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Syndrome specificity and mother-child interactions: Examining positive and negative parenting across contexts and time

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Abstract

This study examined the extent to which child syndromes and observation context related to mothers' parenting behaviors. Longitudinal observations were conducted of parenting behavior across ages 3, 4, and 5 years during structured and unstructured activities. The 183 participants included mothers of children with autism spectrum disorders, cerebral palsy, Down syndrome, undifferentiated developmental delay, or typical cognitive development. Negative parenting behaviors were higher in structured activities and higher in mothers of children in all developmentally delayed groups. Positive parenting was higher in unstructured activities and especially high for mothers of children with Down syndrome. Despite differences found through direct observation of parenting children in different diagnostic groups, they are not as strong as syndrome-group differences found through more commonly used self-report questionnaires assessing domains like parenting stress.

Keywords

developmental disabilities; parenting behaviors; autism

In recent years there has been considerable attention paid to phenotypic characteristics of children with various syndromes associated with intellectual disability. There is evidence that the extent of child behavior problems varies with diagnostic syndrome (Eisenhower, Baker, & Blacher, 2005). Moreover, there is some evidence that these child characteristics are associated with parenting domains. For example, in samples of young children (Eisenhower et al., 2005) and young adults (Blacher & McIntyre, 2006) the presence of clinically significant behavior problems related strongly to mothers' reported stress. Little is known, however, about whether differences in child characteristics or syndromes translate into actual differences in parenting behaviors. Moreover, most studies of behavior challenges and parenting behavior in families with intellectual disability have relied on parental reports rather than on actual observations of parenting behavior.

In the present study, we focused exclusively on maternal behaviors in both structured and unstructured settings. The coding scheme allowed examination of mothers' affect and behaviors toward their children, in this case longitudinally at ages 3, 4, and 5 years. Children participating differed according to specific disability (autism spectrum disorder, cerebral palsy, Down syndrome) in comparison to children with undifferentiated developmental

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delay and to children with typical cognitive development. In this study, the variation in "context" allowed us to observe how parenting behaviors differed in a formal teaching situation (structured) and a play setting (unstructured); studies of parenting have rarely considered the effects of different contexts. We also could examine whether variations in parenting were related to disability (presence or absence) or according to specific disabilities.

Although there have been significant advances in our understanding of mother-child interactions (Bornstein, 1989; Cyr, Dubois-Comtois, & Moss, 2008; Gartstein, Crawford, & Robertson, 2008; Landry, Smith, Swank, & Miller-Loncar, 2000), very little of this knowledge was developed in the context of families raising children with specific developmental disabilities. More recently, however, parenting behavior in the context of a developmental disability has become a topic of interest (e.g., Ruble, McDuffie, King, & Lorenz, 2008; Rutgers, van IJzendoorn, Bakermans-Kraneburg, et al., 2007; Warren & Brady, 2007). A core variable highlighted in a number of studies is maternal responsiveness or sensitivity. Originally identified as a seminal variable in the study of typically developing infants, this construct has sparked research interest in the study of young children with Down syndrome and other disabilities (Slonims, Cox & McConachie, 2006; Venuti, Giusti, & Bornstein, 2008; Warren & Brady, 2007). At the minimum, maternal responsivity can influence language development, important for all children but especially for those with developmental disabilities or syndromes, such as autism, that can delay, or in rare cases, prevent language (Baker, Messinger, Lyons & Grantz, 2010.)

When examining the relation between specific syndromes and behavior it is important to distinguish between "direct" and "indirect" effects (Hodapp, 1997). Direct effects involve the ways in which a particular disorder predisposes individuals to show specific behaviors to a much greater degree (or in a greater percentage of individuals). Indirect effects involve the reactions of others to such etiology-related behaviors. Referred to as evocative genotype-phenotype interactions by Scarr and McCartney (1983), this position argues that a person's genotype evokes particular environmental responses, and also that people may actively seek environments that reinforce, or are compatible with, their genotype. Based on these hypotheses, individuals with specific syndromes may differentially impact their environments, and certain behavioral features within syndromes may set the stage for highly characteristic ways of interacting with others (Dykens & Hodapp, 2001). Although this study

In this study, we were particularly interested in whether mothers' parenting behaviors characterized as positive or negative would be influenced by syndrome-specific behaviors of their children, or by the presence or absence of a developmental disability in general. This aspect of parenting is particularly relevant for children with autism spectrum disorders, as there is some evidence that sensitive maternal parenting of toddlers at risk of autism can influence the onset of autistic-like behaviors at age three (Baker, Messinger, Lyons, & Grantz, 2010). Baker et al. (2010) examined unstructured mother-child interactions in 33, 18-month old children, 24 of whom were considered high risk because they had a sibling diagnosed with ASD, and 9 children had an older sibling who showed no signs of ASD. In this small scale study, the investigators suggested that the construct of maternal sensitivity differed as a function of child risk status. Thus, while parenting does not prevent or cause autism, parenting in the early years certainly matters.

Observational Research on Parent-Child Interactions and Autism

The behavioral phenotype of autism, specifically the qualitative impairment in social communication and heightened problem behaviors, may elicit specific interactive styles

from parents. In addition to the core diagnostic symptoms, children with autism frequently have serious maladaptive behavior, such as aggression, tantrums, and self-injurious behavior in response to routine environmental demands (Hastings & Brown, 2002). These maladaptive behaviors may contribute to the reported finding that mothers of children with autism experience higher stress than parents of children with other syndromes (Dabrowska & Pisula, 2010; Davis & Carter, 2008; Eisenhower et al., 2005; Hoffman, Sweeney, Hodge et al, 2009; Tehee, Honan, & Hevey, 2009, but see Rutgers et al., 2007 for an exception).

Beyond parenting stress, several researchers have asked whether parents of children with ASD behave differently in interactions with the child. Lemanek, Stone, and Fishel (1993) observed dyads of parent and children (aged 3 to 6 years) during a compliance activity. Parents of children with language impairment, mental retardation, or typical cognitive development (TD) did not differ on behaviors coded. Parents of children with autism, however, made significantly more use of structure and cue behaviors (i.e., verbal and nonverbal attention-getting, physical proximity, and nonverbal prompts). Similarly, Doussard-Roosevelt and colleagues (2003) found that in mother-child play sessions with preschoolers, mothers of children with autism used more physical contact, more high intensity behaviors, and fewer social verbal approaches than they did with their own TD children or with a separate group of TD children. Siller and Sigman (2002), observing mother-child interactions, found that mothers of children with autism synchronized their behaviors to their children's attention and activities as much as did mothers of children with developmental delays or TD, and that, with autism, higher levels of synchronization related to better joint attention and language years later.

