored the extent to which differential parenting (the Level 1 variance) was a function of the family context variables once child-specific effects had been taken into account. Single parenthood and sibship gender composition were not found to be significant predictors of differential positivity, and the random parameters for these variables were not retained in the model. The Level 1 random parameters are denoted with a $w$ in Tables 1 and 2. SES (see Table 1, Random parameters, Level 1, SES/intercept), marital dissatisfaction (see Random parameters, Level 1, Marital/intercept), and family size (see Random parameters, Level 1, Family size/intercept), were found to be significant predictors of differential parenting. The Level 1 variance estimate

$^{5}$ Although we tested for effects of being in a family of 2, 3, and 4 children separately, the marked difference in positive parenting was between having 2 children (coded 0) and having 3 or more children (coded 1). There was no significant difference between having 3 and having 4 children, and these categories were combined.
(see Random parameters, Level 1, Intercept/intercept) represents the average amount of differential positivity for a family of average SES, with 2 children, with no marital dissatisfaction. For a family with marital dissatisfaction, the variance estimate increases by $2 \times w_j = 0.46$, and for a large family, it increases by another $2 \times w_k = 0.22$. The combined effect of SES and marital dissatisfaction (see Random parameters, Level 1, Marital/SES) was also significant. Relevant statistical details of Models 5 and 6 are given in a footnote. 6

In Figure 1, differential parenting (Level 1 variance) is plotted as a function of SES (x axis) for larger and smaller families with and without marital dissatisfaction. The degree of differential treatment is greater in families with low SES than in families with high SES even after taking account of all other variables in the model. Both marital dissatisfaction and larger family size also increase the degree of differential parenting. Further, marital dissatisfaction is more strongly associated with differential parental positivity when SES is low than when SES is high. The model for the Level 1 variance was built up by adding each parameter to the model sequentially and examining the change in the log likelihood at each step. SES was added first and resulted in a drop in the log likelihood of 64, followed by marital dissatisfaction (4.7), family size (4.5), and the interaction between marital dissatisfaction and SES (3.9). Thus, associations between SES and differential parenting are strong, and the three other associations are smaller although still significant. It should be remembered when considering the results of Model 6 that child-specific effects had already been accounted for at the point at which shared family context effects were examined. This has two interesting implications. First, if such child-specific effects had not been taken into account in earlier models, the differential parenting estimates for SES, marital conflict, and family size would have been higher because they would have contained child-specific effects that had not been estimated. Second, child-specific effects can differentially explain within-family variance. For example, taking account of child age may reduce the differential parenting estimates associated with family size more than the differential parenting estimates associated with marital dissatisfaction. This would mean that children’s age explains more about differential parenting in large families than it explains about differential parenting in families with marital dissatisfaction. This is further discussed in the next model.

Results from Model 3 indicated that the child age/positive parenting slope varied across families. To examine whether any of our family-level variables (SES, family size, or marital dissatisfaction) explained differences in slope, we entered the interaction terms between these family context variables and child age. If these variables provide a good explanation of differences between families in child age/positive parenting slopes, there should be a large reduction in Level 2 random parameters. The only interaction term that was significant was the family size by age interaction term (see Table 1, Fixed effects, Level 2, Family Size × Age). This demonstrates that the relationship between child age and positive parenting does vary as a function of family size. The way in which family size moderates this relationship can be seen in Figure 2. It is possible to see that the relationship between children’s age and positive parenting is stronger in families with more than 2 children (the slope is steeper) than among families with 2 children. It should be noted, however, that even though this fixed effect was significant, the reduction in the relevant random parameters was negligible (see Table 1, Random effects, Level 2, Age/age and Age/intercept). This suggests that although the slope for age with respect to parenting does vary across families as a function of family size, other factors that are not in our model are likely to be more important in explaining the variation in the age slope across families. It is also possible that this failure to more fully explain the variation in the age slope across families reflects noise in the data. If we return to the issue raised in Model 6 that child-specific variables might explain differential parenting to a greater or lesser degree in different shared family contexts, the significant interaction term between age and family size shows us that age is important for understanding the amount of positivity that children receive in small and large families. The absence of a significant interaction term for marital dissatisfaction and age shows us that children’s age is not having a differential effect on

6 For the reasons described in Footnote 2, analyses were carried out that excluded data provided by nonmaternal informants. The only effect for which results differed was the random parameter at Level 1 for marital dissatisfaction (i.e., Model 6; see Table 1, Random parameters, Level 1, Marital/intercept). In the reduced sample, marital dissatisfaction was not associated with increased differential parenting on its own, although it was associated with increased differential parenting in combination with SES, as had been found in the main analysis.

