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Observed and Perceived Dyadic and Systemic Functioning in Families of Preadolescents With Spina Bifida

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Objective: **To examine dyadic and systemic family functioning across several domains (conflict, cohesion, and stress) in families of preadolescents with spina bifida in comparison to families of able-bodied preadolescents (8- and 9-year olds; $n = 68$ in each sample).**

Methods: **Mother-, father-, and child-reported questionnaire data and observational ratings of family behavior were employed.**

Results: **Findings revealed significant group and socioeconomic status (SES) differences, particularly for the observational family data. Compared to families of able-bodied children, families in the spina bifida sample were less cohesive and children from this sample were more passive during family interaction tasks. Additional analyses suggested that some of these significant associations between group status and family functioning were mediated by verbal IQ, indicating that a significant portion (42%–55%) of the overall group effect was due to variations in child cognitive functioning. Lower SES families demonstrated higher levels of observed mother-child conflict, less observed and perceived family cohesion, and more life events. Lower SES families from the spina bifida sample appear to be particularly at risk for lower levels of family cohesion.**

Conclusions: **Findings for the spina bifida sample support a resilience-disruption view (Costigan, Floyd, Harter, & McClintock, 1997) of systemic functioning in families of children with pediatric conditions.**

Key words: *spina bifida; physical disability; family; family system; SES; adolescence; conflict; cohesion; stress.*

Several scholars have maintained that the impact of pediatric chronic illnesses on children's psychosocial functioning is best examined within the family context (Chaney et al., 1997; Drotar, 1997; Kazak, Segal-Andrews, & Johnson, 1995; Wallander & Varni, 1998). Because most families with chronically ill children appear to be healthy families who happen to be faced with difficult circumstances (Kazak, 1997; Kazak et al., 1995; Quittner & DiGirolamo, 1998; Spaulding & Morgan, 1986), some have sought to examine how the presence of a child with a pediatric illness may alter an otherwise healthy family system (Kazak, 1997). When viewed from a

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family systems perspective, a variable that is found to be maladaptive in families with typically developing children (e.g., a highly structured family environment, parental overprotectiveness) may be adaptive, at least over the short term, in families of chronically ill children (Anderson & Coyne, 1993; Kazak et al., 1995; Seiffge-Krenke, 1998).

Whereas the importance of investigating family functioning in pediatric populations is well recognized (Kazak et al., 1995; Wallander & Varni, 1998), advances in this research area have been hampered because most studies (Drotar, 1997; Kazak, 1986) (1) have not examined family-level (e.g., dyadic, triadic, or systemic) constructs (Wallander & Varni, 1998); (2) have not included matched comparison samples; (3) are based only on information collected from a single source (usually mothers; Holmbeck, Li, Schurman, Friedman, & Coakley, in press); and (4) have used only a single method (usually questionnaires; Holmbeck et al., 2000).

Given past work, it appears that at least two types of family research would be particularly informative. First, we need more process-level information regarding dyadic- and system-level family variables that differ between families of children with and without pediatric conditions. Such information would increase our understanding of how families adapt to and are transformed by the presence of children with these conditions (Costigan et al., 1997). Second, and based on results of the first type of research, we can examine links between the most salient family-level process variables and medical and nonmedical child adjustment outcomes. In this study, we focus on the first type of research. Specifically, the purpose of this investigation was to examine dyadic and systemic functioning in families with preadolescents who have a physical disability (i.e., spina bifida) in comparison to families with able-bodied preadolescents across a variety of family-level dimensions with multisource and multimethod data.

Caring for a child with spina bifida frequently places long-term physical, psychological, and financial strains on the family system (Carr, 1991). Parents of children with disabilities typically experience more stress than parents of healthy children (Holmbeck et al., 1997; Kazak et al., 1995). Although several studies of families in the pediatric literature have found no differences between pediatric families and comparison families on family-level variables (e.g., Ammerman, Van Hasselt, & Hersen, 1991; see Kazak et al., 1995, for a review), one study found that roughly 15% of families of children with spina bifida fell within the clinically problematic range on a general measure of family functioning, and 25% demonstrated difficulties with "the allocation and maintenance of defined roles and responsibilities in the family" (Ammerman et al., 1998, p. 457; also see Loomis, Javornisky, Monahan, Burke, & Lindsay, 1997). Differences across studies may be a function of the type of data used in making comparisons across samples (e.g., normative data vs. data from matched controls). In this study, the family functioning of a demographically matched sample of able-bodied adolescents was compared to the functioning of families of children with spina bifida.

The selection of dyadic and systemic family functioning constructs for this study was based on recent work that has identified *conflict* and *cohesion* as central family process dimensions (Cox & Brooks-Gunn, 1999; Holmbeck, 1996). In addition, *stress* within the family system has received considerable attention in the pediatric literature (Quittner & DiGirolamo, 1998; Wallander & Varni, 1995). All variables included in this study were dyadic or systemic (i.e., variables that indexed the behavior of an individual in isolation were not selected).