Observational Research on Mother-Child Interactions: Down syndrome and Cerebral Palsy

Compared to parents of children with other types of disabilities, parents of children with Down syndrome generally report less stress and greater reward (Eisenhower, et al., 2005; Hodapp, Ly, Fidler, & Ricci, 2001). The Down syndrome phenotype is characterized by a pleasant personality and less maladaptive behavior than children with undifferentiated developmental disabilities, sometimes called the "Down Syndrome advantage." For example, compared to mental-age matched typically developing children, children with Down syndrome show higher rates of such rudimentary social behaviors as looking to the adult and smiling (Kasari, Mundy, Yirmiya, & Sigman, 1990).

Such sociable personalities may in turn influence parental behaviors. While one study (Johnson-Glenberg and Chapman, 2004) found that parental spoken words to children with Down syndrome were similar to those spoken by parents of TD children (e.g. mean length of utterance, number of different words, requests for labels), another study (Fidler, 2003) found differences in prosodic qualities (e.g. parents of children with Down syndrome raised their voice pitch significantly more than parents of children with other ID etiologies). There has been little study, however, of the affective quality of parent-child interactions between mothers and their children with Down syndrome. Moreover, Stoneman (2007) has demonstrated that some of what has been called the "Down syndrome advantage" is accounted for by to socioeconomic advantage (higher family income and mothers' education), an under-explored variable in considering parenting behavior. In the present study we include maternal education as a covariate in our analyses of parenting practices.

Children with cerebral palsy (CP) often have other disorders in addition to their motor impairment, such as intellectual, speech, visual, and perceptual disabilities (Aicardi & Bax, 1992). Eisenhower et al. (2005) found that children with CP and ID displayed high problem behaviors and their mothers reported high stress, a picture similar to children with autism

and their mothers. Yet children with CP palsy have been described as passive communicators, whose conversation partners tend to control and dominate interactions (Pennington & McConachie, 2001). It appears that children with CP may elicit distinct interactive styles.

Thus, a primary question of interest is whether there is a relation between specific syndromes of ID and child behaviors, and, if so, whether these syndrome-specific behaviors influence parenting behaviors. A number of studies have found that mothers of children with specific disabilities might be more likely than mothers of typically developing children to adopt a directive interactive style in response to the absence of clear and frequent signals from their children. In particular, research indicated deficits or delays in the interactive social signaling of young children and a correspondingly greater use of controlling or directive behavior by their mothers. Overall, however, this body of literature has not led to a broader understanding of parenting behaviors in relation to specific syndromes, in part because of design limitations, including inadequate comparison groups, data gathered at a single time-point, observation in only one specific context, and/or focus on one particular parent behavior. We explored whether specific syndromes differentially related to parenting behaviors and whether these differences were consistent over time and across task contexts.

In the present study analyses were guided by four primary questions: (1) Do positive and negative parenting behaviors differ according to whether the child has typical cognitive development or a developmental disability? The intent was to build upon evidence that mother-child interactions were influenced by the presence of a child with a developmental disability (DD). (2) Do positive and negative parenting behaviors differ by the mother-child interaction context (structured with task demands, unstructured free play) and/or across time? Reports of mother-child interactions have rarely considered the observation context and very few studies are longitudinal; (3) Do specific syndromes within developmental disabilities (e.g. autism spectrum disorder, cerebral palsy, Down syndrome) contribute unique variance? As noted earlier, comparisons between specific syndrome groups have not often examined actual parenting behaviors. (4) Are group differences in parenting behaviors, if found, accounted for by parent characteristics (e.g. mother education) or child characteristics (e.g. behavior problems)? While there are many mother and child characteristics that might account for some variance in coded interactions, we examined these two because they have been found to be important determinants of parenting and also because they significantly differentiated the syndrome groups initially.

Method

Participants

Participants were 183 families, recruited to take part in a longitudinal investigation of child and family factors thought to relate to development of psychopathology in children with delayed or typical development. This multi-site study enrolled families of children between 30 and 39 months of age from rural Pennsylvania (24%) and Southern California (76%). Children with developmental delays were recruited through community agencies serving persons with developmental disabilities. The selection criteria were that the child (a) receive a score of 30–75 on the Bayley Scales of Infant Development II (BSID II; Bayley, 1993); and (b) be ambulatory. Children with typical development were recruited primarily through preschools and daycare programs. The selection criteria were that the child (a) receive a score on the Bayley Scales of 85 or above, and (b) not be born prematurely or have any developmental disability. Children scoring in a borderline range, between 76 and 84 on the BSID-II ($n = 11$), were not included in the present sample.

For this study children were classified into five groups: autism spectrum disorders (ASD; *n* = 12), Down syndrome (DS; *n* = 10), cerebral palsy (CP; *n* = 9), undifferentiated developmental delay (UDD; *n* = 37) and typically developing (TD; *n* = 115). Children in the UDD group had no known genetic disorder, and thus had idiopathic developmental delay. Six children who did not meet criteria for any of these syndrome groups or who fell into more than one group (e.g., both autism spectrum disorders and cerebral palsy) were excluded from this sample. The classification of syndromes was based on diagnoses given by service agencies that specialize in identifying and serving children with developmental disability.

When the longitudinal study began, children with autism were excluded. The group of children labeled with “autism spectrum disorders” obtained this diagnosis between ages 3 and 5 years, and parents confirmed the diagnosis at later assessment points. Thus, although diagnoses were made in accordance with best practices in California and Pennsylvania, following the criteria of the DSM (APA, 2000), these children might be less symptomatic than those diagnosed with autism at or before age 3. However, since we were not able to obtain the actual diagnostic records or administer autism diagnostic measures (e.g. ADOS, Lord, Risi, Lambrecht et al., 2000; Lord, Rutter, DiLavore, & Risi, 2001), we conservatively refer to the group as having autism spectrum disorders (ASD). However, all children in the ASD group, as well as in the Cerebral Palsy, Down Syndrome, and Undifferentiated DD groups, had Bayley DQ scores at age 3 <= 75, indicating concomitant cognitive or intellectual disability.

