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Parent Functioning in Families of Preadolescents With Spina Bifida: Longitudinal Implications for Child Adjustment

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The purpose of this study was to test a strength-of-association model regarding possible longitudinal and bidirectional associations between parent functioning and child adjustment in families of children with spina bifida ($n = 68$) and families of able-bodied children ($n = 68$). Parent functioning was assessed across 3 domains: parenting stress, individual psychosocial adjustment, and marital satisfaction. Child adjustment was indexed by teacher-reported internalizing and externalizing symptoms, self-reported depressive symptoms, and observed adaptive behavior. Findings revealed that all 3 parent functioning variables predicted child adjustment outcomes, and that such results were particularly strong for externalizing symptoms. Associations between parent functioning and child adjustment tended to be in the direction of parent to child and were similar across both groups. These findings have implications for potential interventions targeted at helping families manage the transition into early adolescence in families of children with spina bifida as well as families of healthy children.

keywords: spina bifida, child adjustment, parent functioning, parenting stress, marital satisfaction

Children and adolescents with chronic illnesses are at an increased risk for developing adjustment problems compared with their able-bodied peers (Appleton et al., 1997; Appleton et al., 1994; Lavigne & Faier-Routman, 1992; Lavigne, Nolan, & McLone, 1988; Wallander & Varni, 1989, 1998; Wallander, Varni, Babani, Banis, & Wilcox, 1988). However, given considerable variability in adjustment across children with chronic illnesses, less is known about factors that influence whether children with such conditions will be more or less adjusted. In the current study, we sought to examine parent functioning predictors of adjustment in children with spina bifida. More specifically, parent functioning was assessed across three domains: *parenting* stress, *individual* psychosocial adjustment, and *marital* satisfaction (see Figure 1). Moreover, we examined whether longitudinal associations between parent functioning predictors and child adjustment were similar across affected and nonaffected samples (i.e., across families with and without a child with spina bifida). Finally, given the longitudinal nature of the data and given the possibility that child adjustment may affect subsequent levels of parent functioning, bidirectional associations among parent and child variables were also examined.

Spina bifida is one of the most common birth defects, occurring in roughly 1 of every 1,000 live births in the United States (Blum, Resnick, Nelson, & St. Germaine, 1991; Charney, 1992; McLone & Ito, 1998). Spina bifida develops in the first month of pregnancy, in which the spinal column fails to develop fully, resulting in exposure of a portion of the spinal cord. Associated physical problems may include urinary, orthopedic, and neurological difficulties. The physical problems associated with spina bifida are apparent during infancy and childhood, and continue through adolescence and into adulthood (Charney, 1992). Physical problems include motor paralysis and sensory loss, the severity of which is largely dependent on the location of the lesion in the spinal cord. Children with spina bifida often walk with braces or require a wheelchair to ambulate. Virtually all children with this illness, regardless of the location of the lesion, have bladder and bowel control problems (Charney, 1992). Intelligence scores of children with spina bifida tend to be in the low-average range, with learning disabilities being common. The greatest deficits appear to

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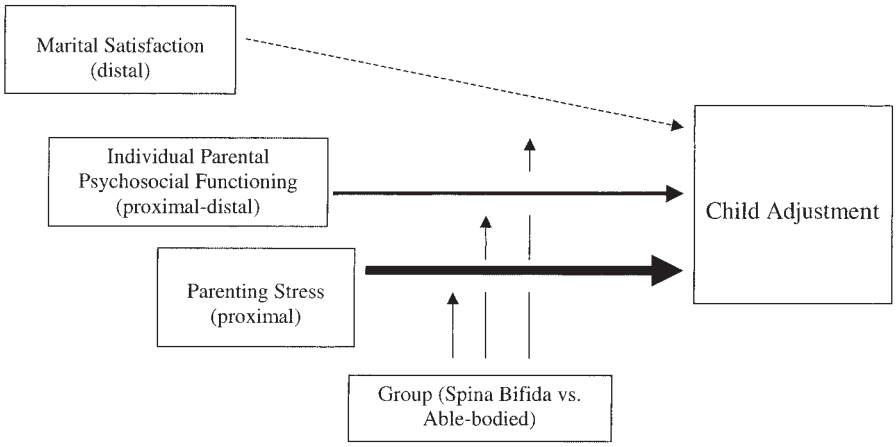

Figure 1. Strength-of-association moderator model. Heavier lines indicate stronger predicted associations.

be with visual-motor ability and arithmetic calculation, with relative strengths in verbal ability (Wills, 1993; Wills, Holmbeck, Dillon, & McLone, 1990). Hydrocephalus, a condition in which the ventricles in the brain become enlarged, occurs in 60–95% of cases and is treated with a shunt procedure in which cerebrospinal fluid is diverted from the ventricles. Hydrocephalus and shunt placement may be associated with a greater degree of cognitive impairment (Charney, 1992; Wills et al., 1990).

Studies in which the psychosocial adjustment of children with spina bifida has been examined have found results that are consistent with studies examining diverse pediatric populations (Holmbeck et al., 2003). In a meta-analytic review of 87 studies, Lavigne and Faier-Routman (1992) found that children with pediatric physical disorders, including spina bifida, were at increased risk for overall adjustment problems, particularly internalizing and externalizing symptoms. Additionally, the meta-analysis revealed that children with spina bifida tended to have lower self-concepts compared with their able-bodied peers. Lavigne et al. (1988), in a study of the social and behavioral adjustment of children with spina bifida, found that children with spina bifida scored higher compared with a normative sample on the Total Behavior Problem scale and the Internalizing scale of the Child Behavior Checklist (CBCL; Achenbach, 1991). Appleton et al. (1997) found that children with spina bifida were at increased risk for depressed mood, low self-worth, and suicidal ideation. Furthermore, this finding was particularly strong for girls with spina bifida. Another study with the same sample studied here found that children with spina bifida tended to be more socially immature and passive, less likely to have social contacts outside of school, less physically active, less likely to make independent decisions, and more dependent on adults for guidance than their able-bodied peers. Children with spina bifida were also less competent scholastically and more likely to exhibit attention and concentration difficulties (Holmbeck et al., 2003). Thus, like the larger literature on chronic illness, it appears that there is an increased risk for difficulties with psychosocial adjustment in children with spina bifida, but that there is substantial variability in outcome as well (Wallander & Thompson, 1995; Wallander & Varni, 1998).