Families of children with spina bifida were expected to exhibit higher levels of stress, given theoretical work that identifies childhood illness as a factor that may increase the overall stress within the family system (McCubbin & Patterson, 1982) and past findings that suggest that parents of children with chronic illnesses exhibit more distress (Holmbeck et al., 1997; Thompson & Gustafson, 1996). With respect to conflict and cohesion, three perspectives on families of children with disabilities yield different predictions; we sought to examine the differential validity of each of these perspectives. The first perspective is based on findings that children with physical disabilities rely more on parents for help with tasks of daily living than able-bodied children do (Murch & Cohen, 1989). It follows, then, that members of families that include children with physical disabilities may be drawn closer together (in a "centripetal" manner; Rait et al., 1992; Stierlin, 1981), as the needs of the disabled child command the attention of the rest of the family (Rolland, 1987). From this perspective, we expected levels of family conflict (observed and per-

ceived) to be lower and cohesion higher in families of children with spina bifida than in families with able-bodied children. We also predicted that children with spina bifida would be less influential in family decision making and that parents from these families would be less likely to solicit input from their children.

A second perspective is that children with spina bifida have the same desires for independent functioning as their able-bodied counterparts, *even prior to adolescence*. Such autonomy strivings may cause tension in the parent-child relationship, particularly in families of children with pediatric conditions where parents may have exercised considerable control over their children's activities and medical regimens during the middle childhood years. From this perspective, we expected more conflict, less parent-child agreement and cohesion, more disengagement, and a tendency for family members to be less receptive to each other's opinions in families of children with spina bifida. Given that we are studying 8- and 9-year-old children, a major question is whether conflicts over independent functioning begin in late childhood, *prior to* the onset of adolescence.

Finally, a third perspective is based on the resilience-disruption hypothesis of family adaptation advanced by Costigan et al. (1997) in their study of families of children with mental retardation. Costigan and colleagues argue that "families are both disrupted by and resilient to the stress associated with raising a child who has a disability" (p. 56). Based on this perspective, we expected family process to be disrupted as children with spina bifida would be less involved and influential in family interactions; such families would, therefore, appear less cohesive than families in the able-bodied sample. On the other hand, these families were likely to evidence resilience by exhibiting low levels of family conflict and family stress.

Given recent findings that outcomes in pediatric populations vary as a function of socioeconomic status (SES; e.g., Frank, Blount, & Brown, 1997), we also examined whether SES main effects and group (spina bifida vs. control) by SES interactions were associated with the family variables. As low SES can be viewed as a stressor that often disrupts parenting and family functioning, we anticipated that lower SES families would exhibit lower levels of cohesion and higher levels of family stress and conflict.

Method

Participants

Participants were 68 families with 8- and 9-year-old preadolescents with spina bifida (37 boys, 31 girls; *M* [age] = 8.34) and a matched comparison group of 68 families with 8- and 9-year-old able-bodied preadolescents (37 boys, 31 girls; *M* [age] = 8.49), who were part of a larger study on the transition to adolescence in families with children who have spina bifida (Holmbeck et al., 1997, 1998; Holmbeck, Shapera, & Hommeyer, 2002). Complete demographic information for both groups is provided in Table I. A wide range of family incomes is represented in both samples. The majority of participants were Caucasian (91% in the able-bodied group; 82% in the spina bifida group). Although biological mothers from all families from both groups participated in the study, only 55 (81%) fathers/step-fathers from the spina bifida group and 52 (76%) fathers/step-fathers from the able-bodied group participated. The groups were successfully matched on all 10 demographic variables (see Table I).

Information on a number of physical status variables for the spina bifida group was obtained based on maternal report or from information gleaned from the child's medical chart: (1) *spinal lesion level:* 32% sacral, 54% lumbosacral or lumbar, 13% thoracic; (2) *spina bifida type:* 82% myelomeningocele, 12% lipomeningocele, 6% other; (3) *shunt status:* 71% shunt, 29% no shunt; and (4) *ambulation:* 19% no assistance, 63% assistance with braces, 18% assistance with a wheelchair. The average number of shunt surgeries among those with shunts was 2.50 (*SD* = 2.91).

As expected, a significant difference was found between the samples on a measure of receptive language (Peabody Picture Vocabulary Test, Revised [PPVT]; Dunn & Dunn, 1981; *M* = 92.49, *SD* = 18.49 for the spina bifida sample and *M* = 108.97, *SD* = 15.06 for the able-bodied sample). This finding parallels results based on verbal IQ test scores; children with spina bifida typically score in the low average range (e.g., Wills, Holmbeck, Dillon, & McLone, 1990). Because lower receptive vocabulary scores were viewed as part of the symptom presentation in children with spina bifida and because children with spina bifida are typically mainstreamed into classrooms with able-bodied children, we made no attempt to match the samples on