Table 1 shows demographic characteristics of the sample by syndrome group status. Overall, children’s age at intake averaged 35.3 months (*SD* = 3.1) and 54% were boys. The participating families represented diverse racial/ethnic and socioeconomic backgrounds. Fifty-eight percent of the children were Caucasian, 16% were Latino, 10% were African-American, 3% were Asian-American, and 13% reported mother or mixed ethnicities. Recruitment initially focused on intact families, so most (85.5%) participants were married. Overall, 49.5% of the mothers graduated from college and 51.6% of families earned more than $50,000 annually.

In Table 1, besides developmental quotient, the syndrome groups differed significantly on child gender and behavior problems and on mother grade in school. All children with ASD were boys, whereas the other four groups showed approximately equal proportions of boys and girls. The ASD group scored highest on CBCL behavior problems. Because mother education and child behavior problems varied across syndrome groups, and because each of these variables was related to parenting variables, they were covaried in subsequent analyses involving diagnostic group.

Procedures

The Institutional Review Boards of the three participating universities (blinded for review) reviewed and approved the procedures. The initial measures of child developmental level were obtained at a home intake screening session, conducted when the child was between 30 and 39 months of age. Observations of mother-child interactions were obtained subsequently when mother and child visited the research centers for lab assessments at 36–39 months and again at 48 and 60 months.

Laboratory activities were an unstructured task (free-play) and structured tasks (clean-up and three problem-solving tasks). For the *free-play task*, the mother and child were brought into an observation room that contained age appropriate toys and the child was asked to play with the toys. The mother was told, “Please feel free to do anything you would normally do at home; simply act as if you are in your own living room.” This task was 10 minutes long

and was designed to be an unstructured activity with no demands. For the *clean-up task,* which followed the free-play period, the child was told that it was time to put all the toys away. The child was left with the mother to complete this activity. Thus, the clean-up task was a 3 minute structured activity with a specific task demand. The *problem solving task* had three parts: (1) a 2 minute easy task that should be completed with no or very minimal adult direction; (2) a 3 minute moderately challenging task that children at age three should be able to accomplish with a little help; and (3) a 5 minute difficult task that three year old children should not be able to accomplish completely, even with clear and significant adult assistance. The tasks were presented in order from easy to difficult. To accommodate differences in mental age the task battery for the children with TD was somewhat more complex than the one for the children with DD. Mothers were instructed to let their children try each task on their own, and then provide whatever help they thought was necessary in order to successfully complete each task. The problem solving tasks were designed to be structured activities with specific task demands.

At 3 years, the easy problem-solving task involved the child putting together a foam board puzzle (e.g., doghouse, telephone). The medium problem-solving task involved the child making a tower with Lego pieces. The difficult problem-solving tasks involved the child playing with a ball drop game and making the ball drop in a specific hole. At 4 years, the easy, medium, and difficult problem-solving tasks involved the child completing *Playful Patterns* puzzles (e.g., caterpillar, train, house). At 5 years, the easy and difficult problem-solving tasks involved the child copying a 2-dimensional design with blocks. The medium problem-solving task involved the child completing a challenging, but developmentally appropriate paper-and-pencil maze.

Measures

Bayley Scales of Infant Development II (BSID II; Bayley, 1993)—The BSID II is a norm-referenced, individually administered test to assess the developmental functioning of children aged 1–42 months. The Mental Development Index (MDI) is normed with a mean of 100 and a *SD* of 15. Bayley (1993) reported test-retest reliability for the MDI ($r = 0.91$); for the internal consistency of the MDI items, alpha ranged from .78 to .93; nine of the 17 coefficients equaled or exceeded .90.

Child Behavior Checklist for Ages 1 ½ – 5 (CBCL; Achenbach & Rescorla, 2001)—The preschool version of the CBCL has 99 items that indicate child problems. The respondent indicates, for each item, whether it is “not true” (0), “somewhat or sometimes true” (1), or “very true or often true” (2), now or within the past two months. The CBCL yields a number of scores, including a T score for total behavior problems, used here, with the mean set at 50 and a standard deviation of 10.

Parent-Child Interaction Rating System (PCIRS; Belsky, Crnic, & Woodworth, 1995; Fenning, J. Baker, B. Baker, & Crnic, 2007)—The PCIRS is a widely used rating system of parenting behavior. For this study, six dimensions of maternal parenting behavior were rated on five-point Likert scales (1 = not at all characteristic, 5 = highly or predominantly characteristic) that considered both the frequency and intensity of the mother’s expressed affect or behavior. Positive Affect indicates the degree to which mothers verbally and nonverbally expressed positive regard, warmth, and affection toward the child (e.g., hugging, kissing, praising). Negative Affect indicates the expression of negative affect, disapproval, and hostility through verbal means (e.g., harsh tone of voice) or nonverbal behavior (e.g., strained expression, look of disgust). Sensitivity indicates the degree to which the mother was “child-centered” and thus responded quickly, appropriately, and consistently to the child’s needs. Intrusiveness indicates parent behavior that was adult-centered rather

than child-centered. The intrusive parent sought to impose an agenda upon the child without regard to the child's signals and may have been overly stimulating or unable or unwilling to relinquish control. Detachment indicates maternal passivity or disengagement, represented by marked non-responsiveness and a lack of awareness of the child's needs. Stimulation of Cognition indicates parental attempts to foster the child's cognitive development at a developmentally appropriate level.

Observers were trained by watching videotaped lab observations until reliability was established, defined as reaching a criterion over 70% exact agreement and 95% agreement within one scale point with the criterion coder. Once an observer reached reliability, individual observers were paired to code the tapes. To maintain inter-reliability within and across contexts, a criterion coder was designated. Reliability was collected regularly (for 30% of the tapes). Kappa for inter-rater reliability was 0.71 (range = .68 – .77), which is considered acceptable (Fleiss, Cohen, & Everitt, 1969).

