Journal of Consulting and Clinical Psychology
2003, Vol. 71, No. 4, 782–796

0022-006X/03/$12.00 DOI: 10.1037/0022-006X.71.4.782

A Multimethod, Multi-Informant, and Multidimensional Perspective on Psychosocial Adjustment in Preadolescents With Spina Bifida

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This study examined the psychosocial adjustment of preadolescents with spina bifida in relation to a comparison sample of able-bodied preadolescents (8- and 9-year-olds; $n = 68$ in each sample). The study also examined the potential clinical utility of a narrowband multimethod, multi-informant, and multidimensional perspective on the assessment of psychosocial functioning in children and adolescents with pediatric conditions. Findings revealed that children with spina bifida tended to be socially immature and passive, less likely to have social contacts outside of school, more dependent on adults for guidance, less competent scholastically, less physically active, less likely to make independent decisions, and more likely to exhibit attention and concentration difficulties. No group differences were found for externalizing symptoms, affective functioning, or global self-worth, suggesting resilience in these domains for the spina bifida sample. Findings also suggest that low socioeconomic status and the presence of a physical disability may be additive risk factors for certain psychosocial adjustment difficulties.

Recent reviews suggest that children and adolescents with chronic illnesses and physical disabilities are at increased risk for internalizing and externalizing symptoms and lower self-esteem (Lavigne & Faier-Routman, 1992; Thompson & Gustafson, 1996). Although such broadband conclusions are useful in highlighting the at-risk status of these children, such reviews have not provided a complete clinical picture of their psychosocial functioning, either within or across illnesses. As in the reviews, individual studies in this field have lacked the specificity needed to describe fully the functioning of children with certain physical disorders. Typically, studies focus on single dimensions of adjustment from the perspective of single informants (Drotar, 1997; Lavigne & Faier-Routman, 1992; Wallander & Varni, 1998).

Those who study children with physical disorders often make a distinction between noncategorical and categorical approaches to studying chronic illness (Lavigne & Faier-Routman, 1992; Stein & Jessop, 1982; Wallander & Varni, 1998). The noncategorical approach is based on the notion that children with different pediatric conditions may be more alike than different across dimensions such as the degree to which a physical disorder is visible or life threatening and the manner in which the condition affects different types of functioning (e.g., sensory, motor, and/or cognitive; Lavigne & Faier-Routman, 1992; Wallander & Varni, 1998). Research designs based on this perspective may, for example, examine the psychosocial functioning of a heterogeneous sample of children from various illness groups in relation to a comparison or normative sample. The categorical approach, on the other hand, emphasizes the utility of differentiating between children with different illnesses, focusing on illness-specific processes that underlie psychosocial adjustment.

Although the noncategorical approach has the potential to isolate generic illness dimensions that are associated with child adjustment outcomes across a broad range of pediatric conditions, this strategy also has certain drawbacks (Lavigne & Faier-Routman, 1992). From an empirical perspective, it is difficult to isolate the effect of noncategorical illness dimensions (e.g., illness visibility) on psychosocial adjustment because these generic dimensions often evidence little variability across multiple illnesses (e.g., many illnesses are similar on dimensions of visibility). Moreover, from a clinical perspective, a practitioner who is working with a particular child with a particular illness may not benefit from findings of noncategorical research, given its rather broadband focus. As noted by La Greca and Schuman (1999), group comparison studies conducted from a categorical perspective may be useful in isolating illness-specific psychosocial strengths and weaknesses that can be the target of future research or intervention work (e.g., social functioning in children with diabetes; La Greca et al., 1995). Clinically, such illness-specific information may be

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Completion of this article was supported by Social and Behavioral Sciences Research Grants from the March of Dimes Birth Defects Foundation and a Research Support Grant and paid leave from Loyola University Chicago. We thank Ann Walsh Johnson, Joy Ito, Pat McGovern, Pat Braun, Caroline Anderson, David McLone, John Lubicky, the Illinois Spina Bifida Association, and the staff of the spina bifida clinics at Children's Memorial Hospital, Shriner's Hospital–Chicago, and Loyola University Chicago Medical Center. We also thank numerous undergraduate and graduate research assistants for help with data collection and data entry. Most important, we thank the parents, children, teachers, and health professionals who participated in our study.

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useful because children with different illnesses may not exhibit the same difficulties, possibly because of illness characteristics that are unique to each condition. In short, group comparison studies such as the current one have the potential to inform highly focused within-group studies and/or model testing in subsequent group comparison studies (e.g., mediational models that attempt to explain underlying mechanisms for group differences).

Spina bifida is one of the most common congenital birth defects, affecting roughly 1 of every 1,000 live births (McLone & Ito, 1998). It is caused by a failed closure of one or more vertebrae during the early weeks of gestation. Associated health complications include weakened or paralyzed lower extremities, urinary and bowel incontinence, and hydrocephalus. The severity of spina bifida varies in accordance with the spinal lesion level and neurological complications (e.g., the number of shunt replacements and infections).