Table I. Demographics: Comparisons Across Samples

Demographic characteristics	Spina Bifida	Able-bodied	Statistical tests
Child age *M* (*SD*)	8.34 (.48)	8.49 (.50)	t (134) = –1.75
Maternal age *M* (*SD*)	37.74 (5.19)	37.74 (4.84)	t (134) =.00
Paternal age *M* (*SD*)	41.02 (5.45)	40.63 (6.50)	t (105) =.33
Child gender			
% Male (*n*)	54.41 (37)	54.41 (37)	χ^2 (1) =.00
%Female (*n*)	45.59 (31)	45.59 (31)	
Child ethnicity			
% Caucasian (*n*)	82.35 (56)	91.18 (62)	χ^2 (1) = 2.30
% Other (*n*)	17.65 (12)	8.82 (6)	
Child birth order			
Mean birth order (*SD*)	2.12 (1.38)	2.06 (1.29)	t (129) =.27
Marital status			
% Two-parent intact (*n*)	80.88 (55)	69.12 (47)	χ^2 (1) = 2.51
% Nonintact (*n*)	19.12 (13)	30.88 (21)	
Maternal income *M* (*SD*)	5.75 (2.57)	5.73 (2.45)	t (130) =.05
Paternal income *M* (*SD*)	6.24 (2.50)	6.35 (2.22)	t (105) = -.24
Hollingshead SES *M* (*SD*)	43.12 (10.57)	46.46 (10.89)	t (131) = –1.80

n = 68 for each sample.
Family income is rated on a scale from 1–11 with 1 < $10,000 . . . 5 = $40,000–49,999 . . . 10 = $90,000–99,999, and 11 > $100,000. The Hollingshead (1975) four-factor index of socioeconomic status is based on a composite of maternal education, paternal education, maternal occupational status, and paternal occupational status. All statistics were nonsignificant.

this variable. On the other hand, given that group status and PPVT scores were confounded, we were interested in whether significant group differences would continue to be significant after accounting for PPVT scores. Thus, we re-ran all analyses controlling for PPVT scores.

Participant Recruitment

Participating families in the spina bifida group were recruited from lists provided by four sources: (1) a children's hospital, (2) a children's hospital that cares exclusively for youngsters with physical disabilities, (3) a university-based medical center, and (4) a statewide spina bifida association. A recruitment letter was sent to all parents of children within the 8- to 9-year-old age range (and those who would reach this age within the following year). Letters were followed up with phone calls. Out of 310 nonoverlapping child names from the four sources, 72 families lived too far away (greater than 120 miles from the laboratory), 64 declined to participate, 56 could not be reached (due to 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 (due to an error on the original participant list). A comparison of participating children with children from families that declined to participate (n = 64) revealed no differences with respect to lesion level (χ^2 [2] = .62, $p > .05$) or type of spina bifida (myelomeningocele vs. lipomeningocele) (χ^2 [1] = 1.63, $p > .05$).

Participating families from the able-bodied comparison group were recruited by contacting schools where the children with spina bifida were enrolled. To obtain a comparison group the same size as the spina bifida group, we did not need to contact all possible schools. Instead, the initial list of schools was based on school enrollment information for the first 42 children with spina bifida who agreed to participate in our study. This list provided us with the necessary number of potential able-bodied participants to yield a satisfactory matching of groups. Of these 42 schools, 24 were ruled out for various reasons (e.g., the community was too far away to run multiple families in that community, the average family income or racial distribution in the school would have produced matching difficulties). Of the remaining 18 schools, 12 agreed to participate. At the participating schools, recruitment let-

ters (as well as self-addressed, stamped envelopes) were sent home with "control" children in our age range; parents could then return a slip indicating their consent to participate. To obtain the sample used in this study, we sent roughly 1,700 letters. The low recruitment rate is attributable, at least in part, to the longitudinal nature of the study that was described in detail in the recruitment letter.

Procedure

Assessments of the participating families were conducted by graduate and undergraduate research assistants during 3-hour home visits. After the family members signed informed consent blanks, parents and child were asked to complete a set of questionnaires as well as one hour of audiotaped and videotaped family interaction tasks. Questionnaires were read aloud to children and all Likert-scale formats were presented on large laminated cards. Upon completion of the questionnaires and interaction tasks, families were paid $50.

Measures

Questionnaire Measures of Family Functioning

Intensity of Parent-Child Conflict. The 15-item Parent-Adolescent Conflict Scale (PAC) is a brief version of the Issues Checklist (Robin & Foster, 1989). The PAC is composed of a list of potential conflicts often discussed in families with preadolescents (e.g., whether or not he or she does chores around the house). Each item requires three responses. The family member first responds "yes" or "no" according to whether or not the issue was discussed during the last 2 weeks. If an issue was discussed, the family member indicates the number of times. Finally, if an issue was discussed, respondents rate on a 5-point Likert scale (ranging from "calm" to "angry") how intense these discussions were on average. Mothers, fathers, and children completed this questionnaire. Only the intensity ratings were used in this study. Alphas for child, mother, and father report for the spina bifida group were .81, .76., and .77, respectively. For the able-bodied group, the corresponding alphas were .68, .65, and .55, respectively.