In order to represent the broader context of maternal parenting style and reduce the six dimensions of the PCIRS, a principal-components analysis with varimax rotation was performed. The analysis yielded two factors with eigenvalues over one. The first factor, named "positive parenting," included maternal positive affect (factor loading = .72) + sensitivity (.70) + stimulation of cognition (.77) and + detachment reverse coded (−.84,); it accounted for 46.5% of the variance. The second factor, named "negative parenting," included maternal negativity (.77) + intrusiveness (.92); it accounted for 30.1% of the variance. Our factor solution replicates the factors derived by other researchers who have used the PCIRS (e.g., Belsky, Hsieh, & Crnic, 1998; Crnic et al, 2005; Fenning et al., 2007).

On the basis of factor analytic results and data composition strategies used in other published studies using the PCIRS, we utilized these two factors to generate two composite scores for each age of measurement and task. The positive parenting composite variable was internally consistent (α = .78). The range of positive parenting for the sample was −2 to 14 (SD = 2.28). The negative parenting composite variable was internally consistent (α = .80). The range of negative parenting for the sample at the six settings was 2 to 10 (SD = 1.40). In this study, the codes for negative and positive parenting were quite reliable, and ranged from r = .45 to .60 across ages (a year apart) and different, developmentally appropriate tasks.

Results

Initial analyses addressed whether mothers' parenting behaviors differed across the two contexts (structured and unstructured activities), using correlations and paired t-tests. Data were then analyzed separately within parenting type and context, using 5 × 3 (diagnostic group by age) repeated measures analyses of covariance with four dependent variables (negative parenting during structured activities, negative parenting during unstructured activities, positive parenting during structured activities, and positive parenting during unstructured activities). Mother education and child behavior problems were entered in all analyses as covariates. Prior to analyses, the assumptions underlying repeated measures analysis of covariance (i.e., normality, homogeneity of variance, linearity, and multicollinearity) were checked. Results of the evaluations of all of these assumptions were satisfactory. Effect sizes are indicated by Eta, with .10 = small, .24 = medium, and .37 or greater = large. Obtained p values, rather than Bonferroni corrections, are reported.

Maternal parenting and child developmental status

Our first question asked if parenting scores differed for children with typical development vs. the four developmentally delayed groups combined. We contrasted these two groups on the parenting factors across the three timepoints. Negative parenting was higher in the DD

groups than in the TD group at all three timepoints in structured interactions (all p <.001, Cohen's d indicates large effects: .81 to .96) and in unstructured interactions (all at least p <. 01, Cohen's d indicates medium effects: .50 to .66). Positive parenting was lower in the DD groups for both structured and unstructured interaction contexts at child age 3 years (p <.05, Cohen's d −.53 and −.31), but did not differ at subsequent ages.

Maternal parenting and interaction context

Our next question asked whether parenting behaviors differed by observation context. To examine whether parenting was consistent across the two contexts, we examined six pairs of correlations, i.e., for negative and positive parenting between structured and unstructured settings at the ages of three, four and five years. Table 2 shows that all correlations between parenting in structured and unstructured contexts were significant, for negative parenting (all r = .60 or above) and positive parenting (all r = .66 or above). Thus, there were consistent between subject differences across contexts. However, paired t-tests, followed by Cohen's d for repeated measures, (Table 2) showed that parenting behavior levels differed by context. Cohen'd of .20 is considered small, .50 medium, and .80 large. Negative parenting was higher in structured situations; differences were significant at ages 3 and 4 years, with medium effect sizes. Positive parenting was consistently higher in unstructured situations; differences were significant at ages 3, 4, and 5, with moderate to large effect sizes.

Maternal parenting, interaction context, and diagnostic group

Our third question asked about syndrome specific parenting behavior across the five diagnostic groups. Table 3 and Figure 1 show the mean positive and negative parenting scores by syndrome group across ages 3, 4, and 5, in the structured and unstructured observation contexts. There were consistent differences by syndrome group, with the F across syndrome groups significant in 11 of 12 comparisons. Focusing on contrasts with the Autism group, post-hoc comparisons (indicated by superscripts in Table 3) for negative parenting were consistent in showing that the Autism group differed from the TD group, but did not differ from any of the other DD groups. Post-hoc comparisons for positive parenting were also consistent, but in showing that the Autism group did not differ from the TD group.

Our fourth question asked about possible effects of mother's education and child behavior problems on the diagnostic group, parenting, and context relationships. To examine syndrome specific parenting across the five diagnostic groups further, considering the impact of mother's education and child behavior problems, we conducted a repeated measures analyses of covariance, with parenting for each specific context at the three age points as the dependent variables, child diagnostic group as the independent variable, and mother education and child behavior problems covaried.

Maternal negative parenting during structured activities at 3, 4, and 5 years

We conducted a repeated measures analysis of covariance with negative parenting in the structured activity context at the three age points as the dependent variable, child diagnostic group as the independent variable, and mother education and child behavior problems covaried. The assumption of sphericity was satisfied, Huynh-Feldt Epsilon = 1.0. Table 4 (top) shows that there was a significant (p<.001) medium-sized between-subjects main effect for syndrome group after controlling for mother education (significant) and behavior problems (not significant). Mothers with more education had lower negative parenting scores.

There was a small but significant time effect, indicating that during these structured activities, negative parenting behavior decreased across the preschool years. This effect is shown clearly in Figure 1 (top), with all diagnostic groups decreasing similarly. Pair-wise

comparisons revealed that negative parenting behavior at 3 years was significantly greater than negative parenting behavior at 4 years, $p = .02$, and 5 years, $p < .001$. Also, negative parenting behavior at 4 years was significantly greater than negative parenting behavior at 5 years, $p < .001$.

Maternal negative parenting during unstructured activities at 3, 4, and 5 years

We conducted a repeated measures analysis of covariance with negative parenting in the *unstructured* activity at the three age points as the dependent variable, child diagnostic group as the independent variable, and mother education and child behavior problems covaried. The assumption of sphericity was satisfied, Huynh-Feldt Epsilon = 1.0. Table 4 (bottom) shows a significant (p<.001) medium-sized main effect for diagnostic group, after controlling for mother's education (not significant) and child behavior problems (significant). Subsequent pair-wise comparisons revealed that syndrome group differences during unstructured activities were generally the same as those during structured activities. Mothers of typically developing children expressed significantly less negative parenting behavior than mothers of children with ASD, Down syndrome, and undifferentiated developmental delays. Also, mothers of children with undifferentiated developmental delays expressed significantly less negative parenting behavior than mothers of children with ASD. The main effect of syndrome group is illustrated in Figure 1 (bottom). Neither the age main effect nor the age X diagnostic group interaction was significant.