Whereas some studies have found no adjustment differences between children with spina bifida and matched comparison groups or normative data (Spaulding & Morgan, 1986; Van Hasselt, Ammerman, Hersen, Reigel, & Rowley, 1991), others have found significant differences (Shine, 1998). From a broadband perspective, children with spina bifida appear to be at-risk for exhibiting higher levels of internalizing symptoms and lower levels of self-esteem than comparison children (Ammerman et al., 1998; Appleton et al., 1994, 1997; Kazak & Clark, 1986; Lavigne, Nolan, & McLone, 1988). They are also more likely to be interpersonally lonely and socially immature (Blum, Resnick, Nelson, & St. Germaine, 1991; Kazak & Clark, 1986). With respect to cognitive functioning, children with spina bifida, and especially those with hydrocephalus, often have difficulties in certain academic areas (e.g., arithmetic, nonverbal cognitive skills; Fletcher, Francis et al., 1992; Wills, Holmbeck, Dillon, & McLone, 1990; see Wills, 1993, for a review), and they tend to score at the low end of the average range of intelligence. They also tend to exhibit deficits in executive functioning, abstract reasoning, and the ability to focus attention (Fletcher, Dennis, & Northrup, 2000). Some have speculated that the cognitive difficulties are due, in part, to the impact of hydrocephalus on cerebral white matter (Fletcher, Bohan, et al., 1992; Fletcher et al., 1995; Rourke, 1989).

Although findings such as these have begun to provide a clinical picture of children and adolescents with spina bifida, group comparison research in this area and in the larger field of pediatric psychology has been limited in a number of respects (Lavigne & Faier-Routman, 1992). In a recent review of studies assessing the functioning of families with chronically ill children, Drotar (1997) reported that only 8 of 57 studies used both mother and father report and only 3 of 57 studies used observational data. One concern with the exclusive reliance on maternal reports is that mothers of children with disabilities are themselves at increased risk for psychological distress (Thompson & Gustafson, 1996); therefore, their reports may yield negatively biased portrayals of child functioning (Blankfeld & Holahan, 1996; Thompson, Zeman, Fanurik, & Sirotkin-Roses, 1992). Unfortunately, few studies have used child reports of their own psychosocial adjustment (Lavigne & Faier-Routman, 1992) or fathers' perspectives on child adjustment (Holmbeck et al., 1997; Quittner & DiGirolamo, 1998). Thus, the current study used mother-, father-, child-, and teacher-report on questionnaires as well as global and microlevel observational data. In addition to including multiple informants and methods (Holmbeck, Li, Schurman, Friedman, & Coakley, 2002), multiple dimensions of psychosocial functioning were also assessed. We chose to examine the following dimensions because they were representative of the major domains of adaptive and maladaptive psychosocial functioning during the middle and late childhood developmental periods (Achenbach, 1991a; R. S. Feldman, 2001; S. S. Feldman & Elliott, 1990; Harter, 1985): physical, social, and scholastic competence; autonomy development, coping, observed behaviors when with family; and internalizing and externalizing problem behaviors.

The choice of a comparison sample is an additional design-related decision that has important implications for findings in group comparison studies (La Greca & Schuman, 1999). Effect sizes for group differences tend to be larger when comparisons are made to normative samples than to matched comparison samples; on the other hand, effect sizes for matched comparison samples increase as the number of matching variables increases (Lavigne & Faier-Routman, 1992). In the current study, we sought to examine preadolescents with spina bifida in relation to a carefully matched able-bodied comparison sample. Because of the increasing emphasis on "inclusion" programs for children with disabilities (Stephens, 1994) and because most children with spina bifida are mainstreamed in regular classrooms (with most estimates close to 80%; e.g., Appleton et al., 1994; Tew, 1991), able-bodied classmates from the same schools that include children with spina bifida were viewed as an appropriate comparison sample.

Hypotheses for this study were guided by consideration of the primary limitations experienced by children with spina bifida (Appleton et al., 1994; 1997; Ammerman et al., 1998; Blum et al., 1991; Kazak & Clark, 1986; Shine, 1998): (a) children's *physical limitations* were expected to impact on their activity level, degree of self-reliance, and frequency of social opportunities, (b) children's *neurological limitations*, resulting from hydrocephalus and other brain anomalies, were expected to impact on their ability to focus attention, perform well in the school setting, and attend to social cues, and (c) children's *psychological reactions* to these physical and neurological limitations were expected to have an impact on their self-concept (in the social and school domains), affect quality (e.g., expressed positive affect, internalizing symptoms), and social skills. Thus, children with spina bifida were expected to exhibit higher levels of internalizing symptoms, less observed positive affect, more problems with attention, less involvement in observed family interactions, less independent behavior, and lower self-concept scores in the areas of athletic competence, social competence, and scholastic competence. They were not expected to differ with respect to other self-concept domains (e.g., physical appearance, behavioral conduct), level of externalizing symptoms, or type of coping behaviors (Lavigne et al., 1988).

Given recent findings that outcomes in pediatric populations vary as a function of socioeconomic status (SES; Frank, Blount, & Brown, 1997), we also examined whether SES main effects and Group (spina bifida vs. comparison) $\times$ SES interactions were associated with the adjustment variables. A significant Group $\times$ SES interaction would indicate that SES moderates associations between group status and adjustment outcomes (Holmbeck, 1997). We expected that lower SES children from both samples would exhibit lower levels of adjustment (i.e., a main effects hypothesis; Holmes, Yu, & Frentz, 1999). Finally, given that gender differ-

ences have emerged in past work (Appleton et al., 1997), gender main effects and Gender × Group interactions were examined. Past findings suggest that girls in pediatric populations may be less well adjusted than boys (Appleton et al., 1997).