Family-Level Conflict and Cohesion. Mothers and fathers completed a shortened version of the FES, a 90-item self-report measure that assesses social-environmental characteristics of the family system (Moos & Moos, 1986). The FES, composed of 10 subscales, is administered in a true/false format. For this study, items from the conflict and cohesion subscales were used. Based on data from this study, Cronbach alphas for the spina bifida group for the two subscales were as follows: mother report of conflict (.60), mother report of cohesion (.71), father report of conflict (.67), and father report of cohesion (.74). The same alphas for the able-bodied comparison sample were .74, .71, .78, and .57. The somewhat modest alphas for some subscales were due to the restricted true-false response format (Roosa & Beals, 1990).

Dyadic Decision-Making Agreement. Decision-making agreement was assessed using the individually completed questionnaires included as part of the Structured Family Interaction Task (SFIT; Ferreira, 1963; see description later). All family members completed a 5-item form that required respondents to indicate their first and second choices for several family activities. To compute dyadic decision-making agreement, we summed all possible agreements among the first two choices for members of each dyad. For example, if for a given family, the child's second choice for item 1 corresponded to the mother's first choice for item 1, this was counted as an agreement for this item. Scores for each dyad could range from 0–10 (two possible agreements across each of the five items). For families where no father was present, scores for dyads that included fathers were not computed.

Family Life Events. The Family Inventory of Life Events (FILE) was employed as a parent-report measure that assesses the frequency of life events and the degree to which events have an impact on the family system (Olson et al., 1985). In its original form, the FILE includes 71 items that assess life events in the general areas of family conflicts, marital relations, births/pregnancies, money, jobs, moves, deaths, and other. The version employed in this study includes an additional 19 items (for a total of 90 items) added by another investigator to tap additional relevant stressors (Judy Garber, personal communication, October 1993). Of these 19 added items, 16 were new (e.g., "child experienced increased conflict with peers," "your home was robbed"); three items were added because three of the original items were divided into two items each (e.g., "spouse/parent was separated or divorced" was split into two items: one that assessed "separation" and one that assessed "divorce"). Each item has two

parts: first, the family member responds "yes" or "no" as to whether the event has occurred in the past 12 months; second, if the item has occurred in the past 12 months, family members rate on a 5-point Likert scale (ranging from "no effect at all" to a "very big effect") how much of an impact the event has had on them. Only the total event score was used in this study. The scale reliability for the mother's total event score was .86 for the spina bifida sample and .87 for the comparison sample, while the corresponding alphas for fathers were .70 and .83, respectively.

Observational Measures

Videotaped Family Interaction Tasks. Three tasks from the videotaped family session were coded (the order of which were counterbalanced across families): an unfamiliar board game task (developed for this study), a conflict task (Smetana, Yau, Restrepo, & Braeges, 1991), and the Structured Family Interaction Task (Ferreira, 1963). Prior to these tasks, families participated in a warm-up task that consisted of two parts. The first part included a series of anagrams, which children were asked to work on for 5 minutes. The second part involved assembling a series of five puzzles.

For the unfamiliar board game task, families were asked to play an educational game purchased through a mail order catalog (not available for retail purchase). No families reported that they had ever seen the game. Families spent 10 minutes engaged in this task, during which time they were asked to establish their own rules and then play the game.

The conflict task was based on a procedure employed by Smetana et al. (1991). During the questionnaire portion of the home visit, parents and child completed a short form of the Issues Checklist (Robin & Foster, 1989). Prior to the beginning of the interaction tasks, research assistants tabulated weighted conflict scores (i.e., intensity $\times$ frequency) for each issue endorsed by each family member. The five issues that received the highest total weighted conflict score across family members were presented to the family for discussion during the conflict task. Family members were asked to select three of the five issues and discuss them for a total of 10 minutes.

Families also completed the Structured Family Interaction Task (SFIT; Ferreira, 1963). As noted earlier, during the questionnaire portion of the home visit, each parent and child completed a five-item questionnaire with each item containing five response options. Respondents recorded their first and second choices for commonly discussed family activities (e.g., what TV show they would watch). During the videotaped family interaction portion of the home visit, the family was again handed a copy of this questionnaire and was asked to come to a group consensus and select a first and second choice for the same items.

Global Coding of Family Interaction. Observational data for the three tasks described were coded using a global-coding method developed by Holmbeck, Belvedere, Gorey-Ferguson, and Schneider (1995), based on a system developed by Smetana et al. (1991). As is typically done with global coding systems, coders viewed a single family interaction task and then provided 5-point Likert scale ratings on a variety of dimensions for that task. The manual that accompanies this coding system includes behavioral descriptions for each of the points along the Likert scale. The coding system assesses several areas of parenting behavior, child behavior, and parent-child relationships across six dimensions: (1) interaction style, (2) conflict, (3) affect, (4) control, (5) child-centered and collaborative problem solving, and (6) several family-level codes. Only items that assessed dyadic-level (mother-child, father-child, mother-father) or family-level interactions were selected for use in this study. Following is a list of the dyadic codes (with the number of codes and domain assignment [i.e., cohesion, conflict, stress] included in parentheses): (1) family member requests input from another family member (six dyadic codes; cohesion), (2) how receptive a family member is to another family member (six dyadic codes; cohesion), (3) the level of conflict between two family members (three dyadic codes; conflict), and (4) the degree to which parents present a united front (one code; cohesion). Family-level variables included four codes that assessed the degree to which a family was (1) impaired (cohesion; reverse-scored; assesses how well the family is able to respond to the task and how well they can communicate and discuss differences); (2) disengaged (cohesion; reverse-scored); (3) open or warm (cohesion); and (4) able to reach a resolution or agreement (cohesion). Undergraduate and graduate student coders were trained for approximately 10 hours until they obtained at least 90% agreement with an expert graduate coder. All coders were "blind" to the specific hypotheses of this study, but not necessarily to the group status of the child. For each of the three tasks, two coders rated dyadic and

family behaviors. Item-level means of the two raters for each task were summed across the three tasks to yield a single score for each coding item for each family.