Maternal positive parenting during structured activities at 3, 4, and 5 years

Two parallel questions and ANCOVAs addressed positive parenting. For structured activities Mauchly's test of sphericity showed that the within-subject factor of age did not meet the assumption of sphericity, therefore, the results were adjusted using the Huynh-Feldt correction. Table 5 (top), shows that main effects for diagnostic group were not significant after controlling for child behavior problems (not significant) and mother's education (a medium-sized effect, p<. 001); more educated mothers were more positive with their children in the structured teaching contexts regardless of diagnostic group. The relationship between child age and positive parenting was not significant, but the age by diagnostic group was significant (p = .007). This interaction, a medium-sized effect, is displayed in Figure 2 (top). Mothers of children with Down syndrome had a sharp increase in positive parenting during structured tasks from child age 3 to 5 years, while positive parenting by mothers of children in the other four groups changed little.

Maternal positive parenting during unstructured activities at 3, 4, and 5 years

The results for positive parenting during unstructured activities are shown in Table 5 (bottom) and Figure 2 (bottom). The assumption of sphericity was satisfied, Huynh-Feldt Epsilon = 1.0. There was a significant (p = .03) medium-sized main effect for syndrome group, after controlling for behavior problems (significant, p<.01) and mother's education (highly significant, p<.001). Here, too, mothers with higher education evidenced higher positive parenting. Pair-wise comparisons showed that during unstructured activities mothers of children with Down syndrome expressed significantly more positive parenting behavior than mothers of children in all other groups. Also, the diagnostic group X age interaction was significant (p=.02). The mothers of children in three groups decreased slightly over time in their positive parenting behavior during unstructured activities, while the behavior of mothers of children with Down syndrome and cerebral palsy stayed about the same.

Discussion

This study examined parenting behavior with children with developmental delays, either undifferentiated or falling into one of specific syndrome or diagnostic groups (i.e., autism, Down syndrome and cerebral palsy), in comparison to typically developing children. We examined behavior across two different contexts (i.e., structured activity with specific task demands, unstructured free play activity with no task demand) and longitudinally across three time-points (i.e., child ages 3, 4, and 5 years).

Our first question asked whether parenting behaviors differed according to whether the child had typical cognitive development or a developmental disability. There were indeed group status differences over time and across contexts for negative parenting, where all parents of children in the developmentally delayed group demonstrated more negative parenting behaviors. In contrast, though, positive parenting behaviors were lower for DD groups at age 3 only, in both structured and unstructured situations. This is a somewhat optimistic finding, though it may be accounted for by the increase in positive parenting demonstrated by the parents of children with Down syndrome, discussed further below.

One of the major foci of interest in this study was whether positive and negative parenting behaviors differed by the mother-child interaction context (structured with task demands, unstructured free play) and/or across time. The context clearly mattered. Mothers displayed positive parenting behaviors to a greater extent in the unstructured or free play context and displayed negative parenting behaviors more in the structured context. The contextual "draw" for certain types of parenting behaviors has methodological implications for researchers, as an examination of negative or positive parenting behaviors under only one of these activity contexts would have missed the context-specific effect.

We examined parenting by diagnostic group and child age within structured and unstructured activities. Maternal negative parenting in both contexts was lower in the typically developing group than in any of the disability groups. Moreover, the undifferentiated DD group was less negative than all three specific diagnostic groups in the structured context, and less than autism in the unstructured one. In structured activities, negative parenting decreased for all groups across the preschool years. One viable explanation for this fact is that by age 5, the children had spent time in the school context such as kindergarten, where demands for child compliance, attention and adaptive behavior increase dramatically (Eisenhower, Baker, & Blacher, 2005; McIntyre, Blacher, & Baker, 2006; Pianta & Stuhlman, 2004). Given that structured activities are more common in the school context than at home, it is possible that the children learned more compliance behaviors that were also exhibited in the parenting context, thus mitigating the need for negative parenting behaviors to appear.

Mothers of typically developing children may have displayed less negative parenting during structured activities in part because their children likely had fewer problem behaviors. Eisenhower, Baker & Blacher (2005), examining questionnaire data from the same groups of participants, found that overall rates of problem behavior in the syndrome groups were high, and that parenting stress covaried with the level of child behavior problems. However, in this study the Down syndrome group had low levels of behavior problems, and the mean score for this group did not differ significantly from that of the typically developing groups. On the other hand, the mean Bayley scores were similar for all of the syndrome groups, and lower than the undifferentiated delayed group. So, why, in the present study, did mothers of children with Down syndrome display higher levels of negative parenting behavior than mothers in the other groups? A possible explanation is that mothers of children with Down syndrome are probably the first to receive intervention, as this disability is identified at, or

shortly after, birth. Thus, these mothers may have learned behavioral techniques that appear to be more intrusive or directive, behaviors that load on the negative parenting factor in the PCIRS coding system. Indeed, Warren and Brady (2007) noted that overly directive statements can serve to redirect the child's attention. The lack of differentiation between appropriate direction and unnecessary intrusion is a limitation of this coding system as we employed it. We note, though, that this limitation characterizes many observational studies of parenting that include children who are not typically developing.

Maternal positive parenting in both activity contexts was also highest for mothers of children with Down syndrome, an effect interacting with age in the structured activities and a main effect in unstructured ones. In general, children with Down syndrome have been reported to be more compliant, with better self-regulation, and greater interest in people than those with autism (Adamson, Deckner, & Bakeman, 2010; Bieberich & Morgan, 1998). Children with Down syndrome may bring out positive parenting behaviors, such as verbal and nonverbal expressions of positive regard, warmth, and affection toward them (e.g., hugging, kissing, praising). There is also evidence of increased maternal sensitivity having an effect on play behaviors of children with Down syndrome. For example, highly sensitive mothers elicited more symbolic play in 3-year-old children with Down syndrome, suggesting that dyadic emotional availability is related to the quality of children's play (Venuti et al., 2008). The benefits of positive parenting also have been demonstrated with toddlers at risk for poor socio-emotional outcomes (Brophy-Herb, Schiffman, Bocknek et al., 2011). Thus, given the importance of warm and sensitive maternal responding for children's social, emotional, and behavioral development (Warren & Brady, 2007), it is noteworthy that mothers of children with Down syndrome in this study were markedly more positive than other mothers.