Method

Sample

Participants were 68 families with 8- and 9-year-old preadolescents with spina bifida (37 boys, 31 girls; mean age = 8.34 years) and a matched comparison group of 68 families with 8- and 9-year-old able-bodied preadolescents (37 boys, 31 girls; mean age = 8.49 years) who were part of a larger longitudinal study on the transition to adolescence in families of children with spina bifida (Holmbeck et al., 1997, 1998; Holmbeck, Johnson, et al., 2002; Holmbeck, Coakley, Hommeyer, Shapera, & Westhoven, 2002; Holmbeck, Shapera, & Hommeyer, 2002). The initial focus on 8- and 9-year-olds permitted the collection of baseline data prior to the beginning of the transition to adolescence (hence, the term *preadolescent*). Complete demographic information for both groups is provided in Table 1. A wide range of family incomes is represented in both samples. The majority of participants were White (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 1).

Information on a number of physical status variables for the spina bifida group was obtained on the basis of maternal report or from information gleaned from the child's medical chart: (a) *spinal lesion level* (medical chart): 32% sacral, 54% lumbosacral or lumbar, 13% thoracic, (b) *spina bifida type* (medical chart): 82% myelomeningocele, 12% lipomeningocele, 6% other, (c) *shunt status* (maternal report): 71% shunt, 29% no shunt, and (d) *ambulation* (maternal report): 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 ($SD = 2.91$). Within the spina bifida sample, these physical status variables have been found to be associated with various psychosocial adjustment outcomes (Hommeyer, Holmbeck, Wills, & Coers, 1999).

As expected (Wills et al., 1990), a significant difference was found between the samples on a measure of receptive language (Peabody Picture Vocabulary Test—Revised; PPVT–R; 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, insofar as children with spina bifida typically score in the low-average range (e.g., Wills et al., 1990). Because lower receptive vocabulary scores were viewed as part of the symptom presentation in children with spina bifida (much like ambulation difficulties, for example) and because children with spina bifida are typically mainstreamed into classrooms with able-bodied children, no attempt was made to match the samples on this variable. On the other hand, group differences findings for the psychosocial variables are reported in two ways: with PPVT–R scores controlled and without PPVT–R scores controlled. By reporting findings with and without this covariate controlled, we were able to determine the degree to which significant effects were (or were not) accounted for by this covariate (Hinshaw, Carte, Sami, Treuting, & Zupan, 2002).

Participant Recruitment

Participating families in the spina bifida group were recruited from lists provided by four sources: (a) a children's hospital, (b) a children's hospital that cares exclusively for youngsters with physical disabilities, (c) a university-based medical center, and (d) a statewide spina bifida association. A recruitment letter was sent to all parents of children within the 8–9-year-old age range (and those who would reach this age within the following year). 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 (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 7 were excluded for miscellaneous reasons. Seventy families remained. A comparison of participating children with children from families that declined to participate ($n = 64$) revealed no differences with respect to lesion level, $\chi^2(2, N = 116) = 0.62$, $p > .05$,

Table 1
Demographics: Comparisons Across Samples

Demographic characteristics	Spina bifida	Able-bodied	Statistical test
Child age in years, *M* (*SD*)	8.34 (0.48)	8.49 (0.50)	$t(134) = -1.75$
Maternal age in years, *M* (*SD*)	37.74 (5.19)	37.74 (4.84)	$t(134) = 0.00$
Paternal age in years, *M* (*SD*)	41.02 (5.45)	40.63 (6.50)	$t(105) = 0.33$
Child gender			
Male, % (*n*)	54.41 (37)	54.41 (37)	$\chi^2(1) = 0.00$
Female, % (*n*)	45.59 (31)	45.59 (31)	
Child ethnicity			
White, % (*n*)	82.35 (56)	91.18 (62)	$\chi^2(1) = 2.30$
Other, % (*n*)	17.65 (12)	8.82 (6)	
Child birth order, *M* (*SD*)	2.12 (1.38)	2.06 (1.29)	$t(129) = 0.27$
Marital status			
Two-parent intact, % (*n*)	80.88 (55)	69.12 (47)	$\chi^2(1) = 2.51$
Nonintact, % (*n*)	19.12 (13)	30.88 (21)	
Maternal income *M* (*SD*)	5.75 (2.57)	5.73 (2.45)	$t(130) = 0.05$
Paternal income *M* (*SD*)	6.24 (2.50)	6.35 (2.22)	$t(105) = -0.24$
Hollingshead SES *M* (*SD*)	43.12 (10.57)	46.46 (10.89)	$t(131) = -1.80$

Note. $n = 68$ for each sample. Family income is rated on a scale from 1 to 11 on which $1 <$ *$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 (SES) is based on a composite of maternal education, paternal education, maternal occupational status, and paternal occupational status. All statistics were nonsignificant.

or type of spina bifida (myelomeningocele vs. lipomeningocele), $\chi^2(1, N = 119) = 1.63$, $p > .05$.

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, it proved unnecessary to contact all possible schools. Instead, a representative listing of schools was chosen based on the following factors: location, the average family income of the surrounding community, and the ethnic distribution in the school. 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. Of these, 24 were ruled out (e.g., the community was too far away to run multiple families in that community given limited funding resources, there was a racial distribution in the school that could have produced matching difficulties). Of the remaining 18 schools, 12 agreed to participate and 6 declined. To obtain the sample used in this study, roughly 1,700 letters were distributed to schools; children were asked to bring the letters home and request parental permission to participate. Seventy-two families agreed to participate. 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.