Satisfactory interrater reliability (Fleiss, 1981) was found between coders across the 20 codes for both samples. The only exceptions occurred for "mother requests input from father" and "father requests input from mother," which yielded low intraclass correlations for the spina bifida sample ($rs < .30$). Thus, these two items were dropped from further analysis. For the spina bifida group, the ranges and means for the item-level intraclass correlations were as follows: mother-child .60 to .76 ($M = .67$); father-child .51 to .77 ($M = .69$); mother-father .46 to .70 ($M = .64$; and family .71 to .78 ($M = .73$). The corresponding item-level intraclass correlations for the comparison sample were mother-child .52 to .79 ($M = .67$); father-child .61 to .79 ($M = .69$); mother-father .39 to .70 ($M = .55$); and family .65 to .85 ($M = .75$).

Given high intercorrelations among the four family-level items (mean $r = .70$ in the spina bifida sample and .71 in the comparison sample), these items were combined into an "observed family-level cohesion" composite (scored in the direction of higher cohesion).

Home Observation Ratings. One research assistant completed the 44-item Home Visit Report measure at the end of each home visit. Most items were developed for this study, with 17 based on the work of another investigator (Judy Garber, personal communication, October 1993). This measure assesses eight global scales of the home environment (level of familial organization, parent friendliness, child friendliness, degree to which the home environment is child-centered, noise level, home messiness, quality of parenting behavior, and validity of child self-report data). All items were measured on 5-point Likert scales (ranging from "not at all" to "very much") with an option of "not applicable." To assess "family stress," subscales that tapped family-level constructs and those subscales that were expected to vary as a function of stress levels in the home were selected. As such, level of family organization, noise level, and home messiness were all considered measures of family stress (or lack of stress). Unfortunately, home messiness could not be used due to low frequencies and low interrater agreement**.** The family organization scale includes four items and had scale alphas of .85 and .80 for the spina bifida and comparison groups, respectively. The noise level scale also includes four items and had scale alphas of .85 and .70 for the spina bifida and comparison groups, respectively. Rater reliability data for the family organization and noise level scales were based on 15 randomly selected families and were .80 and .70, respectively, for the spina bifida sample and .85 and .85, respectively, for the comparison sample.

Results

Analyses of group (spina bifida vs. comparison), SES (high [≥ 45] vs. low [< 45] based on a median split of Hollingshead scores; Hollingshead, 1975), and gender (of child) differences with respect to the family variables were conducted with MANOVAs and ANOVAs. Child-, mother-, and father-reported dependent variables were run in separate analyses because listwise deletion defaults for MANOVA reduce the N to those participants with complete data on all variables (e.g., a MANOVA that included mother- and father-report variables in the same analysis would have eliminated all single-parent families as well as all families where only one of two parents responded to the research protocol). Although this strategy of running analyses separately by family member allowed us to make use of all available data, this approach also necessitated the use of ANOVAs (rather than MANOVAs) for some analyses. Because no gender differences were found, all analyses included only group and SES (and their interaction) as independent variables. Significant effects were followed up with appropriate univariate post-hoc tests. All findings are reported separately within each of the dependent variable domains: conflict, cohesion, and stress (see Table II).

Conflict

As can be seen in Table II, there were no significant group or SES main effects or interactions for child report of conflict intensity or for mother report of conflict. Although a significant MANOVA emerged for father report of conflict, $F(2, 98) = 3.55$, $p < .05$, neither of the univariate F tests was significant. The only other significant effect for the conflict domain was for observed mother-child conflict, $F(1, 128) = 5.31$, $p < .05$. For this dyadic variable, there was a significant difference between SES groups, with higher SES participants ($M = 1.46$) scoring lower than low SES participants ($M = 1.64$).