An interesting finding is the very strong relationships of mothers' education to positive parenting. Education entered significantly in all four ANCOVAs, but diagnostic group explained more variance in negative parenting whereas mother education explained far more variance in positive parenting. Mothers of children with Down syndrome often have socioeconomic advantages relative to parents of children with other types of developmental disabilities (Dykens, Hodapp, & Finucane, 2000; Stoneman, 2007), and this was the case in the present sample, although of course not true of all families with Down syndrome (Helff & Glidden, 1998.) There is a clear need to further examine socioeconomic variables, like education, as an influence on parenting behaviors not only for children with developmental delays but also those with typical development. In the past, studies have noted that low maternal education is strongly correlated with low maternal responsivity, and vice-versa (Yodor & Warren, 2001). In the future, researchers might consider possible mediators of this relationship between mothers' education and parenting behaviors.

There are at least three methodological points to consider when interpreting the present findings. First, the syndrome-specific group sizes were small, limiting statistical power to detect group differences. Although diagnostic group differences were found, further study with larger samples might reveal more subtle differences in parenting behaviors than we could find. Nevertheless, as we proposed initially, there was some differential effect of child cognitive level and behavioral characteristics on mothers' parenting. Second, the focus of this study was on maternal behavior, not child behavior, and the PCIRS coding system does not provide for coding reciprocity. Future studies that examine contingencies between parenting and child behaviors could help to clarify the meaning of certain parenting behaviors – such as directiveness/intrusiveness – in context. Third, observations of fathers' parenting behaviors were not obtained. In part this was a pragmatic decision because only mothers attended the center-based assessments. While some studies have found that mothers and fathers of typically developing children and of children with developmental delays

behave similarly in the parenting context (Crnic, Pedersen y Arbona, Baker, & Blacher, 2009), there is a clear need for more direct observational studies of fathers' parenting.

Despite these limitations, the present study represents an important step in understanding mothers' parenting behaviors with children who have developmental delays and, in particular, different specific syndromes. One clear methodological contribution is the use of direct behavioral observation of parenting behaviors, as so much of the parenting and disability literature is derived from questionnaire measures. The present observed differences in parenting behavior do not seem as striking as the diagnostic group differences found on self-report measure of domains like parenting stress (Dabrowska & Pisula, 2010; Davis & Carter, 2008; Eisenhower et al., 2005; Hoffman et al., 2009). Another methodological contribution is the longitudinal design, which afforded observational data across the preschool period. This methodology not only allowed us to examine the reliability of the parenting codes across time but also to chart their trajectories. A third methodological contribution was the observation of parenting within different activity contexts.

We note several important findings. First, negative parenting behaviors were more in evidence in structured/teaching situations while positive parenting behaviors were higher in unstructured/play situations. Second, mothers of preschoolers with developmental delays demonstrated more negative parenting and less positive parenting than mothers of preschoolers with typical cognitive development. Third, mothers of children with ASD, despite coping with the highest child behavior problems, showed as much positive parenting and no greater negative parenting than mothers of other children with developmental disabilities. Fourth, observed negative parenting was strongly related to child factors (developmental disability and behavior problems) whereas observed positive parenting was most strongly related to a mother factor (years of education).

Parenting and the family context are important for the development of a wide range of social behaviors in very young and school-age children (Baker & Crnic, 2009; Morris, Silk, Steinberg, Myers, & Robinson, 2007). Understanding parenting and adaptation of parents to the context of having a child with disabilities involves multiple processes (Crnic et al., 2009). Here, we have been able to examine one piece of the parenting puzzle. It is important to take syndrome specific behaviors into account when considering maternal behaviors that may affect child development over time. There are, of course, many intervening variables that could impact parenting, but here we showed the similarities and differences in mothers' behaviors over time, and across the context of several disability groups. Future family researchers might consider data collection from multiple modalities (e.g., observations plus questionnaires), in multiple contexts, across a longer time period, and with larger samples in order to understand better the family context of specific syndromes associated with developmental delays.

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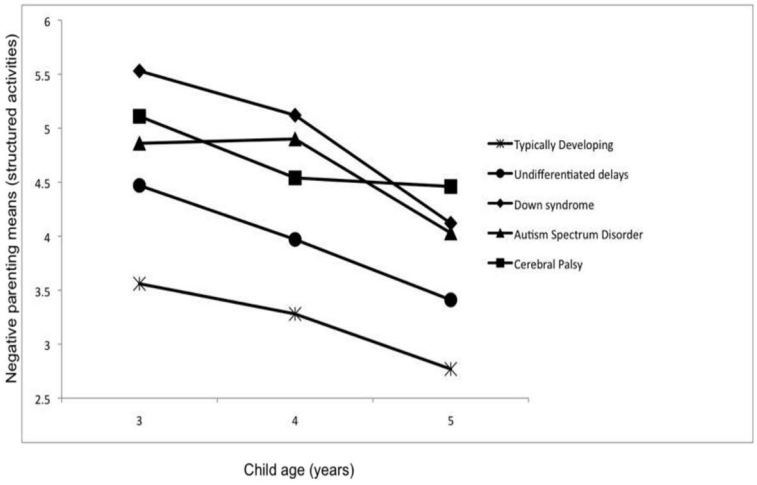

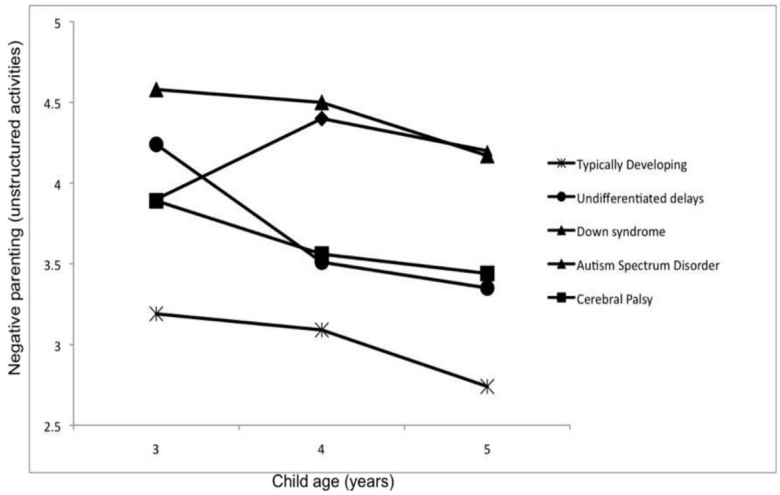

Figure 1.
Maternal negative parenting means (structured activities) and (unstructured activities) at child ages 3, 4, and 5 years. A repeated measures analysis of covariance was conducted, covarying for mother's education.