Matching of the samples on the 10 demographic variables was achieved at the group rather than individual level. In other words, specific individuals in one group were not matched (demographically) to specific individuals in the other group. A demographic comparison of the original samples (*n*s of 70 and 72 in the spina bifida and comparison samples, respectively) revealed sample differences ($p < .05$) on 3 of the 10 demographic matching variables (child age, SES, and child ethnicity). Families who were most discrepant from the mean of their subsample were dropped until matching was achieved on all 10 variables. Thus, two families from the spina bifida sample and four families from the comparison sample were dropped from the analyses to facilitate group-level matching and to achieve equal sample sizes ($n = 68$) in each group.

Procedure

Assessments of the participating families were conducted by research assistants during 3-hr home visits. After parents gave consent and children gave assent, parents and children were asked to complete a set of questionnaires as well as 1 hr of audiotaped and videotaped family interaction tasks, for which they were paid $50. Questionnaires were read aloud to children and all Likert-scale formats were presented on large laminated cards. Parents were also asked to sign release of information forms for the child's teacher (return rate = 97% in the spina bifida sample and 84% in the able-bodied sample; teachers were paid $5).

Up to three of the following tasks from the videotaped family session (the order of which was counterbalanced across families) were coded with three different family interaction coding systems (see below; Allen, Hauser, Bell, Boykin, & Tate, 1996; Holmbeck, Belvedere, Gorey-Ferguson, & Schneider, 1995; Johnson & Holmbeck, 1994): 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).

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). The conflict task was based on a procedure used 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), a frequently used measure of parent–child conflict that inquires about parent–child discussions that have taken place over the past 2 weeks across several issues. Prior to the beginning of the interaction tasks, research assistants tabulated weighted conflict scores (i.e., Frequency × Intensity) for each issue endorsed by each family member on the questionnaires. 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 min.

Finally, families completed the Structured Family Interaction Task (SFIT; Ferreira, 1963). 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 issues (e.g., what television 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.

Measures

Demographics

Prior to completing the questionnaires at each session, parents responded to a series of questions designed to obtain demographic information.

Questionnaire Measures of Preadolescent Adjustment

Adjustment variables are listed within domains assessed in the multivariate analysis of variance (MANOVA) analyses: physical competence and activity level, scholastic competence, social competence, behavior problems, autonomy development, and coping.

Physical competence and activity level. Perceived athletic competence and physical appearance were assessed with child, mother, father, and teacher report on the Child or Parent/Teacher Versions of the Self-Perception Profile for Children (SPPC; Harter, 1985). The 36-item Child Version is a multidimensional measure of self-concept that consists of six subscales (scores range from 1 to 4): Scholastic Competence, Social Acceptance, Athletic Competence, Physical Appearance, Behavioral Conduct, and Global Self-Worth. Parents and teachers completed the shorter 15-item version that tapped the same domains, excluding Self-Worth. Subscale alphas for Athletic Competence and Physical Appearance ranged from .67 to .88 across respondents and groups ($M = .78$). Means of all available child-, mother-, father-, and teacher-report data were used to assess athletic competence and physical appearance (e.g., if father-report data were missing, the mean of the mother-, child-, and teacher-report data was used).

Mother and father report on the Activities subscale from the Child Behavior Checklist (CBCL–Competence Scales; Achenbach, 1991a) were used to evaluate involvement in activities. The mean of all available mother and father data was used.

Scholastic competence. The Scholastic Competence subscale from the Child, Parent, and Teacher Versions of Harter's (1985) SPPC Scale was used to assess scholastic functioning. Alphas ranged from .70 to .90 across respondents and groups ($M = .79$). The mean of all available child, mother, father, and teacher report data was used.

Grades from the child's most recent report card were assessed with teacher report. Grades were coded on a scale of 1 to 8, with higher scores indicating better grades (e.g., a score of 8 indicated *an excellent performance* or the letter-grade *A*, a score of 5 represented *a satisfactory performance* or the letter-grade *B/C,* a score of 1 indicated *an unsatisfactory performance* or the letter-grade *F*). Grade point averages were computed for four classes: science, social studies, English, and math. Alphas were .85 and .84 for the spina bifida and comparison groups, respectively.

Teacher reports on the following five adaptive functioning subscales of the Teacher Report Form (TRF; Teacher Version of CBCL; Achenbach, 1991b) were used: Academic Performance (current school performance across six subject areas on a 5-point Likert scale), Working Hard ("How hard is he/she working?"), Behaving Appropriately ("How appropriately is he/she behaving?"), Learning ("How much is he/she learning?"), and Happy ("How happy is he/she?"). The latter four were answered on a 7-point Likert scale.

Parents rated the highest level of education that they expected the child to complete on a 9-point scale ranging from *some grade school* to *receive a professional degree*. The mean of all available mother and father data was used.

Social competence. The Social Acceptance subscale from the Child, Parent, and Teacher Versions of Harter's (1985) SPPC Scale was used to assess social acceptance by peers (alphas ranged from .67 to .93; $M = .78$). The mean of all available child-, mother-, father-, and teacher-report data was used.

Mother and father report on the Social Competence subscale from the CBCL (Achenbach, 1991a) was used to evaluate social competence. The mean of all available mother and father data was used.

Behavior problems. Mother and father reports on the CBCL and teacher reports on the TRF were used to measure behavior problems. The problem behavior portion of the Parent and Teacher Versions comprises 113 items that can be combined to form eight problem subscales (Withdrawn, Somatic Complaints, Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, Delinquent Behavior, and Aggressive Behavior) and two second-order problem scales representing internalizing and externalizing symptoms. Means of all available maternal-, paternal-, and teacher-report data on the eight problem scales were used in this study (in T-score form).[1] 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 and Externalizing scales, respectively. Percentages for the comparison sample were 7.4% and 7.4%, respectively.