Previous research with families of healthy children has shown that parent functioning is a significant predictor of variability in child adjustment. In this line of research, measures of parental functioning have taken into account the different roles parents play in the family: parents in the parenting role, parents as marital partners, and parents as individuals. Specifically, *parenting stress,* which Deater-Deckard described (1998) as "the stress reaction to the demands of being a parent" (p. 3), has been linked directly, and indirectly, through its relationship with poor parenting, to maladjustment in offspring. *Individual parental psychopathology* is also known to have a strong correlation with child psychosocial adjustment (see Zahn-Waxler, Duggal, & Gruber, 2002, for a review). Finally, *marital adjustment* has been shown to be associated most often with child behavior problems (Dadds & Powell, 1991; Frick, Lahey, Hartdagen, & Hynd, 1989; Jouriles, Bourg, & Farris, 1991; Westerman & Schonholtz, 1993), but has also been shown to be associated with child depressive symptomatology (Wang & Crane, 2001) and poor school performance (Westerman & La Luz, 1995). Adaptive parental functioning has also been linked to positive psychological adjustment of children with chronic physical disorders (Drotar, 1997; Rodrigue, Geffkan, Clark, & Hunt, 1995; Sawyer, Streiner, Antoniou, Toogood, & Rice, 1998). In the current study, these three parent functioning constructs were examined in relation to child adjustment, based on the model presented in Figure 1. Moreover, it was expected that "proximal" parent functioning variables (i.e., parenting stress and, to a lesser extent, individual psychopathology) would be more highly related to child adjustment than "distal" predictors (i.e., marital satisfaction), given that children are presumably more likely to be exposed to the former than to the latter.

In addition, parental functioning appears be a particularly salient issue in pediatric populations as parents of children with chronic illness have additional burdens. The entire family is likely to be profoundly affected by a child's

illness. Along with the emotional difficulties that may arise from having a child who is disabled or seriously ill, parents may have additional burdens associated with caretaking; indeed, parents are often relied upon to negotiate various illness-related issues throughout the child's development. Such demands may have both direct and indirect effects on the parents' individual functioning (Kazak, Segal-Andrews, & Johnson, 1995).

Although there have been mixed findings, past research has generally shown that parents of children with chronic illness tend to report greater disruptions in parental functioning than parents of healthy children (Kazak et al., 1995). In a study of families who had children with spina bifida, parents enjoyed less parental satisfaction, perceived themselves as less competent in their parenting skills, and reported greater parenting stress (Holmbeck et al., 1997; Kahng, Friedman, & Holmbeck, 2002). Ievers and Drotar (1996) reviewed 31 articles concerning parental adjustment in families of children with cystic fibrosis. Although they concluded that parents of a child with cystic fibrosis experience greater stress than parents of healthy children, many of these studies had methodological problems. Several studies did not examine demographic factors that may differ between groups. Of the eight studies that did measure demographic factors, three found group differences on potential confounding variables such as race, age of child and parent, parental education, and family income. The measurement of parent functioning was also limited in that most studies relied solely on self-report, and many only included mothers as the sole source of data.

The present study builds on the work of Holmbeck et al. (1997) by examining a model of longitudinal associations between parent functioning and child adjustment in the same sample. There are several limitations of past research that this study attempts to address. One limitation of studies that examine the role of family processes in pediatric populations is the lack of a comparison sample. Few studies directly compare families in which there is a child with a physical disability and families with healthy children. Therefore, it is unclear whether effects are qualitatively or quantitatively different in affected families or whether the same process is occurring across groups (Drotar, 1997). Also, most research in this area has been cross-sectional, limiting the ability to establish a time–order relationship among variables or to make directional claims (La Greca & Schuman, 1999). In addition, another limitation of past research has been the nearly exclusive focus on maternal parenting, ignoring the potentially influential role of fathers in influencing child adjustment. Moreover, most studies have investigated the effects of child illness on the individual parents, usually the mothers, and have not given enough attention to the effect on the marital dyad (Kazak et al., 1995). Lastly, the measurement of child and family functioning in previous research has also been problematic in that most studies rely solely on the self-report of mothers (Lavigne et al., 1988; Wallander & Varni, 1989; Wallander et al., 1988). This practice often makes it difficult to interpret one's findings because the use of the same source and method for both independent and dependent variables makes it impossible to rule out common source and method variance explanations for significant findings (Holmbeck, Li, Shurman, Friedman, & Millstein, 2002).

Given these limitations, this study examined longitudinal associations between parent functioning and child adjustment by comparing families of children with spina bifida to a matched comparison sample of families with able-bodied children. Both maternal and paternal functioning were assessed. This study also addressed the limitations of previous research by using a multisource and multimethod assessment in order to rule out common source and method variance explanations.

It was hypothesized that less adaptive levels of parent functioning, as indexed by parenting stress, individual psychosocial adjustment, and marital satisfaction, would be associated with negative outcomes with regard to child adjustment, whereas more adaptive levels of parent functioning would lead to an increase in positive adjustment outcomes over time. Several domains of child adjustment were included as outcome variables: teacher-reported internalizing and externalizing symptoms, self-reported depression, and observed adaptive behavior.

As noted earlier, predictions were based on a strength-of-association model in which some components of parental functioning were expected to be more distally and others more proximally related to child adjustment (Figure 1). Moreover, as it is likely that having a child with a high level of behavioral adjustment difficulties may increase the level of parent stress, and given that the longitudinal nature of the present study allows for the investigation of directional claims, the possibility of significant bidirectional effects was also examined. It was hypothesized that there would be significant findings in the direction of parent to child adjustment and not vice versa.