Table II. Group Means (Standard Deviations) With MANOVA and ANOVA Findings

	Spina Bifida (SB)		Able-bodied (AB)		MANOVA		
	Low SES (1)	High SES (2)	Low SES (3)	High SES (4)	Multivariate	Univariate	ANOVA
Conflict							
Child report							
Conflict intensity (IC)	1.70 (.75)	1.77 (.63)	1.70 (.62)	1.48 (.49)			*ns*
Mother report					*ns*		
Conflict intensity (IC)	1.79 (.64)	1.82 (.83)	1.83 (.77)	1.64 (.61)		—	
Family conflict (FES)	.34 (.20)	.31 (.19)	.40 (.27)	.31 (.24)		—	
Father report					G*		
Conflict intensity (IC)	1.84 (.52)	1.54 (.44)	1.53 (.45)	1.54 (.46)		*ns*	
Family conflict (FES)	.29 (.23)	.25 (.20)	.38 (.28)	.33 (.23)		*ns*	
Observational codes of family interaction							
Mother-child conflict	1.67 (.46)	1.46 (.38)	1.61 (.43)	1.46 (.42)			S*(H<L)
Father-child conflict	1.58 (.46)	1.46 (.50)	1.45 (.26)	1.49 (.44)			*ns*
Mother-father conflict	1.36 (.43)	1.25 (.24)	1.47 (.54)	1.31 (.28)			*ns*
Cohesion							
Mother report							
Family cohesion (FES)	.81 (.19)	.87 (.21)	.74 (.22)	.88 (.17)			S**(L<H)
Father report							
Family cohesion (FES)	.82 (.20)	.79 (.24)	.77 (.17)	.83 (.19)			*ns*
Dyadic agreement (SFIT)							
Child-mother agree	4.82 (1.55)	4.31 (1.59)	5.28 (1.33)	5.56 (1.37)			G***(SB<AB)
Child-father agree	4.78 (1.47)	5.21 (1.74)	4.81 (1.50)	5.64 (1.85)			*ns*
Mother-father agree	6.76 (1.43)	5.71 (1.63)	5.81 (1.21)	6.77 (1.63)			GxS***(2,3<1,4)
Observational codes of family interaction: Mother-child					G**		
Mother req. input from child	4.08 (.61)	4.19 (.57)	4.04 (.55)	4.07 (.51)		*ns*	
Child req. input from mother	2.49 (.64)	2.79 (.48)	2.89 (.47)	3.00 (.54)		G**(SB<AB)	
Mother receptive to child	3.82 (.50)	4.05 (.43)	3.94 (.43)	4.06 (.39)		*ns*	
Child receptive to mother	3.60 (.55)	3.75 (.45)	3.67 (.53)	3.74 (.52)		*ns*	
Observational codes of family interaction: Father-child					G*		
Father req. input from child	3.45 (.76)	3.79 (.63)	3.40 (.80)	3.56 (.54)		*ns*	
Child req. input from father	2.36 (.51)	2.64 (.48)	2.65 (.45)	2.86 (.53)		G**(SB<AB)	
Father receptive to child	3.60 (.56)	3.93 (.60)	3.74 (.42)	3.86 (.45)		*ns*	
Child receptive to father	3.42 (.55)	3.67 (.64)	3.68 (.55)	3.70 (.50)		*ns*	
Observational codes of family interaction: Mother-father					*ns*		
Mother receptive to father	3.60 (.42)	3.84 (.51)	3.70 (.64)	3.92 (.36)		—	
Father receptive to mother	3.58 (.57)	3.87 (.53)	3.74 (.47)	3.82 (.45)		—	
Parents present united front	3.64 (.70)	3.92 (.53)	3.70 (.68)	3.76 (.41)		—	
Observational code of family interaction: Family							
Family cohesion composite	3.94 (.54)	4.35 (.38)	4.25 (.50)	4.37 (.36)			G*(SB<AB)
							S***(L<H)
Stress							
Mother-report							
Life events (FILE)	14.03 (7.48)	11.84 (5.81)	16.54 (7.80)	13.28 (8.31)			S*(H<L)
Father-report							
Life events (FILE)	11.71 (6.32)	12.28 (6.31)	13.10 (7.77)	10.94 (6.38)			*ns*
Observational codes: Home visit ratings					G*		
Home organization	4.49 (.67)	4.76 (.44)	4.71 (.40)	4.69 (.45)		*ns*	
Level of noise	1.94 (.97)	1.92 (.83)	1.53 (.58)	1.62 (.69)		G**(AB<SB)	

S = SES, G = Group, G x S=Group by SES interaction, *ns* = nonsignificant, H = high, L = low, IC = Issues Checklist, FES = Family Environment Scale, FILE = Family Inventory of Life Events.
*$p < .05$.
**$p < .01$.
***$p < .001$.

Cohesion

For cohesion, there was a significant SES main effect for mother report of family cohesion, $F(1, 126) = 8.36$, $p < .01$, with lower SES families ($M = .78$) scoring lower than higher SES families ($M = .88$). No significant effects were found for father report of family cohesion. For child-mother agreement, there was a group main effect, $F(1, 128) = 10.80$, $p < .001$, such that families in the spina bifida group ($M = 4.63$) scored lower than families in the able-bodied group ($M = 5.44$). The only significant group × SES interaction was found for mother-father agreement, $F(1, 101) = 11.58$, $p < .001$. Duncan post-hoc analyses revealed that high SES families from the spina bifida group and low SES families from the able-bodied group tended to score lower than other families on this agreement variable. Significant MANOVAs emerged for the group main effect for observed mother-child cohesion, $F(4, 125) = 4.20$, $p < .01$, and father-child cohesion, $F(4, 98) = 2.85$, $p < .05$. For both sets of follow-up univariate analyses, "child requests input from mother/father" was lower in the spina bifida sample (*M*s of 2.62 and 2.49 for mother-child and father-child, respectively) than in the able-bodied sample (*M*s of 2.95 and 2.77 for mother-child and father-child, respectively). The univariate statistics were as follows: (1) mother-child, $F(1, 128) = 10.01$, $p < .01$, and (2) father-child, $F(1, 101) = 6.86$, $p < .01$. No significant MANOVAs were found for observed mother-father cohesion.