Child depressive affect was assessed with child report on the 27-item Children's Depression Inventory (CDI; Kovacs, 1992), a measure that allows children to select among alternatives on a 3-point scale reflecting the degree of depressive symptomatology. Alphas were .81 and .80 for the spina bifida and comparison samples, 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. These scores are in the average range relative to normative data for boys and girls 7–12 years old (Kovacs, 1992).

Self-worth (which was expected to be lower in the presence of internalizing symptoms) was assessed with child report on the six-item Self-Worth subscale from the SPPC (Harter, 1985). Alphas were .73 and .63 in the spina bifida and able-bodied samples, respectively.

The Behavioral Conduct subscale (which is scored in the direction of positive conduct) from the Child, Parent, and Teacher versions of Harter's (1985) SPPC Scale was used. Alphas ranged from .53 to .93 across respondents and samples ($M = .75$). The mean of all available child-, mother-, father-, and teacher-report data was used.

Autonomy development. Teacher-reported intrinsic motivation in the classroom was assessed with Harter's (1980) 10-item 4-point scale of Intrinsic Versus Extrinsic Orientation in the Classroom—Revised. This measure of child motivation assesses five dimensions (Harter, 1980): Challenge (preference for challenge vs. preference for easy work); Curiosity (curiosity/interest vs. pleasing the teacher); Independent Mastery (doing own work vs. reliance on teacher for guidance); Independent Judgment (independent decision making vs. reliance on teacher's opinion); and Internal Criteria for Success/Failure (child knows when he/she has succeeded/failed vs. child is dependent on external sources of evaluation). The total intrinsic motivation score was used (i.e., the average item score across all subscales). Alphas were .79 for the spina bifida group and .87 for the comparison group.

To assess behavioral autonomy (i.e., the degree to which one makes his/her own decisions), we used the Decision-Making Questionnaire (Steinberg, 1987) for which respondents (mothers, fathers, and children) were asked to rate their perception of who makes decisions in the family. Fifteen issues were included in this measure, such as when the child has to do homework and what the child is allowed to watch on television. Items were rated in terms of the following: 1 (*parents tell child what to do*), 2 (*parents and child discuss the issue, but parents have the final say*), 3 (*parents and child discuss the issue, but child has the final say*), and 4 (*the child decides*). The average scale alpha across reporters was .81 for the spina bifida sample and .74 for the able-bodied sample. The mean across all available reporters was used and was scored in the direction of greater behavioral autonomy for the child (scores can range from 1 to 4).

An additional measure of behavioral autonomy (Holmbeck & O'Donnell, 1991) was based on mother and father report and assessed the willingness of parents to grant autonomy to adolescents in the future across the same 15 items used in the Decision-Making Questionnaire. Items were rated on a 4-point scale ranging from 1 (*I want a lot more control*) to 4 (*I want my child to have a lot more control*). Alphas ranged from .86 to .89 ($M = .88$). The mean across reporters was scored in the direction of greater willingness to grant autonomy to the child in the future.

Emotional autonomy (i.e., the degree to which the participant has relinquished childish dependencies on parents) was assessed with child report on three subscales of the Emotional Autonomy Scale (EA; Steinberg & Silverberg, 1986; Parental Deidealization, Nondependency on Parents, and Individuation). The EA was completed twice by all child participants, once with regard to mothers and again with regard to fathers. The mean of the total scores for the two versions was used in this study (alphas were .70 for the spina bifida sample and .80 for the comparison sample).

Parents were also asked to list the number of tasks and/or chores for which the child is responsible at home. The mean of all available mother and father report data was used.

Coping. Child coping was measured using child report on the Self-Report Coping Scale (SRCS; Causey & Dubow, 1992), a theory-driven, multifaceted, 34-item, Likert-type coping measure for elementary level students. The scale assesses five coping strategies which are subsumed by two subscales: the Approach subscale and the Avoidance subscale. Children were asked to indicate what they "usually do when something bad happens to you like when you get a bad grade or when you get in an argument or a fight with a friend" on a 5-point scale ranging from 1 (*never*) to 5 (*always*). Alphas ranged from .63 to .86 ($M = .74$).

Global Observational Measures of Preadolescent Behavior

Two coding systems were used to tap five dimensions of observed child behavior: interaction style, conflict behavior, affect, power/control, and dependent behavior.

Interaction style, conflict behavior, affect, and power/control. The three family interaction tasks were coded using a global coding method developed by Holmbeck et al. (1995), based on a system devised by Smetana et al. (1991). As is typically done with global coding systems, coders viewed an entire family interaction task and then provided 5-point Likert scale ratings on a variety of dimensions that assess child, parent, and family behavior (for a total of 82 codes). The manual includes behavioral descriptions for each of the points along the Likert scale.[2] All items were rated by two coders for all three tasks across all families. The coders were undergraduate- and graduate-level research assistants who received at least 10 hr of training prior to beginning the coding process. All coders

[1] The Withdrawn and Social Problems subscales are included in this outcome domain instead of in the social competence domain for three reasons: (a) both subscales consist entirely of behavior problem items rather than social competence items, (b) social competence items are included in the CBCL in addition to the social problems items (see above), and (c) we wanted to examine all CBCL problem scales within a single multivariate analysis.