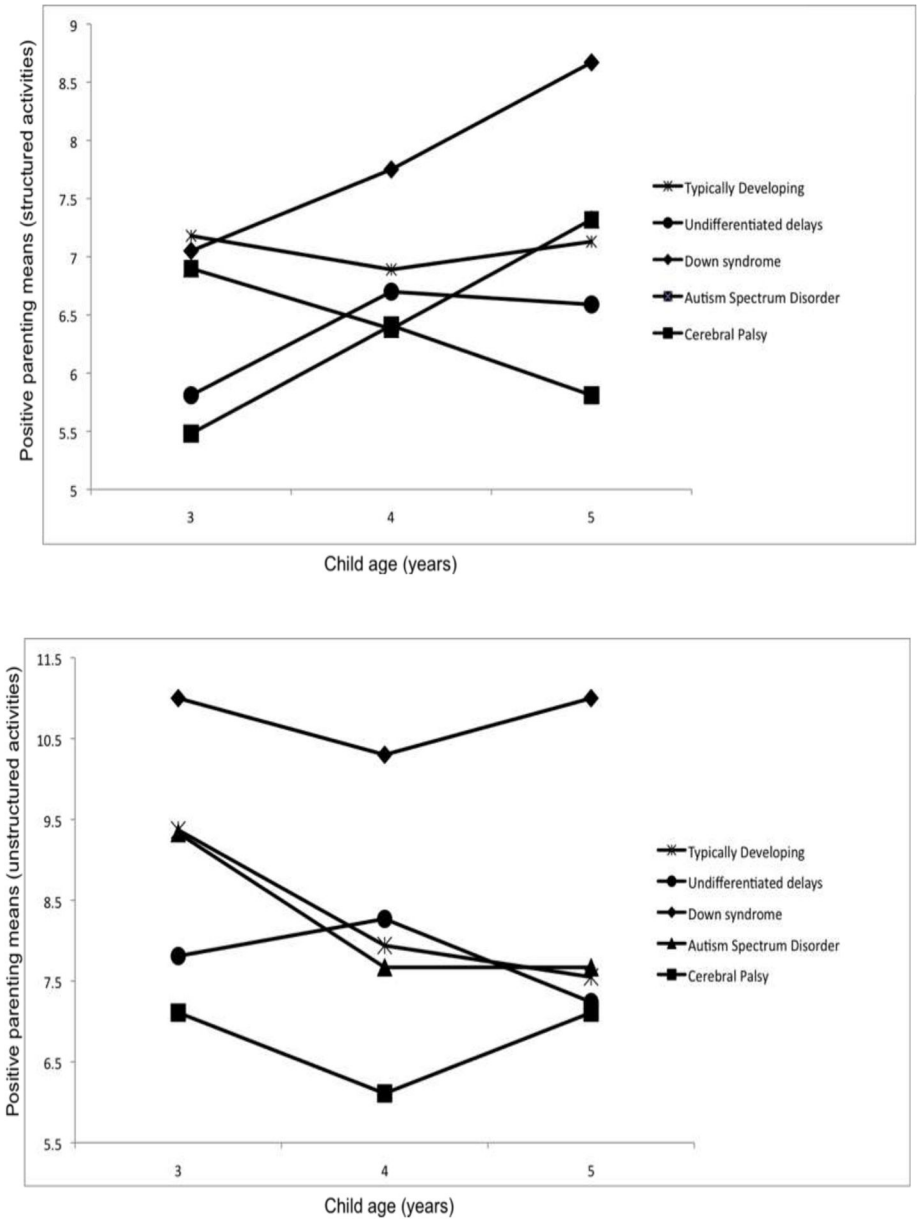

Figure 2.

Maternal positive parenting means (structured activities) and (unstructured activities) at child ages 3, 4, and 5 years. A repeated measures analysis of covariance was conducted, covarying for mother's education.

Table 1

Demographics by syndrome group at child age three years (N=183)

	ASD (n = 12)	CP (n = 9)	DS (n = 10)	UDD (n = 37)	TD (n = 115)	F or Chi Square
Child						
Mean age (SD) at testing (mo.)	35.6 (2.9)	35.3 (3.0)	35.1 (3.8)	35.6 (2.8)	34.8 (3.1)	F=0.60
Gender (% boys)	100.0	33.0	50.0	64.9	50.4	^{2} =14.05**
Race (%Caucasian)	75.5	44.4	60.0	54.1	60.9	^{2} =2.59
Siblings (% only child)	50.0	33.3	40.0	27.0	30.4	^{2} =2.64
Mean Bayley DQ Score (SD)	57.6^{ac} (8.7)	57.6 ^{ac} (6.4)	46.1^{a} (8.7)	63.8^{c} (8.2)	104.3^{b} (11.9)	F=179.46***
Mean CBCL Total T (SD)	63.2^{a} (10.8)	58.8^{ac} (10.1)	51.2^{bc} (11.1)	54.8^{ac} (10.2)	50.5^{bc} (9.9)	F=5.94***
Mother and Family						
Mother mean age (SD)	35.5 (6.0)	31.1 (5.8)	34.6 (5.3)	32.3 (7.1)	34.1 (5.8)	F=1.33
Mother grade in school (SD)	15.6	13.4	16.3^{ac}	13.9^{b}	15.7^{a}	F=5.72***
Mother employed (%)	58.3	44.4	30.0	59.5	61.7	^{2} = 4.59
Mother married (%)	83.3	55.6	90.0	78.4	87.8	^{2} =7.87
Family income (% $50K+)	50.0	33.3	50.0	40.5	58.8	^{2} =5.30

Note: ASD (Autism Spectrum Disorder); CP (Cerebral Palsy); DS (Down Syndrome); UDD (Undifferentiated Developmental Delay); TD (Typical Development)

Reading across rows, groups with different superscripts differed at $p < .05$ (Tukey statistic)