Finally, associations between parent functioning and child adjustment were investigated within families of children with a chronic illness—spina bifida—and were directly compared with the associations between parent functioning and child adjustment within a matched comparison sample of families with able-bodied children. Given that living with spina bifida requires affected children to follow medical regimens that may make them more dependent on their parents than healthy children (Charney, 1992), and because children with spina bifida may also spend more time with their parents and less time with peers than their healthy age mates (Blum et al., 1991), it was hypothesized that parental functioning would be more highly associated with adjustment outcomes in families of children with spina bifida when compared with families who had able-bodied children.

Method

Participants

Participants were part of a larger longitudinal investigation of psychosocial adjustment and family relationships during the transition to adolescence in children with spina bifida. The study was conducted at Loyola University Chicago and was funded by the March of Dimes (Holmbeck, Coakley, Hommeyer, Shapera, & Westhoven, 2002; Holmbeck et al., 1997; McKernon et al., 2001). During the first data collection period (Time 1), 68 families who had a child with spina bifida and 68 families who had an able-bodied child were interviewed (age = 8 or 9 years at Time 1).

Biological mothers from all families from both the spina bifida and comparison groups participated, as well as 55 fathers (or stepfathers) in the spina bifida group and 52 fathers (or stepfathers) in the able-bodied group. Data collection at Time 2 occurred 2 years after the initial interview, with an overall retention rate of 98% for the entire sample. The total sample completing both Time 1 and Time 2 interviews consisted of 67 families of children with spina bifida and 66 families in the comparison group. Participants from the spina bifida and comparison groups were matched on the following demographic variables: child age, child gender, child ethnicity, birth order, family structure (two parent vs. one parent), socioeconomic status, age of mother, and age of father. Significant differences were not found between the two groups on any of these variables, indicating that the groups were successfully matched.

Children with spina bifida were recruited from the following sources: a children's hospital, a children's hospital that cares exclusively for children with physical disabilities, a university-based medical center, and a statewide spina bifida association. A letter was sent to all parents of children within the 8–9-year-old age range. Out of 310 nonoverlapping child names from the four sources, 72 families lived too far away (greater than 120 miles from the laboratory), 64 families declined to participate, 56 could not be reached (because of invalid addresses and phone numbers), 16 did not speak English, 14 children had turned 10 years old before a visit could be scheduled, 11 children did not have spina bifida, and 8 were excluded for miscellaneous reasons. Sixty-nine families remained. One additional family was dropped following the family visit as the child was 13 years old (because of an error on the original participant list). Sixty-eight families of children with spina bifida made up the final group of participants. A comparison of participating children with children from families who declined to participate ($n = 64$; we were able to collect data regarding lesion level and type of spina bifida from the hospital databases for all children on the potential participant list) revealed no differences with respect to lesion level, $\chi^2(2, N = 116) = 0.62$, $p > .05$, or type of spina bifida (myelomeningocele vs. lipomeningocele), $\chi^2(1, N = 119) = 1.63$, $p > .05$. Further demographic information regarding the families who declined to participate was not available.

Participants in the able-bodied group were recruited by contacting schools where the participating children with spina bifida were enrolled. Parents who desired to participate returned a form indicating their consent. Parents who returned consent forms were then contacted by phone. Sixty-eight families of able-bodied children made up the final comparison group. Families who agreed to participate in the study were contacted 2 years later for a second wave of data collection (see Holmbeck, Johnson, et al., 2002, for a more detailed description of recruitment procedures).

Measures

Different sources were used to measure predictor and dependent variables in order to rule out common source and method variance explanations for significant findings. Specifically, all predictor variables were assessed by mother and father report, and all dependent variables were assessed by child report, teacher report, or independent observer. All measures were scored in the direction that the name of the construct suggests (i.e., a higher score on the Dyadic Adjustment Scale (DAS; Spanier, 1989) indicates a higher level of marital satisfaction).

Parenting stress. Mothers and fathers both completed three subscales of the Parenting Stress Index (PSI; Abidin, 1990) as a measure of stress in the parenting role: Perceived Parental Competence subscale (11 items; e.g., "I have had more problems raising my children than expected"; reverse scored), Restriction of Role subscale (7 items; e.g., "I feel trapped by my responsibilities as a parent"), and Social Isolation subscale (6 items; e.g., "Since having children, I have a lot fewer chances to see my friends and make new friends"). Because of time constraints, the entire PSI could not be administered. However, past studies support the validity of the individual subscales (Abidin, 1990). These three subscales were chosen because they best captured the functioning of the parents in their role as parents. Other PSI subscales tap child functioning, health of parent, psychopathology, and attachment between parent and child, all of which were viewed as less relevant to parenting role stress. As the three subscales were highly correlated with each other, they were combined to create one measure of parenting stress. The correlations between the subscales ranged from .31 for father's report of role restriction and social isolation ($p < .001$) to $-.53$ for mother's report of role restriction and perceived competence ($p < .001$). Within the spina bifida sample, $\alpha = .89$ for mother's report of parenting stress and $\alpha = .83$ for father's report. Within the comparison sample, $\alpha = .84$ for mother's report and $\alpha = .79$ for father's report of parenting stress.