7 The equation expressing Model 5 for positivity is as follows:

$$
\begin{align*}
\text{positivity}_i & = \beta_0 + \beta_1 \text{age}_i + \beta_2 \text{age}_i^2 + \beta_3 \text{negative affectivity}_i \\
& + \beta_4 \text{girl}_i + \beta_5 \text{not bio father}_i + \beta_6 \text{not bio mother}_i \\
& + \beta_7 \text{oldest}_i + \beta_8 \text{middle}_i + \beta_9 \text{ses}_i + \beta_{10} \text{marital}_i \\
& + \beta_{11} \text{family size}_i + \beta_{12} \text{girl-sibship}_i \\
& + \beta_{13} \text{mixed-sibship}_i + \epsilon_{0i} \\
\beta_{0i} & = \beta_0 + u_{0i} \\
\beta_{1i} & = \beta_1 + u_{1i} \\
\beta_{3i} & = \beta_3 + u_{3i} \\
\begin{bmatrix} u_{0i} \\ u_{1i} \\ u_{3i} \\ u_{5i} \end{bmatrix} & \sim N(0, \Omega_u) \\
\epsilon_{0i} & \sim N(0, \sigma^2_\epsilon)
\end{align*}
$$

where $i$ indexes child and $j$ indexes family. Thus variables with $ij$ subscripts are child-specific predictors, and variables with a single $j$ subscript are family-level predictors. The family-level random effects associated with the intercept, age, and negative affectivity are represented by $u_{0j}$, $u_{1j}$, and $u_{3j}$, respectively. The $3 \times 3$ covariance matrix of these family-level random effects is $\Omega_u$. The Level 1 (within-family) variance $\sigma^2_\epsilon$ is a measure of differential parenting, as described in the text. Model 6 differs from Model 5 in that the Level 1 variance is modeled. This allows us to explore the extent to which differential parenting changes from family to family as a function of the family-level variables SES, family size, and marital dissatisfaction. The equation for Model 6 is identical to that for Model 5 with the following additional line:

$$
\sigma^2_{\epsilon j} = w_0 + 2w_1 \text{ses}_j + 2w_2 \text{ses}_j^2 + 2w_3 \text{marital}_j \\
+ 2w_4 \text{marital} \cdot \text{ses}_j + 2w_5 \text{family size}_j
$$

For further details on fitting complex structure to the Level 1 variance, see Goldstein (1995, pp. 47–58).
parental positivity as a function of the amount of marital dissatisfaction in the home. Thus it is indeed the case that child-specific factors operate differentially across high-risk circumstances.

**Negativity**

Results for negativity are given in Table 2. Model 1 has no predictors in the model and simply shows the breakdown of the variance (see Random parameters, Level 2 and Level 1, Intercept/intercept) into Level 2 (7.7) and Level 1 (6.4). Fifty-four percent of the variance is at the family level. This means that siblings do get parented somewhat similarly (intraclass correlation = .54) when between-families variability is taken into account. It is also the case, however, that within-family variability is substantial, suggesting that negativity in the parent–child relationship does vary markedly across siblings.

Level 1 (child-specific) predictors were entered into Model 2, and the results can be found in Table 2 under Fixed effects, Level 1. Children’s negative affectivity was the strongest predictor of parental negativity. For a 1-unit increase in children’s negative affectivity, parental negativity increased by 4 points on the Negativity scale. Being a girl was associated with less parental negativity than was being a boy (0.68 fewer points on the Negativity scale). Parental negativity was significantly higher for children who were not living with their biological fathers (by 0.49 points on the Negativity scale). Children’s age was associated with parental negativity, with each year of age being associated with a drop of 0.08 points on the Negativity scale. Not living with the biological mother and birth order were not associated with parental negativity. When the child-specific variables are entered into the model, differential treatment (see Table 2, Random parameters, Level 1, Intercept/intercept) drops from 6.43 to 5.67, a reduction of 12%. To determine the largest child-specific predictor of differential negativity, we entered all Level 1 predictors into the model on the first step and removed one predictor variable from the model on the second step. The Level 1 variance was compared for each step (not shown in the table). The drop in Level 1 variance was mainly accounted for by child negative affectivity (9% of the variance) and secondly by gender of the child (2% drop), with effects for other variables being small. Although not living with the biological father was significant as a fixed effect, its entry into the model was associated with very little drop in Level 1 variance. This means that parenting in stepfather families is more negative than parenting in intact families (because the fixed effect is significant), but biological relatedness to the father does not explain why children within a family are parented differently.