[2] All coding manuals can be obtained from Grayson N. Holmbeck on request.

were blind to the specific hypotheses of this study but were not necessarily blind to group status.[3]

This coding system taps the following four dimensions of child behavior (each of which includes multiple items): (a) interaction style (5 codes), (b) conflict behavior (3 codes), (c) affect (5 codes), and (d) power/control (2 codes). Satisfactory interrater reliability was found between raters for each of these 15 items; item-level intraclass correlations (Suen & Ary, 1989) ranged from .50 to .87 across dimensions and samples ($M = .72$).

Dependent behavior. Two of the observational tasks (the unfamiliar board game task and the conflict task) were coded using a global coding system developed by Johnson and Holmbeck (1994; Holmbeck, Johnson, et al., 2002), which is also based on the methodology devised by Smetana et al. (1991). This coding system assessed parental overprotectiveness and child dependent behavior. Items were coded on 5-point Likert scales (ranging from *almost never* to *almost always*); the manual includes behavioral descriptions for each of the points along the Likert scale. Any score greater than 1 indexed the presence of excessive child dependent behavior. The Child Dependent Behavior Scale included five codes: (a) "child engages in nonverbal exploratory behavior" (reverse-scored and reworded "lack of exploratory behavior"), (b) "child expresses individual views/opinions" (reverse-scored and reworded "lack of opinion expression"), (c) "child is needy," (d) "child seeks an excessive amount of physical contact," and (e) "child acts like a baby."

Undergraduate and graduate student coders were trained for roughly 8–10 hr and all coders were blind to the hypotheses of this study. All tasks on all tapes were coded by two coders. Item-level intraclass correlations ranged from .45 to .84 across samples ($M = .64$).

"Micro" Observational Measures of Preadolescent Behavior

Microlevel codes were assessed using a coding scheme developed by Allen et al. (1996; Autonomy and Relatedness Coding System) as applied to the conflict task. The purpose of this coding system was to assess each family member's tendency to promote or inhibit the autonomous functioning of other individuals and their tendency to support or inhibit the ability of other individuals to connect with or relate to other family members. This coding system was selected because of the salience of the autonomy construct for children who have physical disabilities (Holmbeck, Johnson, et al., 2002).

The system includes 10 codes, which make up three scales: Exhibiting Autonomous-Relatedness (5 codes; states reasons, confidence in stating opinions, information seeking/queries, validates the other person, and engages with the other person), Undermining Autonomy (3 codes; recanting one's position, overpersonalizing a disagreement, and pressuring another person to agree), and Undermining Relatedness (2 codes; distracting, ignoring, or cutting off the other person and hostility expressed toward the other person). For each of the 10 codes, scores were computed for each dyad, and in both directions (e.g., mother to adolescent and adolescent to mother). Only codes in the direction of adolescent to parent were used in the analyses reported here (i.e., adolescent to mother and adolescent to father). Although the final scores for each of the 10 codes are molar in nature (summed across an entire interaction to yield scores ranging from 0 to 4 using one half point intervals), the scores that are summed to yield these final scores are based on microlevel speech-specific codes (with scores assigned on the basis of the frequency and intensity of certain behaviors). To facilitate coding, we transcribed all conflict interactions; coders used the transcripts and videotaped interaction while coding. Two (out of a total of three) coders provided ratings for all interactions. Item-level intraclass correlations ranged from .35 to .84 across groups and dyads ($M = .67$).

Data Reduction

As noted above for several of the questionnaire measures, composite scores were based on means across reporters. Such data reduction was necessary to reduce the number of potential analyses and was justified on the basis of moderate intercorrelations among the respondent pairs. Specifically, the means of the *r*s across the six possible respondent pairs for the five Harter subscales were .25 and .30 for the spina bifida and comparison samples, respectively. The means of the *r*s among the three possible respondent pairs across the eight CBCL problem behavior subscales were .31 and .24, respectively. For mother and father report on the CBCL Activities and Social Competence subscales, *r*s between reporters for the two samples were .52 and .45, respectively. For the Behavioral Autonomy Scale, the means of the *r*s among the three respondent pairs were .34 and .26 for the two groups, respectively. Finally, *r*s between mother and father report on number of tasks and/or chores, educational aspirations for the child, and parental willingness to grant autonomy ranged from .32 to .61 for the spina bifida sample and from .39 to .60 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's scores; Hollingshead, 1975), and gender (of child) differences with respect to the outcome variables were conducted with MANOVAs. Because few gender main effects and Group $\times$ Gender interactions were found (one gender main effect and no Group $\times$ Gender interactions), all analyses included only group and SES (and their interaction) as independent variables. Significant multivariate effects were followed up with appropriate univariate post hoc tests. All findings are reported separately within each of the dependent variable domains.

As indicated previously, MANOVAs were run in two ways, once with PPVT–R scores controlled and once without PPVT–R scores controlled. In general, findings changed little after PPVT–R scores were controlled. Out of 11 significant multivariate group main effects (spina bifida vs. comparison), all 11 remained significant after controlling for the PPVT–R scores. Similarly, 7 of 8 significant multivariate SES main effects remained significant after instituting such controls. In the sections that follow, MANOVA findings are reported for analyses where PPVT–R scores were not controlled; when differences across the two types of analyses were found for the multivariate or univariate analyses, these differences are noted.

Questionnaire Measures of Preadolescent Adjustment

In this section, MANOVA findings are provided for the following dimensions: physical competence and activity level, scholastic competence, social competence, behavior problems, autonomy development, and coping.