Parent psychosocial functioning. Parents completed the Symptom Checklist–90—Revised (SCL-90–R; Derogatis, 1983) by responding to each of 90 psychological symptoms on a Likert scale. The Global Severity Index (GSI) was used in this study and is the average severity response (range = 0–4) across all 90 items ($\alpha = .96$ for mother's report and $\alpha = .95$ for father's report within the spina bifida sample; $\alpha = .96$ for mother's report of psychosocial functioning and $\alpha = .92$ for father's report within the comparison sample). Derogatis has developed cutoff criteria for "caseness" on the SCL-90–R, which is "the value or score . . . that serves in the selection model to define a positive case" (p. 28). This value is a *T* score of 63 or above on the GSI, which corresponds to a GSI raw score of .78 for female nonpatients and .58 for male nonpatients. In our study, 19.2% of the mothers and 25.6% of the fathers met criteria for caseness at Time 1. Chi-square analyses, which assessed whether there were group differences for rates of caseness, were not significant for mother's report, $\chi^2(1, N = 136) = 0.84$, $p > .05$, or father's report, $\chi^2(1, N = 107) = 2.69$, $p > .05$.

Marital satisfaction. The DAS (Spanier, 1989) was used to assess marital satisfaction. Both parents were administered an adapted 32-item version. Two items related to sexual behavior were dropped from the original measure because, during pilot testing, some participants reported that these items made them feel uncomfortable. It was decided that these 2 items would be dropped so as not to jeopardize the longitudinal participation of the study participants. Paternal and maternal reports of marital satisfaction were highly correlated ($r = .54$). As a result, the scales were combined to create one measure of marital satisfaction. In the spina bifida sample, $\alpha = .91$ for mother's report and $\alpha = .88$ for father's report; in the comparison sample, $\alpha = .96$ for mother's report and $\alpha = .92$ for father's report.

Child internalizing and externalizing symptoms. The CBCL (Achenbach, 1991) is a 113-item measure of internalizing and externalizing symptoms that includes an assessment of three areas of competence (activities, social, and school). The CBCL consists of eight problem subscales and two second-order problem scales assessing child internalizing and externalizing symptoms. The subscales that are combined to form the Internalizing Problem scale are Withdrawal, Anxiety/Depression, and Somatic Complaints. The Externalizing Problem scale includes the Aggression and Delinquency subscales. Respondents rate the items as 0 (*not true*), 1 (*somewhat or sometimes true*), or 2 (*very often true*) of the child. The CBCL was administered to mothers, fathers, and teachers in the study. The teacher version is the Teacher Report Form (TRF; Achenbach, 1991). The teacher version was used to provide a measure of child internalizing and externalizing symptoms.

Achenbach reported a high level of reliability and validity for both the parent and the teacher form of the CBCL. With respect to level of behavior problems in this sample, 23.5% and 7.4% of the spina bifida sample had mean *T* scores of 60 or above on the Internalizing Problem and Externalizing Problem scales, respectively. Percentages for the comparison sample were 7.4% for the Internalizing Problem scale and 7.4% for the Externalizing Problem Scale.

Child depression. The Children's Depression Inventory (CDI; Kovacs, 1992) was used to measure child self-report of depressive symptoms in the present study ($\alpha = .81$ and $\alpha = .78$ for the spina bifida and comparison groups, respectively). The mean CDI score was 8.92 ($SD = 6.71$) in the spina bifida sample and 6.02 ($SD = 4.69$) in the able-bodied sample at Time 1. These scores are in the average range relative to the normative data for boys and girls 7–12 years old (Kovacs, 1992).

Observed adaptive behavior. Ten items from a 44-item questionnaire, the Home Visit Report Form, were used as a measure of observed adaptive behavior in the child. This questionnaire was used to assess child and parent behavior observed during family home visits. The two trained graduate or undergraduate research assistants who were present during the family home visit discussed the items and completed the form together. Seventeen items of this observational measure are based on the work of another investigator (Judy Garber, personal communication, July 5, 1999), and the rest of the items were developed for this study. The 10 items that applied specifically to child functioning were selected for this study and were used as a single scale (2 of the 10 were from Garber's measure). Child adaptive behavior was rated on a five-point Likert scale with responses ranging from 1 (*not at all*) to 5 (*very much*). Items that assessed child adaptive behavior included "the child was cooperative with staff" and "the child was distrustful" (reverse scored). Scale reliabilities within the spina bifida and able-bodied groups were .76 and .75, respectively. The interrater reliability, based on ratings of two coders for 15 randomly selected families, was .70.

Procedure

Families were interviewed at Time 1 when the children were 8–9 years old and again at Time 2, 2 years after the initial assessment. Data at both Time 1 and Time 2 were collected by trained graduate and undergraduate psychology students during a visit to each family's home. Each family was paid $50 for participation at Time 1 and $75 for participation at Time 2. During both sessions, a brief overview of study goals and confidentiality issues were first reviewed with the family, and parents were then asked to sign a consent form for themselves and their child. Children were also asked to sign an assent form for their own participation. Release of information forms for teacher participation (for both samples) and medical chart reviews (for the spina bifida sample) were also signed. The 3-hr home visit included the completion of several questionnaire packets by the identified child, mother, and father. The questionnaire packets (four for each parent and three for each child) were presented in a counterbalanced order. Moreover, the parent functioning and child adjustment measures were in separate questionnaire packets. Therefore, there was a random ordering of the parent functioning and child adjustment measures across participants.

Statistical Treatment

A series of hierarchical regression analyses was conducted to determine if parent functioning variables were related both concurrently and prospectively to change in child adjustment over time. To determine if these effects were moderated by group status (spina bifida vs. comparison), group status was included in the regression analyses. Prior to running regression analyses, all continuous independent variables were centered by subtracting the sample mean from all individuals' scores on the variable, producing a revised sample mean of zero (Aiken & West, 1991; Holmbeck, 1997). One set of analyses was run for each of the five parent variables (mother parenting stress, father parenting stress, mother individual psychosocial functioning, father individual psychosocial functioning, and marital satisfaction) and for each of the four child adjustment outcome variables (internalizing symptoms, externalizing symptoms, depression, and observed adaptive behavior).