In Model 3, the coefficient for children’s negative affectivity was allowed to vary at the family level. This meant that each

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8 To understand the role of gender more fully, we carried out two further analyses. We examined whether boys showed higher levels of negative affectivity than girls by treating negative affectivity as the outcome variable. This was found to be the case, with boys scoring 0.33 (SE = 0.01) higher on negative affect than girls. We examined whether the effect of gender on parental negativity was mediated by boys’ higher levels of negative affectivity by estimating the relationship between gender and negativity with and without children’s negative affectivity in the model. Although effects of gender were reduced when negative affectivity was in the model, the effect of gender remained strong. The coefficient (β) for gender dropped from .79 (SE = .08) to .67 (SE = .07) when children’s negative affectivity was added to the model. This suggests that although higher negative affectivity is one reason that boys receive more parental negativity than girls, it is not the only reason.

9 It seems counterintuitive that biological relatedness to the father does not explain within-family variability in parenting. The reason for this result is most likely methodological. Not living with the biological father, although assessed at a child-specific level, operates mainly as a family-level variable. In the majority of families, most siblings share their relatedness to their father with their other siblings. Because this variable does not vary within most families, it cannot explain within-family variability.
family was allowed to have its own slope. In Table 2, under Random parameters, Level 2, the Neg. affect/neg. affect parameter shows the variation across the families’ summary line in their slopes. Families were found to vary significantly in their slopes. This means that in some families, the relationship between children’s negative affectivity and parental negativity is strong, and that in other families, it is weak. There was a significant improvement to the fit of the model. This is evident if one compares the log likelihood between Model 2 and Model 3, shown at the bottom of Table 2. Under Random parameters, Level 2, the Neg. affect/intercept parameter shows the relationship between the family-level intercept and the slope. This parameter was significant and positive, indicating that parents who showed higher average parental negativity also showed a stronger relationship between children’s negative affectivity and parental negativity. In other words, parents who were more negative to their children were also likely to be more reactive (in terms of their own negativity) to the children’s negative emotions. This finding also explains differential parenting, because Level 1 variance drops a further 5%: This can be seen by subtracting the variance estimate (see Table 2, Random parameters, Level 1, Intercept/intercept) in Model 3 (5.36) from the same variance estimate in Model 2 (5.67) and dividing by the variance estimate for Model 2 (0.31/5.67 = 5%).

In Model 4, the family-level predictors were entered into the model as fixed effects. It can be seen from the fixed parameters (all listed in Table 2 under Fixed effects, Level 2) that only marital dissatisfaction was associated with increased negativity. Parental negativity was 0.56 points higher in families with marital dissatisfaction.

In Model 5, differential parental treatment (Level 1 variance) was modeled as a function of family context variables, once child-specific effects had been taken into account, to determine whether these family-level predictors were significant predictors of differential negativity. The random parameters for SES and family size were dropped from the model because they were not associated with differential negativity either singly or in interaction with any other variable. Single parenthood was found to be a significant predictor of differential negativity (see Table 2, Random parameters, Level 1, Single-parent/intercept). Marital dissatisfaction was associated with differential negativity but only in mixed-gender sibships (see Table 2, Random parameters, Level 1, Mixed gender sibship/marital). Children in mixed-gender sibships whose parents were dissatisfied in their marriages experienced significantly higher levels of differential negativity than did children in all-boy sibships whether or not they were exposed to marital dissatisfaction. All-girl sibships did not differ from all-boy sibships in parental differential negativity either by themselves (see Table 2, Random parameters, Level 1, All-girl sibship/intercept) or in interaction with marital dissatisfaction (see Table 2, Random parameters, Level 1, All-girl sibship/marital). The model for the Level 1 variance was built up by adding each parameter to the model sequentially and examining the change in the log likelihood at each step. Marital dissatisfaction was added first and resulted in a drop in the log likelihood of 27.2, followed by single parenthood (19.5), all-girl and mixed-gender sibships (10.2), and the interactions between marital dissatisfaction and all-girl and mixed-gender sibships (5.4). Estimates of differential