Physical Competence and Activity Level

As can be seen in Table 2, there was a significant multivariate group main effect, $F(3, 125) = 36.01$, $p < .01$, for the physical

[3] It proved impossible to guarantee that coders would be blind to group status because children with spina bifida often use wheelchairs, which may be observed on the videotape. Moreover, families often discuss issues related to spina bifida during taped interaction tasks.

Table 2
Group Means (and Standard Deviations) for Questionnaire Data With MANOVA and Univariate ANOVA Follow-Up Findings

	Spina bifida		Able-bodied		PPVT–R not controlled		PPVT–R controlled	
Questionnaire	Low SES	High SES	Low SES	High SES	Multi	Uni	Multi	Uni
Physical Competence/Activity Level					G***		G***	
Harter Athletic Competence (M, F, T, C)	2.05 (0.48)	2.24 (0.54)	2.86 (0.47)	2.84 (0.43)		G***		G***
Harter Physical Appearance (M, F, T, C)	3.31 (0.34)	3.34 (0.41)	3.50 (0.31)	3.51 (0.31)		G**		G**
CBCL Activity Involvement (M, F)	41.24 (6.67)	41.38 (5.89)	50.04 (4.71)	50.60 (4.90)		G***		G***
Scholastic Competence					G***, S**		G***, S*	
Harter Scholastic Competence (M, F, T, C)	2.53 (0.44)	2.79 (0.59)	3.18 (0.50)	3.33 (0.49)		G***, S*		G***
School Grades (T)	5.31 (1.36)	5.76 (1.23)	6.02 (1.08)	6.63 (1.24)		G**, S*		*ns*
CBCL Academic Performance (T)	41.28 (5.96)	44.77 (9.22)	50.60 (9.04)	54.77 (8.67)		G***, S*		G***
CBCL Working Hard (T)	44.14 (7.98)	47.46 (9.83)	48.95 (7.80)	51.83 (8.67)		G**		*ns*
CBCL Behaving Appropriately (T)	46.72 (7.45)	50.91 (10.86)	48.35 (8.60)	53.43 (8.89)		S**		S*
CBCL Learning (T)	42.58 (7.25)	45.32 (9.36)	49.15 (8.39)	53.83 (8.92)		G***, S*		G**
CBCL Happy (T)	46.42 (7.23)	50.86 (9.05)	47.35 (8.46)	52.27 (8.34)		S**		S*
Educational Expectations (M, F)	6.62 (1.24)	7.36 (0.93)	7.08 (1.20)	7.83 (0.74)		G*, S***		G*, S***
Social Competence					G***, S***		G***, S***	
Harter Social Acceptance (M, F, T, C)	3.05 (0.42)	3.09 (0.55)	3.19 (0.46)	3.24 (0.34)		*ns*		G*
CBCL Social Competence (M, F)	41.88 (6.14)	46.02 (4.74)	47.12 (6.00)	51.33 (3.94)		G***, S***		G***, S***
Behavior Problems					G***, S**		G**, S**	
CBCL Withdrawn (M, F, T)	55.15 (4.44)	53.30 (4.37)	53.19 (2.46)	53.03 (3.90)		*ns*		*ns*
CBCL Somatic (M, F, T)	58.02 (6.96)	56.85 (5.74)	53.84 (4.16)	54.38 (4.96)		G***		G**
CBCL Anxious/Depressed (M, F, T)	55.96 (5.59)	54.04 (4.03)	53.51 (4.17)	53.62 (4.92)		*ns*		*ns*
CBCL Social Problems (M, F, T)	59.72 (6.55)	56.76 (5.70)	53.96 (5.20)	52.62 (4.05)		G***, S*		G***, S*
CBCL Thought Problems (M, F, T)	54.54 (4.30)	53.87 (4.41)	53.25 (4.00)	53.32 (4.54)		*ns*		*ns*
CBCL Attention Problems (M, F, T)	59.09 (5.85)	55.96 (5.04)	55.57 (5.50)	52.92 (4.22)		G***, S**		G**, S**
CBCL Delinquent (M, F, T)	53.19 (3.45)	53.03 (4.66)	54.15 (3.95)	51.94 (2.37)		*ns*		*ns*
CBCL Aggressive (M, F, T)	53.93 (3.77)	52.14 (3.17)	54.79 (5.61)	51.99 (3.10)		S**		S**
CDI Depression (C)	9.40 (6.29)	6.73 (5.26)	6.43 (4.94)	5.87 (4.51)		G*		*ns*
Harter Global Self-Worth (C)	3.13 (0.82)	3.19 (0.61)	3.30 (0.46)	3.19 (0.55)		*ns*		*ns*
Harter Behavioral Conduct (M, F, T, C)	3.26 (0.35)	3.41 (0.35)	3.12 (0.42)	3.44 (0.42)		S***		S***
Autonomy Development					G***, S**		G***, S*	
Intrinsic Motivation (T)	1.86 (0.44)	2.19 (0.68)	2.50 (0.64)	2.62 (0.60)		G***, S*		G**
Behavioral Autonomy (M, F, C)	1.92 (0.35)	2.12 (0.26)	2.09 (0.31)	2.20 (0.27)		G*, S**		G*, S**
Willing to Grant Autonomy (M, F)	2.49 (0.53)	2.62 (0.25)	2.43 (0.37)	2.48 (0.34)		*ns*		*ns*
Emotional Autonomy (C)	2.21 (0.39)	2.16 (0.38)	2.30 (0.46)	2.25 (0.43)		*ns*		*ns*
Child Tasks/Chores (M, F)	3.27 (1.26)	3.64 (1.36)	4.11 (0.80)	4.63 (1.45)		G***		G**
Child Coping					*ns*		*ns*	
Approach Coping (C)	3.50 (0.65)	3.50 (0.83)	3.36 (0.54)	3.38 (0.44)		*ns*		*ns*
Avoidance Coping (C)	2.45 (0.53)	2.38 (0.42)	2.49 (0.41)	2.34 (0.44)		*ns*		*ns*