In each regression, child adjustment at Time 1 was entered in the first step in order to assess the effect of parent functioning on change in child adjustment over time. More specifically, a residual that is created by first controlling for the Time 1 child adjustment variable represents the change in rank (positive or negative) over time for that individual on the dependent measure in relation to other participants in the sample. In the second step, group status and Time 1 parent functioning were entered as main effects. The interaction between Time 1 parenting functioning and group status was then entered in the regression analysis to test for moderator effects (Holmbeck, 1997). Time 2 parent functioning was entered in the next step to examine whether change in parent functioning from Time 1 to Time 2 predicts concurrent change in child adjustment from Time 1 to Time 2. Finally, Group Status $\times$ Time 2 Parent Functioning interactions were entered into the regression analyses to test for moderator effects for concurrent change. In this way, two sets of analyses were run within a single regression: (a) a prospective analysis examining the association between Time 1 parent functioning and change in child adjustment over time and (b) a concurrent analysis of the relationship between change in parent functioning from Time 1 to Time 2 and change in child adjustment over the same time period.

In an effort to reduce common method variance, all analyses were run using responses from different sources. Parent functioning was measured using parent report, and child adjustment was measured using teacher report, child report, and observational data.

A second set of analyses was run to rule out the possibility of bidirectional effects. For example, it is possible that having a child with a high level of behavioral adjustment difficulties may increase the level of parental stress. Past research using cross-sectional analyses has not been able to test such a competing hypothesis. To test directionality of effects, additional regression analyses were conducted in which Time 1 child adjustment was entered as the independent variable and Time 2 parent functioning was used as the dependent variable, after controlling for Time 1 parent functioning.

All available data from every participant were used in each separate analysis. Given that the number of fathers participating in the study (55 for the spina bifida group and 52 for the comparison group) was lower than the number of mothers participating (68 for both groups), the total number for the analysis of father-reported data was lower than that for the analysis of mother-reported data. In addition, analysis of the marital satisfaction data included only two-parent families.

Results

Preliminary Analyses

Correlations between independent variables (mother- and father-reported parenting stress, mother- and father-reported psychosocial adjustment, and a combined mother and father report of marital satisfaction) at both Time 1 and Time 2 were low to moderate, ranging from $-.02$ between Time 2

father's report of parenting stress and Time 2 mother's report of psychopathology to .51 between Time 1 mother's report of parenting stress and Time 1 mother's report of psychopathology ($M = .27$). Correlations between dependent variables (teacher-reported internalizing and externalizing behaviors, child-reported depressive symptoms, and observed adaptive behavior) ranged from $-.03$ to .49 ($M = .20$). All rs $> .19$ were significant at $p < .05$. Given that nearly all correlations were low to moderate, further data reduction was not considered necessary. Main effects for group status are not reported here. Group differences between the spina bifida and able-bodied samples on several child adjustment variables are reported in a study by Holmbeck et al. (2003).

Prospective Associations Between Parent Functioning and Child Adjustment

As Table 1 demonstrates, the multiple regression analysis testing the relationship between parent functioning at Time 1 and change in child adjustment from Time 1 to Time 2 yielded the following findings: Father-reported stress in the parenting role, $F(2, 80) = 12.45$, $p < .001$, as well as father symptomatology at Time 1, $F(3, 79) = 4.08$, $p < .05$, were found to be associated with change in child externalizing symptoms, such that increased father-reported stress and symptomatology were both associated with an increase in externalizing symptoms over time. Maternal symptomatology was also found to be positively associated with child externalizing symptoms, $F(2, 104) = 4.59$, $p < .05$. Additionally, mother's and father's report of marital satisfaction, $F(2, 93) = 7.88$, $p < .01$, was negatively associated with child externalizing symptoms such that higher levels of reported marital satisfaction were associated with a decrease in externalizing symptoms over time. Higher levels of father parenting stress at Time 1 were additionally related to an increase in child internalizing symptoms, $F(2, 80) = 4.08$, $p < .05$, and higher levels of reported marital satisfaction at Time 1 were related to an increase in observed adaptive behavior, $F(2, 104) = 9.66$, $p < .01$.

Significant moderation of group status was found for the association between Time 1 marital satisfaction and prospective change in child depressive symptoms, $F(4, 104) = 5.75$, $p < .05$. Significant interaction effects were probed by computing conditional moderator variables in which the spina bifida group was assigned a value of zero and the comparison group a value of one. Post hoc regressions were run with these conditional variables to compute simple slopes of the conditional effects of parent functioning on child adjustment for each group. Regression lines were calculated at plus-and-minus one standard deviation of the parent functioning variable, and then plotted to examine the slope of the association between parent functioning and child adjustment separately within each group. (See Holmbeck, 2002, for complete examples of probing significant moderator effects using conditional variables and plotting simple slopes.)

When the significant moderation was probed, it was found that within the able-bodied group, higher levels of reported marital satisfaction at Time 1 were associated with a decrease in child depressive symptoms from Time 1 to Time 2, but the slope was nonsignificant, $t(113) = -1.23$, *ns*. Within the spina bifida group, change occurred in the opposite direction revealing a counterintuitive result such that higher levels of marital satisfaction at Time 1 were associated with an increase in child-reported depressive symptoms from Time 1 to Time 2, $t(113) = 2.14$, $p < .05$ (see Figure 2).