Finally, two main effects were found for the observational measure of family-level cohesion: (1) group, $F(1, 128) = 4.28$, $p < .05$, and (2) SES, $F(1, 128) = 10.62$, $p < .001$. Families in the spina bifida group ($M = 4.12$) and in the lower SES group ($M = 4.07$) scored lower than their counterparts in the able-bodied group ($M = 4.32$) and the higher SES group ($M = 4.36$). Inspection of the means reveals that the low SES, spina bifida sample scored significantly lower than the other three groups (a finding confirmed with a Duncan post-hoc analysis).

Stress

Although there were no significant effects for father report of life events, there was a significant SES main effect for mother report of stress, $F(1, 126) = 4.16$, $p < .05$, with higher SES families ($M = 12.72$) scoring lower than lower SES families ($M = 15.09$). Finally, a significant MANOVA group main effect emerged for the observational measures of stress, $F(2, 126) = 3.46$, $p < .05$. Univariate follow-up analyses revealed a significant group main effect for level of noise observed in the home, $F(1, 127) = 6.28$, $p < .01$, with families from the able-bodied group ($M = 1.61$) scoring lower than families from the spina bifida group ($M = 1.92$).

PPVT Analyzed as a Covariate and Mediator

Given that the groups differed on the PPVT, all analyses were re-run with PPVT scores as a covariate. All of the univariate effects remained statistically significant, except for the following three effects for group status (nonsignificant *p* values from these covariate analyses are provided in parentheses): "child requests input from mother" ($p = .06$), "child requests input from father" ($p = .12$), and the "family cohesion composite" ($p = .32$). Such findings raised the possibility that PPVT scores mediated associations between group status and these family variables (i.e., we were interested in whether group status was associated with PPVT scores, which were, in turn, associated with the three family outcomes; group → PPVT → family functioning; Greene & Ernhart, 1991). To determine whether there was significant mediation, four criteria had to be met (Holmbeck, 1997): (1) the effect of group (the predictor) on PPVT scores (the mediator) should be significant; (2) the effect of group on the family outcome should be significant; (3) the effect of PPVT scores on the family outcome should be significant, after controlling for the group effect; and (4) the group → family outcome total effect should drop significantly when PPVT scores are included in the model. Based on multiple regression analyses, the first three conditions were met for all three of these family outcomes. The fourth condition was examined by testing the significance of the indirect effect (Holmbeck, in press), by using Sobel's (1988) equation for the standard error of the indirect effect. Significant mediation was found in all three cases ($z > 1.96$) and PPVT scores accounted for between 42% and 55% ($M = 46.9\%$) of the total effect of group status on these three family outcomes.

Discussion

The purpose of this study was to examine observed and perceived family functioning in a sample of

preadolescents with spina bifida in comparison to families of able-bodied children. Findings revealed significant group and SES differences, with most of the significant effects for the observational data. In the spina bifida sample, families were observed to be less cohesive, children were perceived as more passive during the family interaction tasks, there was less mother-child agreement on a measure of activity preferences, and noise levels were higher in the home environment than was the case in the able-bodied sample. On the other hand, levels of conflict and reports of life events did not differ across the two groups. Lower SES families demonstrated higher levels of observed mother-child conflict, less observed and perceived family cohesion, and more life events. Finally, PPVT scores were found to mediate some of the associations between group status and observed family functioning.

Findings of this study appear to be most consistent with the resilience-disruption hypothesis proposed by Costigan et al. (1997). With respect to disruption, families of children with spina bifida were viewed as less cohesive; indeed, four of the five significant group effects emerged in the cohesion domain. Such results support the findings of previous work based on self-reports of family functioning as compared to normative data (Loomis et al., 1997). Families in the spina bifida sample demonstrated resilience as well. That is, levels of conflict and rates of life events did not vary across the groups. In other words, having a preadolescent with spina bifida appears to be associated with some disruption in family relationships, but such disruptions do not translate into higher levels of family conflicts and stress (Costigan et al., 1997). As Kazak (1997) noted, "families of children with serious illness and physically handicapping conditions are different but not deviant" (p. 145). (It is important to note that we found support for the "resilience" portion of Costigan et al.'s resilience-disruption hypothesis via the absence of significant effects for certain variables. Conclusions based on null findings should be viewed cautiously.)