Table 2

Negative and positive parenting by activity context: structured vs. unstructured

Parenting/Age	Structured Mean (*SD*)	Unstructured Mean (*SD*)	Pearson *r*	Paired *t*-test	Cohen's d
Negative					
Age 3	4.00 (1.37)	3.57 (1.57)	.60***	4.51***	0.43
Age 4	3.69 (1.28)	3.37 (1.45)	.66***	3.85***	0.40
Age 5	3.14 (1.19)	3.08 (1.36)	.66***	0.80	0.08
Positive					
Age 3	6.79 (2.00)	9.03 (2.96)	.66***	−13.65***	−1.55
Age 4	6.84 (2.30)	8.03 (3.03)	.72***	−7.61***	−0.84
Age 5	7.03 (2.18)	7.68 (3.06)	.76***	−4.41***	−0.51

*** $p < .001$.

Table 3

Means, standard deviations, overall F, and paired comparisons by group at ages 3,4,5 years

Negative Parenting: Structured						
Age	**ASD**	**CP**	**DS**	**UDD**	**TD**	**F**
3 years: M (S.D.)	4.86^{b} (1.92)	5.11^{b} (0.98)	5.53^{b} (1.09)	4.47^{b} (1.22)	3.56^{a} (1.16)	12.39***
4 years	4.90^{cb} (1.85)	4.54^{cb} (1.43)	5.12^{c} (1.55)	3.97^{b} (1.19)	3.28^{a} (0.97)	12.79***
5 years	4.03^{b} (1.59)	4.46^{b} (1.71)	4.12^{b} (1.05)	3.41^{b} (1.33)	2.77^{a} (0.85)	11.40***

Negative Parenting: Unstructured						
Age	**ASD**	**CP**	**DS**	**UDD**	**TD**	**F**
3 years	4.58^{b} (2.19)	3.89^{ba} (1.17)	3.90^{ab} (1.29)	4.24^{b} (1.83)	3.19^{a} (1.34)	5.22**
4 years	4.50^{b} (2.20)	3.56^{ab} (1.33)	4.40^{b} (1.71)	3.51^{ab} (1.68)	3.09^{a} (1.15)	4.66**
5 years	4.17^{b} (1.03)	3.44^{ab} (1.33)	4.20^{b} (1.69)	3.35^{ab} (1.50)	2.74^{a} (2.74)	6.41***

Positive Parenting: Structured						
Age	**ASD**	**CP**	**DS**	**UDD**	**TD**	**F**
3 years	6.90^{ab} (2.41)	5.48^{ab} (1.43)	7.05^{ab} (1.23)	5.81^{b} (1.97)	7.18^{a} (1.94)	4.67**
4 years	6.38 (2.62)	6.41 (2.85)	7.75 (1.29)	6.70 (1.97)	6.89 (2.39)	0.64
5 years	7.32 (2.08)	5.81 (2.66)	8.67 (1.96)	6.59 (2.07)	7.13 (2.18)	2.64*

Positive Parenting: Unstructured						
Age	**ASD**	**CP**	**DS**	**UDD**	**TD**	**F**
3 years	9.33^{ab} (3.45)	7.11^{ab} (3.48)	11.00^{ac} (2.06)	7.81^{b} (2.95)	9.37^{a} (2.78)	4.43**
4 years	7.67 (2.77)	6.11 (3.22)	10.30 (3.02)	8.27 (2.45)	7.97 (3.13)	2.50*
5 years	7.67^{abc} (2.57)	7.11^{ab} (3.06)	11.00^{b} (2.11)	7.24^{ac} (2.81)	7.58^{ac} (3.14)	3.87*

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Note: ASD = Autism Spectrum Disorders; CP = Cerebral Palsy; DS = Down Syndrome UDD = Undifferentiated Developmental Delays; TD = Typical Cognitive Development

Reading across rows, groups with different superscripts differed at $p < .05$ (e.g. In the first row, for negative parenting: structured, the syndrome groups do not differ but all differ from TD).

Table 4

Repeated measures analyses of covariance for negative parenting during structured and unstructured activities at age 3, 4, and 5 years, covarying mother's education and child behavior problems.

Structured Activities

Source	*df*	*SS*	*MS*	*F*	*Eta*
Between subjects					
Mother's Education	1	18.24	18.24	7.25**	.20
Behavior Problems	1	8.31	8.31	3.30(*)	.14
Diagnosis Group	4	143.90	36.00	14.30***	.49
Error	176	442.84	2.52		
Within subjects					
Time	2	7.26	3.63	5.54**	.17
Time × Diagnosis	8	4.34	.54	.83	.14
Error	354	230.74	.652		

Unstructured Activity

Source	*df*	*SS*	*MS*	*F*	η^2
Between subjects					
Mother's Education	1	11.43	11.43	3.31(*)	.14
Behavior Problems	1	26.48	26.48	7.67**	.20
Diagnosis Group	4	75.43	18.86	5.46***	.33
Error	177	611.25	3.45		
Within subjects					
Time	2	6.21	3.11	2.12(*)	.14
Time × Diagnosis	8	7.66	0.96	0.87	.14
Error	354	389.30	1.10		

(*) $p < .10$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 5

Repeated measures analysis of covariance for positive parenting during structured and unstructured activities at age 3, 4, and 5 years, covarying mother's education and child behavior problems.

Structured Activities

Source	*df*	*SS*	*MS*	*F*	*Eta*
Between subjects					
Mother's Education	1	202.23	202.23	23.98***	.35
Behavior Problems	1	19.88	19.88	2.36	.10
Diagnosis Group	4	17.71	4.43	0.52	.10
Error	176	1484.00	8.43		
Within subjects					
Time	2	5.55	2.77	1.39	.10
Time × Diagnosis	8	46.53	5.82	2.92**	.24
Error	354	701.15	2.00		

Unstructured Activity

Source	*df*	*SS*	*MS*	*F*	η^2
Between subjects					
Mother's Education	1	265.01	265.01	17.98***	.30
Behavior Problems	1	120.03	120.03	8.15**	.20
Diagnosis Group	4	165.83	41.46	2.81*	.24
Error	177	2608.05	14.74		
Within subjects					
Time	2	11.31	5.66	1.23	.10
Time × Diagnosis	8	86.11	10.76	2.38*	.22
Error	354	1604.21	4.53		

* $p < .05$.

** $p < .01$.

*** $p < .001$.