The resulting function used to describe how differential negativity changes from family to family is as follows:

$$\sigma_{i}^{2} = w_{0} + 2w_{\text{marital}} + 2w_{\text{single-parent}} + 2w_{\text{girl-sibship}}$$

$$+ 2w_{\text{mixed-sibship}} + 2w_{\text{girl-sibship} \cdot \text{marital}}$$

$$+ 2w_{\text{mixed-sibship} \cdot \text{marital}}$$

To examine how mixed-gender sibships differed from all-girl sibships, we also ran the analyses after changing the reference category from all-boy sibships to all-girl sibships. Mixed-gender sibships showed significantly more differential parenting than all-girl sibships, and although this difference was more marked in families with marital dissatisfaction, it was not significantly so.
negativity as a function of gender composition of the sibship and marital satisfaction are given in Table 3.

Model 6 further explored issues identified in Model 3. In Model 3, it was evident that the children’s negative affectivity/negative parenting slope varied across families. To examine whether any of our family-level variables explained differences in slope, we entered the interaction terms for these variables with children’s negative affectivity. If these variables provide a good explanation of the difference in slopes across families, then there should be a large reduction in Level 2 random parameters (see Table 2, Random parameters, Level 2, Neg.affect/relaffect and Neg.affect/intercept). The only interaction term that was significant was the SES by negative affectivity interaction term (see Fixed effects, Level 2, SES × Negative Affectivity in Table 2). The way in which SES affects this relationship can be seen in Figure 3. There is a stronger relationship between children’s negative affectivity and parental negativity among families of lower SES (solid black line) than among families of middle (dashed line) or high (dotted line) SES. It should be noted, however, that even though this fixed effect was significant, the reduction in the relevant Level 2 random parameters was negligible, as was found for positivity.

Discussion

The findings from this study of a representative sample of Canadian children between the ages of 4 and 11 years indicate that stressful family environments are associated with increased levels of differential parenting. As expected, differential parental treatment is also explained by attributes of individual children, but even after accounting for such child-specific effects, certain family environments are associated with higher levels of differential treatment. We begin by highlighting these contextual effects before discussing the child-specific effects. In the final section, we highlight the theoretical importance of these findings for our understanding of shared and nonshared environments.

Family-Level Effects on Differential Parenting

We found support for the hypothesis that when parenting resources are taxed, through stresses such as marital dissatisfaction, large family size, single parenthood, and low SES, children are treated more differentially by parents. It may be that when parents struggle with fewer basic resources, they respond by concentrating available resources on one child (Henderson et al., 1996). This may be because stress has two effects. On the one hand, it increases the need for support and comfort. On the other hand, it decreases people’s tolerance and ability to negotiate extra demands. In other words, one child may be experienced as comforting and another as more demanding, resulting in increased differential parenting. Differential positivity was best modeled by taking account of the individual characteristics of SES, family size, and marital dissatisfaction as well as the combined effects of SES and marital dissatisfaction. The role of socioeconomic factors in differential parenting has been previously described. Cruiter et al. (1999), investigating differential treatment in a sample of families with adolescent children, found that economic pressure and job satisfaction were associated with increased differential treatment. Although their study differed from the present study in several key respects, the role of socioeconomic factors was common to both. Although parents with more children have been found to be less positive with their children (Kidwell, 1981), the relationship between family size and differential positivity has not been demonstrated before. The ability of previous researchers to address effects of family size on differential parental treatment has been limited by the inclusion of only 2 children per family. By using within-family variance as the estimate of differential treatment, it is possible to include the treatment of more than 2 children in the estimate. In addition, the finding that marital dissatisfaction is associated with increased differential positivity, after child-specific characteristics are taken into account, supports the findings of other researchers (Deal, 1996; McHale et al., 1995; Volling & Elins, 1998) and suggests that stress in the marital relationship does make it more difficult to parent children equally.