Concurrent Associations Between Parent Functioning and Child Adjustment

Also illustrated in Table 1 are the significant findings for the concurrent multiple regression analysis examining the

Table 1
Significant Prospective and Concurrent Regression Findings

	Outcome: Change in child adjustment from T1 to T2			
Predictor: Parent functioning	Internalizing	Externalizing	Depressive symptoms	Observed adaptive behavior
Mother symptomatology	T2: $R^2\ \Delta = 0.043$, $\beta = .246$*	T1: $R^2\ \Delta = .030$, $\beta = .172$*		
Father symptomatology		T1: $R^2\ \Delta = .031$, $\beta = .179$* T2 × G: $R^2\ \Delta = .028$, $\beta = .229$*	T2: $R^2\ \Delta = .083$, $\beta = .344$**	
Mother parenting stress				
Father parenting stress	T1: $R^2\ \Delta = .043$, $\beta = .208$*	T1: $R^2\ \Delta = .090$, $\beta = .305$***		T2 × G: $R^2\ \Delta = .042$, $\beta = .237$*
Mother and father marital satisfaction		T1: $R^2\ \Delta = .056$, $\beta = -.238$**	T1 × G: $R^2\ \Delta = .044$, $\beta = -.256$*	T1: $R^2\ \Delta = .069$, $\beta = .262$** T2 × G: $R^2\ \Delta = .062$, $\beta = .300$**

Note. G = Group Status; T1 = Time 1 predictor; T2 = Time 2 predictor; $R^2\Delta = R^2$ change; β = standardized beta weight; T1 × G = interaction between group status and T1 predictor variable; T2 × G = interaction between group status and T2 predictor variable.
* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

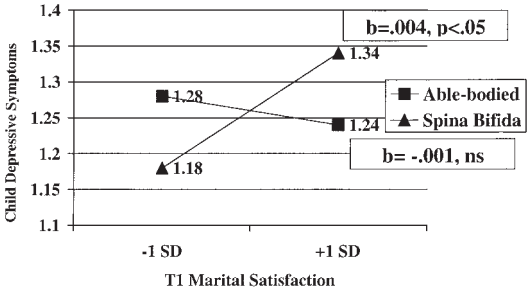

Figure 2. Group × Time 1 Marital Satisfaction interaction for child report of depressive symptoms. T1 = Time 1.

relationship between change in parent functioning from Time 1 to Time 2 with concurrent change in child adjustment from Time 1 to Time 2. There was a significant main effect for the association between maternal symptomatology and child internalizing symptoms, $F(5, 101) = 5.57$, $p < .05$. This finding indicates that an increase in maternal symptomatology from Time 1 to Time 2 was related to an increase in child internalizing symptoms over the same time period. Similarly, an increase in father-reported symptomatology was related to an increase in child-reported depressive symptoms, $F(5, 84) = 9.45$, $p < .01$.

There were three significant interactions between group status and parent functioning at Time 2 that were associated with Time 2 child adjustment. There was a significant interaction effect between group status and father parenting stress at Time 2 when the dependent variable was child observed adaptive behavior, $F(6, 81) = 4.21$, $p < .05$. A significant moderation effect for group status was also found for the association between father symptomatology and child externalizing symptoms, $F(6, 76) = 3.96$, $p < .05$. Finally, group status was found to be a significant moderator of the association between parent-reported marital satisfaction and child observed adaptive behavior, $F(6, 100) = 9.67$, $p < .01$.

When the interaction between group status and father parenting stress in the prediction of change in observed adaptive behavior, as described earlier, was further probed, it was found that when father parenting stress increased, child observed adaptive behavior tended to increase slightly within the able-bodied group and to decrease slightly within the spina bifida group. However, neither of these slopes were significantly different from zero. When the interaction between group status and father symptomatology in the prediction of child externalizing symptoms was further probed, it was found that the simple slope for the spina bifida group was not significantly different from zero, $t(82) = -0.62$, *ns*, while the simple slope for the comparison group was significant, $t(106) = 2.83$, $p < .01$. The direction of the simple slope indicated that an increase in paternal symptomatology was associated with a corresponding increase in child externalizing behavior within the able-bodied group (Figure 3). Similarly, the simple slope for the spina bifida group was not significant, $t(106) = -1.05$, *ns* while the simple slope for the comparison group was significant, $t(106) = 2.83$, $p < .01$, when probing the interaction between group status and marital satisfaction in the prediction of observed adaptive behavior. The direction of the simple slope for the able-bodied comparison group indicated that observed adaptive behavior tended to be higher at higher levels of reported parental marital satisfaction (Figure 4).

Bidirectional Associations

Possible bidirectional associations were tested, whereby Time 1 child adjustment variables were predictors and Time 2 parent functioning variables were outcomes. No significant main effects were found. There was one significant interaction between group status and parent functioning. As there was only one significant effect, this effect was considered likely to be explained by chance alone.

Discussion

This study investigated a strength-of-association model of longitudinal associations between maternal and paternal functioning and child adjustment. Both prospective and concurrent analyses were conducted to investigate the hypothesis that parent functioning at Time 1, as well as change in parent functioning from Time 1 to Time 2 (2 years later), would influence change in child adjustment from Time 1 to Time 2. Specifically, it was hypothesized that less adaptive levels of parent functioning—as indexed by parenting stress, individual psychosocial adjustment, and marital satisfaction—would be associated with negative outcomes with regard to child adjustment, whereas more adaptive levels of parent functioning would lead to an increase in positive adjustment outcomes over time. Furthermore, it was predicted that proximal parent functioning variables (mother- and father-reported parenting stress, and to a lesser extent, mother and father psychosocial adjustment) would be more strongly associated with child adjustment outcomes than distal parent functioning variables (e.g., marital satisfaction). Finally, these associations between parent functioning and child adjustment were investigated within families who had children with a chronic illness—spina bifida—and compared with a sample of families who had able-bodied children. Given that children with spina bifida may be more

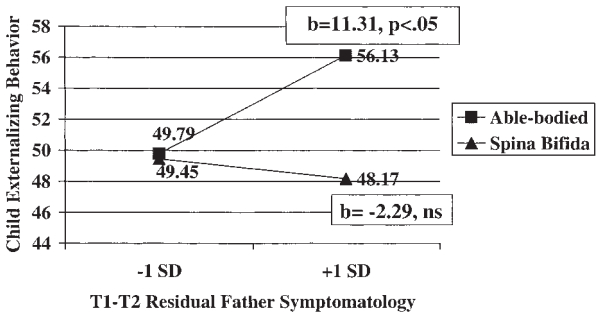

Figure 3. Group × Time 2 Father Symptomatology interaction for teacher report of child externalizing behaviors. T1 = Time 1; T2 = Time 2.