Although the lower levels of observed family cohesion in the spina bifida sample support the "disruption" side of Costigan et al.'s (1997) resilience-disruption hypothesis, the link between group status and cohesion was significantly mediated by PPVT scores. Moreover, the fact that PPVT scores remained significantly associated with family cohesion even after accounting for group status suggests that the association between PPVT and family functioning is robust. It may be that communication in families of children with lower verbal IQs is disrupted because of reduced involvement of these children in family conversations. Alternatively, because the PPVT tended to be associated only with the observational variables, it may be that the raters who coded the videotapes for this study were biased in some way with respect to verbal IQ level (a possibility that should be investigated in future work). These interpretations aside, although PPVT scores served a significant mediational role, roughly half of the group effect remained even after accounting for PPVT scores. Thus, it appears that both group status and verbal IQ level have an impact on observed family functioning. (In interpreting the findings for the PPVT, we have implied that the PPVT is a valid proxy for verbal IQ scores, given that the PPVT is highly correlated with verbal IQ scores, especially vocabulary subtests. There is some controversy over this issue [Gregory, 2000].)

The finding that children with spina bifida were less likely to request input from their parents during observed family interactions is in line with past work on families of children with pediatric and cognitive conditions (Costigan et al., 1997). In our sample, it is not clear if this lack of involvement on the part of children with spina bifida is a consequence of certain aspects of their neuropsychological functioning (e.g., moderately lower IQ and receptive vocabulary abilities, attentional problems; Wills et al., 1990), a manifestation of internalizing symptoms (Ammerman et al., 1998; Appleton et al., 1997), a form of "learned passivity" that may have resulted from higher levels of parental control in these families (see Holmbeck et al., 2002), or if the child's lack of interest in his or her parents' perspectives is a passive strategy for gaining a certain degree of autonomy. In support of the first possibility, the mediational analyses revealed that the PPVT scores partially mediated the effect of group status on the "child requests input from parent" variables. The meaning of such passive behaviors among children with such conditions will need to be addressed in future research.

Although, at a systemic level, families appear to adapt successfully to having a child with a physical disability, past research from the same data set suggests that stress is higher at the individual level (Holmbeck et al., 1997). It may be, then, that parents experience more stress as individuals, but that this does not have an impact on level of satisfaction in the marriage or the level of conflict in the family

as a whole. Such parents may simply be less engaged during interactions with their family. On the other hand, our findings may be age-dependent; the lack of effects for certain family variables may have been a consequence of our focus on preadolescents. If this is the case, we may begin to see more group differences as the children in our sample move into the adolescent transition.

Unlike the group differences findings, the analyses involving SES revealed that this variable had an impact on all three domains of family functioning. Lower SES families exhibited higher levels of observed mother-child conflict, less cohesion, and more life events. It is also noteworthy that the findings for SES emerged for *both* self-reports and observational data. Why were the effects for SES more pervasive? The findings of this study suggest that families may be less adept at adjusting to economic strain than to the presence of a child with special needs. Unlike the effects for group status, low SES appears to adversely affect the family's ability to stave off family conflicts and life events. It also appears that parents are aware of the impact of SES, given that significant SES effects were found for the self-report data. These findings for SES parallel results of studies that have focused on the impact of single parenting (e.g., Costigan et al., 1997) and studies of SES and other outcomes (Bier, Morales, Liebling, Geddes, & Kim, 1997).

The fact that the group *and* SES main effects were significant for observed family cohesion suggests that these two variables have an additive effect on this family variable. Specifically, the low-SES, spina bifida sample appears to be particularly at-risk for low levels of cohesion. Additive effects like this one have been found in other studies in the pediatric literature (Carr, 1991). Holmes, Yu, and Frentz (1999), for example, found that disease status and negative life events predicted child adjustment problems additively; diabetic children from environments characterized by high levels of negative life events were more likely to have adjustment difficulties than children experiencing only one of these stressors.

Despite finding significant group and SES effects across several dyadic and systemic variables, our study is not without limitations. First, the generalizability of these findings to children and adolescents of other ages is limited due to the narrow age range targeted in the present investigation (8- and 9-year-olds). The age of the sample also may have limited the number of significant results. As noted earlier, group differences in family dynamics may emerge as the children move into adolescence. Second, 16 families were excluded from participating because they did not speak English (most of these families were Spanish-speaking). Thus, the results of this study are generalizable primarily to Caucasian, English-speaking families. 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, we have examined only one illness group; thus, we do not know the degree to which the group differences apply more generally to the larger population of chronically ill children. Finally, although the coders of the observational data were blind to the specific hypotheses of this study, they were not blind to the group status (spina bifida vs. comparison) of the children. Thus, some coders may have been biased in their ratings. On the other hand, all coders were instructed not to base their ratings on their knowledge of the child's group status.

From a clinical perspective, the findings of this study identify low SES families of children with spina bifida as a possible at-risk group (also see Seefeldt et al., 1997). Clinicians who work with such families may wish to bolster the stress management skills of family members to reduce the risks of possible increases in family conflicts and decreases in cohesion. With respect to families of children with physical disabilities more generally, and given that there may be a link between parenting stress (Holmbeck et al., 1997) and lower levels of family cohesion, the level of individual stress could also be addressed with clinical interventions. Finally, although many families of children with physical disabilities appear to be resilient as they adapt to the stresses of managing a child with special needs (Costigan et al., 1997), the degree to which such resilience skills can be supported is likely to determine whether members of these families exhibit adjustment difficulties in the future.

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