There was also evidence that these stresses potentiated one another to increase differential positivity. Marital dissatisfaction was more strongly associated with differential positivity at low levels of SES than it was at high levels of SES. This can be understood as a special kind of moderation. In ordinary regression models, moderation refers to how the mean changes as a function of the combination of explanatory variables. In multilevel modeling, as well as modeling the mean (the fixed effect), we also model the variance. We can examine how the variance changes as a function of the combination of explanatory variables. It is evident from the parenting data presented here that when low SES and marital dissatisfaction occur together they potentiate one another and result in higher levels of differential positivity than would be expected if the effects were additive.

We also found that single parenthood and the interaction of marital dissatisfaction and gender composition of the sibship were associated with increased differential negativity. Single parents were not found to show a higher level of negativity than parents in intact families but rather to be more differential in the negativity that they did show. Parents in dissatisfied marriages showed higher levels of negativity as well as more differential negativity toward their children when they were parenting children in mixed-gender sibships. The fixed effect for gender indicates that boys are the target of more parental negativity than girls and thus that within the mixed-gender sibships, the boys’ experiences are more negative than those of the girls. Why are boys in mixed-gender sibships whose parents are dissatisfied in their marriages the target of more parental negativity? One possible interpretation of this is that boys react more negatively to problems in the marriage and that parents react in turn to the boys’ more problematic behavior when they compare their boys’ behavior with their girls’ behavior. An alternative explanation is that this effect is parent driven, with parents finding their boys more problematic than their girls, not because of the child’s behavior but because of the dynamics in the marriage.

Table 3

<table>
<thead>
<tr>
<th>Gender composition</th>
<th>No marital dissatisfaction</th>
<th>Marital dissatisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed-gender sibships</td>
<td>5.13</td>
<td>8.62</td>
</tr>
<tr>
<td>All-boy sibships</td>
<td>4.95</td>
<td>5.81</td>
</tr>
<tr>
<td>All-girl sibships</td>
<td>4.34</td>
<td>5.68</td>
</tr>
</tbody>
</table>
For instance, parents may be more likely to displace anger from the marital relationship onto boys than onto girls.

Families differed from one another in the degree of association between children’s age and positive parenting. Children’s age was a stronger correlate of parental positivity in larger families than in smaller families. When parenting resources are strained by having to care for more children, parents may prioritize on the basis of the perceived developmental needs of children.

There was also evidence that children’s negative affectivity had a stronger effect on parental negativity in some families than in other families. SES was a significant, but modest, factor in explaining why the association between children’s negative affectivity and parental negativity differed across families. In families with higher SES, the link between children’s negative affectivity and parental informants’ negativity was relatively weak. There are several possible explanations for this. First, it may be that this finding reflects a real difference between low- and high-SES parents. Parents in higher socioeconomic conditions may be less reactive to their temperamentally difficult children because of lower ambient stress (R. D. Conger, Ge, Elder, Lorenz, & Simons, 1994; Garner, Jones, & Miner, 1994) or because of different ways of attributing child misbehavior (Bugental & Johnston, 2000) such that some parents may make attributions about the endogenous or constitutional basis of child temperament that allow for a less negative reaction to the child. Alternatively, we cannot rule out the possibility that this is an effect of reporting bias. For example, parental informants in higher SES contexts may be more affected by social desirability in their responses and therefore be more likely to uncouple the child’s temperament from their own negative behavior. Follow-up studies using data from multiple sources are needed to reject the rater bias explanation.

Child-Specific Effects in Predicting Differential Parenting

Children’s age was the strongest child-specific predictor of differential positivity. Differences in age among the children in a family accounted for 24% of the differential positivity that parents showed. Other child-specific predictors were also important. Oldest children received more positivity than youngest children, and middle children received significantly less positivity than youngest children. These birth order variables did not reduce within-family variance because age effects and birth order effects within a family are confounded. Others have reported similar birth order effects (Kidwell, 1981), but because birth order was entered in this study only for reasons of demographic control, and because birth order effects have a long and contentious history in between-families designs (Ernst & Angst, 1983; Furman, 1995), we await reports from other general population studies that include within-family data before interpreting these results.