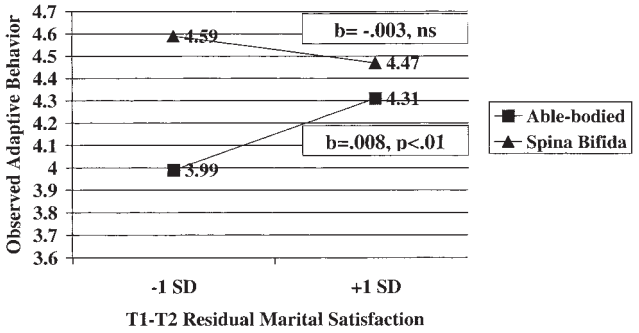

Figure 4. Group × Time 2 Marital Satisfaction interaction for observed adaptive behavior. T1 = Time 1; T2 = Time 2.

dependent on their families and spend less time with peers (Blum et al., 1991; Charney, 1992), it was hypothesized that their psychosocial adjustment would be more highly influenced by parental adjustment than would be the case in the comparison sample.

The results of this study contribute to our understanding of predictors of variability in psychosocial adjustment among children living with a chronic illness as well as their able-bodied peers. Specifically, support was found for the proposed model (see Figure 1) insofar as parent functioning predictors were associated both prospectively and concurrently with child adjustment outcomes. Prospective analyses demonstrated that most measures of parental functioning at Time 1, when the child was 8 or 9 years old, were significantly associated with child adjustment over the period of 2 years. Such findings were particularly robust for externalizing symptoms.

The analyses investigating the concurrent association between change in parent functioning with change in child adjustment over a 2-year period revealed similar results. However, while the prospective analysis suggested that parent functioning is mainly associated with the child adjustment outcome of externalizing behaviors, the concurrent analysis revealed significant associations with child internalizing symptoms across both groups. There may be several reasons why there were fewer prospective associations between parent functioning and child adjustment in the internalizing realm (internalizing and depressive symptoms) as compared with associations between parent functioning and externalizing behaviors. For one, the age group studied is relatively young (ages 8–11). Although these youngsters are approaching adolescence, we still might not expect to see a high prevalence of internalizing symptoms, as depression is relatively rare in young children (Garber, 2000). In addition, it has been suggested in the developmental psychopathology literature that early family processes seem to be a more significant risk factor for behavior problems than for internalizing symptoms. Discipline patterns instilled by parents during the early school years have a major impact on the development of externalizing behaviors. In several studies, inconsistent discipline and harsh punishment have been linked to later conduct problems (see Dodge, 2000, for a review). Although associated with parenting behaviors such as overcontrol and harsh criticism, internalizing symptoms such as depression may not be activated by early family dysfunction alone. It has been suggested that the appearance of a depressive syndrome may also require a higher level of cognitive maturation as well as an accumulation of significant life stressors in addition to early risk factors (Garber, 2000). Consistent with this research literature, the findings of this study suggest that child externalizing symptoms may be sensitive to the effects of early parent functioning (as documented in the prospective analyses), while internalizing symptoms may be more sensitive to recent shifts in parent functioning (as documented in the concurrent analyses).

Although support was found for the overall model of the association between parent functioning and child adjustment, evidence was not found for the strength-of-association component of the model in which it was hypothesized that parenting stress, and then parental symptomatology, would be more strongly related to child adjustment outcomes than would marital satisfaction. Mother and father parenting stress were not associated with a greater number of outcome variables, nor were the effect sizes greater for the association between parenting stress and outcomes in comparison to the other parent functioning predictor variables. The lack of support for this hypothesis suggests that it is not only how parents function in the parenting role, but also how they function as individuals and as marital partners that affect the psychosocial adjustment of children.

Strong support was found for the salience of *paternal* functioning for child adjustment. In fact, a greater number of significant effects were found for father-reported predictors than for mother-reported predictors. Father-reported symptomatology and parenting stress, as well as a combined mother and father report of marital satisfaction, were all found to be associated with various domains of child adjustment. These findings testify to the important role of fathers in child socialization (Phares, 1992).

Most of the significant findings in this study were group main effects, suggesting that the process by which parental functioning predicts child adjustment is similar across families who have children with spina bifida and families who have able-bodied children. This general trend demonstrates the value of utilizing a comparison group in studies of pediatric populations so as to be able to place significant findings within a larger context. However, it is important to note that while the process by which parent functioning affects child functioning is similar across groups, parents who have children with spina bifida tend to experience greater stress in the parenting role (Holmbeck et al., 1997). Therefore, such increased parental stress in these families may place children with spina bifida at higher risk for adjustment problems than their able-bodied peers.

Some of the significant interactions found were somewhat counterintuitive in nature. For example, in the prospective analyses, group status moderated associations between marital satisfaction and child depressive symptoms. Within the spina bifida group, higher levels of marital satisfaction at Time 1 were associated with an increase in child-reported depressive symptoms over time. It is possible that parents with high levels of marital satisfaction focus

more attention on their marriage than on their children, and that children with spina bifida may require more attention from their parents than they are receiving in these families, resulting in an increase in child depressive symptoms.

When significant interactions within the concurrent analysis were probed further, it was found that significant moderator effects were contrary to prediction, given that findings were stronger in the able-bodied sample. For example, within the able-bodied group, an increase in marital satisfaction was associated with an increase in observed adaptive behavior in the child over time. Corresponding associations within the spina bifida group were nonsignificant. One might postulate several explanations for these findings. First, parents who have children with spina bifida may be particularly resilient. Although these parents report higher stress levels than parents of healthy children, perhaps they are able to cope well enough to meet the greater challenges that they face as parents (Holmbeck et al., 1997; Kahng et al., 2002). Second, parents who have children with spina bifida may have greater access to health care resources that prepare them and help them face the stressors associated with having a child with a disability. These parents may also expect to have more stress in the parenting role; such heightened awareness may make it more likely that parents who have a child with a chronic illness will work harder to mitigate the effects of individual, parenting, or marital stress in their lives. Third, children with spina bifida tend to function cognitively at a low average level as compared with their same-age healthy peers (Wills et al., 1990). Differences in the child's cognitive functioning may affect a child's sensitivity to subtle changes in parental functioning.