Child-specific effects were also important in explaining differential negativity. The more negative affectivity the child showed, the more parental negativity the child received. Our findings support those of Pike et al. (1996), who found that children within the same family who are more negative, irritable, or aggressive are more likely to receive more negative parenting even after genetic effects have been taken into account. Differential negativity was also explained by children’s gender. Boys were exposed to more negativity than girls, a finding that was not simply explained by the higher levels of negative affectivity in boys.

It is through the child-specific predictors that explain Level 1 variance that we are able to see which children within a family are likely to experience the higher degree of negativity or the lower degree of positivity when a shared family process is associated with increased differential parenting. Children who are older and who show more negative affectivity are the children within a family who receive less parental positivity. Boys and children showing higher levels of negative affectivity experience more parental negativity.

Parenting in stepfather families was more negative and less positive than parenting in families headed by two parents who were both biologically related to the children. This finding is
consistent with a previous report that found that mothers’ parenting may be compromised in stepfather families, perhaps especially in the early stages of the remarriage when there is a heightened level of strain (Hetherington & Clingempeel, 1992). We did not find that biological relatedness to the child explained differential parenting, however, a finding that is probably best explained methodologically. In our sample, we had too many children who shared their biological or nonbiological relatedness to their parents with their siblings and too few for whom there was meaningful within-family variability.

The findings for the present study suggest that differential parenting is likely to be made up of both normative and pathogenic influences. For instance, parents show more positivity to younger children because their developmental level requires it. Evidence from Kowal and Kramer (1997) suggests that this type of differential parental treatment may not be negatively experienced by children. When differences in positivity, however, are more driven by stress, they may be experienced by children as more arbitrary and less fair. These differences may represent the pathogenic elements of differential parenting.

Shared Environments

In this section, we argue that the method of differentiating between child-specific and family-level variance, and between child-specific and family-level predictors, has implications beyond the study of differential parenting. Our findings speak to a broader debate about shared and nonshared factors in development. These results show us that the differences in how parents treat siblings are attributable to aspects of family life shared by siblings. Most studies of child personality traits and behavior have shown a large role for nonshared environmental effects and a small role for shared environmental effects. In other words, children who are raised in the same environment are more unlike one another than like one another after their degree of genetic similarity has been taken into account. This has led investigators to assume that shared environments are relatively unimportant in children’s outcomes, a conclusion that may not be correct (Rutter, Silberg, O’Connor, & Simonoff, 1999). Although the designs of a behavioral genetic study and a multilevel family study are different, the conceptual meaning of shared and nonshared environments can be assessed in both (although operationalized differently). From the perspective of the debate concerning shared and nonshared environment, the key finding from this study is that attributes of the family that were shared by all siblings influenced the individual relationships that parents developed with their children (i.e., nonshared effects). If shared or family-wide environmental factors, such as SES or marital dissatisfaction, influence the relationship quality between individual parents and children, then to conceptualize parent–child relationships as either exclusively nonshared or child-specific is problematic.

These findings also highlight the methodological strengths of the multilevel approach for testing hypotheses about shared and child-specific environments and the relation between the two. Multilevel modeling provides a unique tool in clarifying processes of influence on children at different levels of the family environment. Moreover, multilevel modeling methods are also amenable to testing genetic hypotheses embedded in family studies. That is, with multilevel modeling it is possible to examine different types and levels of environmental influence for siblings with varying degrees of biological relatedness.

Limitations

One of the methodological limitations of this study is that we did not have observational measurements of parenting to complement our measures based on parental report. It is possible that rather than assessing what parents actually do with children we were measuring what they think they do. First, it should be said that population studies are usually based on survey methods that share similar limitations (Glasgow et al., 1997). Second, in other studies on the same sample, we have found that these same ratings of parenting predict changes in teacher-rated child behavior over time (O’Connor & Jenkins, 2000). Thus, even if these ratings represent what parents think they do, then what parents think they do predicts change in children’s behavior as rated by teachers. The findings on subjectively assessed constructs (child temperament, marital dissatisfaction) should be viewed with more caution than the findings for those constructs that were more objectively measured (family size, SES, etc.). The real association between these constructs may be inflated by the single-informant report. Although we should be cautious about findings derived from within-informant report, we have to weigh such caution against the value of the data reported. It would, of course, be almost impossible to collect observational ratings of parenting on a population of children as large or as representative as the population that is reported on in this article.

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