Interestingly, the analysis of bidirectional associations between child adjustment and parent functioning revealed no significant main effects. This finding rules out a possible alternative explanation for significant findings that the level of child adjustment in fact predicts the level of parent functioning. While these findings provide greater support for the overall model, in which it was proposed that the direction of effect is from parent to child, the possibility of bidirectional effects was only able to be ruled out in the prospective analysis. It is still possible that there is a transactional relationship between concurrent levels of child adjustment and parent functioning.

Despite finding significant prospective and concurrent effects, our study is not without limitations. First, the generalizability of these findings to children and adolescents of various age groups is limited to the age-range studied here (ages 8–11). As noted earlier, the age range of this sample may also limit the number of significant results, particularly when the outcome variable in question was child internalizing symptoms. Second, the majority of participants in this study were Caucasian. Future studies should include a more representative sampling of Spanish-speaking families to attend to this issue of external validity, particularly given the high rate of spina bifida in Hispanic populations (Lary & Edmonds, 1996). Third, whereas the sample size was typical of studies of pediatric populations, reduced power may have limited our ability to detect smaller main effects and interaction effects, particularly in the concurrent analyses, as concurrent effects were tested after prospective effects were controlled. Fourth, adapted measures of both parenting stress and marital satisfaction were utilized in this study. Although these adapted measures appear to have adequate internal consistency within the present sample, relevant components of these two constructs may not be represented by the adapted measures, and the ability to compare the results of this study with other studies in which the complete measures were used may be compromised. Fifth, general measures of parent functioning as opposed to measures that are illness related were used in this study. In other words, general measures may not be adequate for investigating the specific adjustment issues that may be associated with the experience of having a child with spina bifida (La Greca & Schuman, 1999). Finally, we speculated that a decrease in adaptive parent functioning would interfere with one's ability to parent a child, which would result in child adjustment problems; such mediational relationships were not explicitly tested in this study.

The analyses conducted in this study are fairly conservative in that change in child adjustment was examined as the outcome variable. Much of the variance accounted for in child adjustment at Time 2 was accounted for by level of child adjustment at Time 1. In addition, multiple reporters were used across independent and outcome measures in order to eliminate source and method variance explanations for significant findings. Teacher report was used to measure two of the four outcome variables (internalizing and externalizing symptoms). Therefore, in order for the relationship between parenting and child adjustment to be significant (when teachers reported on the latter), the effect would have to generalize across reporters and the contexts of home and school. The many significant findings of this study in the context of such conservative analyses provide strong evidence for associations between parent functioning and child functioning.

The findings also provide strong support for a developmental family systems approach to understanding child adjustment. Child adjustment must be placed within context in order to be properly assessed, and the family is the primary context in which children develop (Fiese, Wilder, & Bickman, 2000; Kazak, 1989; Kazak et al., 1995). As the results of this study demonstrate, the family is a system in which the functioning of one member is likely to have a significant impact on the functioning of all members of the family. Therefore, research investigating child mental health and adaptation will benefit from the assessment of parental variables in conjunction with child variables (Kazak, 1989).

A developmental family systems perspective may be particularly useful when investigating child adaptation in the context of chronic illness (Kazak, 1989; Kazak et al., 1995). While children with a chronic illness may be at risk for adjustment problems, there is considerable interindividual variability in adjustment outcomes (Kazak et al., 1995; Lavigne & Faier-Routman, 1992; Wallander & Varni, 1998). A family systems approach can be normalizing in that, within this model, families of a child with a chronic illness are conceptualized as typical families confronting difficult and sometimes long-term chronic stressors (Kazak et al., 1995).

The longitudinal nature of this study provides a valuable perspective that goes beyond presenting parent and child adjustment as fixed in time, but rather, aims to understand family adaptation as an unfolding process. While this study focuses on the families of preadolescent children, more work needs to be done to understand how the processes examined in this study may change as the children transition to adolescence. In addition, future research is needed to investigate the potential mediators and moderators of the relationship between parent functioning and child functioning. Parent functioning may influence child adjustment by change in child-rearing behaviors or family-level variables such as family conflict or cohesion (i.e., mediation). Parent or child coping style may influence the impact of parent functioning on child adjustment. As noted earlier, for families of children with spina bifida, greater access to health services or the expectation of greater stress in the parenting role may be important moderators. The exploration of mediating and moderating variables may help explain the apparent resilience of families who have children with spina bifida and suggest intervention strategies for families who are at risk. Another strength of this study was the use of father data (Phares, 1992). Results of this study suggest that father functioning may be particularly important for child psychosocial adjustment and point to the need for further research investigating the role of fathers in child socialization.

From a clinical perspective, the findings of this study have implications for potential interventions targeted at helping families manage the transition to early adolescence in families who have children with spina bifida as well as families who have healthy children. There is a great deal of evidence supporting prevention and intervention strategies that involve the parents as well as the child (Kazdin & Weisz, 1998; Kumpfer & Alvarado, 2003). The findings of this study provide further rationale for a family systems approach to prevention and intervention of child adjustment problems. Specifically, the results of this study suggest that interventions targeting parental functioning (including stress related to parenting, individual parental psychopathology, and marital stress) will likely reduce the risk of child adjustment problems in families who have children with or without a chronic illness. In addition, it is clear that interventions should focus not only on helping mothers, but also on addressing the psychosocial adjustment of fathers, as well as the parents' marital relationship as perceived by mothers and fathers. Interventions targeted only at the individual child without working to improve parental functioning within the larger family system may overlook an important avenue for mitigating risk and promoting healthier families.

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