Note. PPVT–R = Peabody Picture Vocabulary Test—Revised; SES = socioeconomic status; multi = multivariate; uni = univariate; G = group; S = SES; M = mother; F = father; T = teacher; C = child; CBCL = Child Behavior Checklist; CDI = Children's Depression Inventory.
* $p < .05$. ** $p < .01$. *** $p < .001$.

functioning domain. The multivariate SES effect was not significant. Univariate analyses revealed that children with spina bifida scored lower on all three scales in this domain: Athletic Competence, Physical Appearance, and Activity Involvement.

Scholastic Competence

There was a significant multivariate group main effect, $F(8, 97) = 6.23$, $p < .01$, and a significant SES main effect, $F(8, 97) = 2.62$, $p < .01$, for scholastic functioning (see Table 2). Univariate findings revealed that children with spina bifida and those from low SES homes scored lower on scholastic competence, several teacher-reported indicators of academic performance (including school grades), and parent report of future educational aspirations. Such a pattern of findings is consistent with an *additive effects* model. That is, the presence of spina bifida and low SES can be viewed as additive risk factors for school performance difficulties. When both risk factors are present, school performance is more adversely affected than if only one or the other is present. Similarly, when only one risk factor is present, the impact is greater than if no factors are present. The means in Table 2 are consistent with this interpretation. For measures of positive functioning, for example, means tend to be lowest in the low SES spina bifida sample, at moderate levels for the low-SES able-bodied and high-SES spina bifida samples and highest for the high-SES, able-bodied sample.

Although the multivariate group and SES main effects continued to be significant after PPVT–R scores were controlled, many univariate findings became nonsignificant after such controls were instituted (i.e., two of six group effects and four of seven SES effects became nonsignificant). For example, group and SES differences in school grades were no longer statistically significant after controlling for PPVT–R scores. In other words, cognitive functioning (or, more specifically, receptive vocabulary skills) appears to account for a significant portion of the univariate group and SES main effects on scholastic functioning.[4]

Social Competence

Multivariate group, $F(2, 126) = 15.88$, $p < .01$, and SES, $F(2, 126) = 10.15$, $p < .01$, main effects were found for social functioning (see Table 2). In both PPVT–R conditions, children from the spina bifida and low-SES subsamples scored lower on the parent-report CBCL measure of Social Competence.[5]

Behavior Problems

Group, $F(11, 112) = 4.27$, $p < .01$, and SES, $F(11, 112) = 2.42$, $p < .01$, multivariate main effects were found for behavior problems (see Table 2). In both PPVT–R conditions, children with spina bifida scored higher on three CBCL subscales: Somatic Complaints, Social Problems, and Attention Problems.[6] Although preadolescents from lower SES homes also scored higher on social problems and attention problems, they also scored higher on aggressive behavior and lower on the Harter Behavioral Conduct subscale. These latter findings suggest that low SES, but not spina bifida status, was a risk factor for various externalizing difficulties. Child-reported CDI scores were higher for preadolescents with spina bifida, but this finding was not significant after controlling for PPVT–R scores.

Autonomy Development

Multivariate group, $F(5, 103) = 7.72$, $p < .01$, and SES, $F(5, 103) = 3.06$, $p < .01$, main effects were significant (see Table 2). Both were significant in both PPVT–R conditions. Children with spina bifida scored lower on measures of intrinsic motivation, behavioral autonomy, and number of task responsibilities in the home than children from the comparison sample. Children from lower SES homes scored lower on measures of intrinsic motivation and behavioral autonomy than those from higher SES homes, although only the latter remained significant after controlling for PPVT–R scores.

Coping

No significant multivariate effects emerged for the coping domain (Table 2).

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[4] In a follow-up analysis, a two-way (group, SES) MANOVA was run with the four school subjects (i.e., science, social studies, English, and mathematics) as dependent variables. The group, $F(4, 86) = 5.59$, $p < .01$, and SES, $F(4, 86) = 3.68$, $p < .01$, main effects were significant (and continued to be significant after PPVT–R scores were controlled). On the other hand, after controlling for PPVT–R scores in the univariate follow-up analyses, higher SES participants scored higher only in science and social studies and children with spina bifida scored lower only in mathematics.

[5] In a follow-up MANOVA analysis, six items from the CBCL Social Competence subscale were examined (number of close friends, times per week that the child does things with friends outside of school, separate items that assess how well the child gets along with his or her brothers and sisters, peers, and his or her parents, and how well the child plays by him- or herself). Regardless of whether PPVT–R scores were controlled, preadolescents with spina bifida and those from lower SES homes had fewer contacts with friends outside of school. Moreover, those from lower SES homes were less likely to get along with other kids than those from higher SES homes. Of note is the finding that children with spina bifida were less able to play alone, although this finding was nonsignificant after PPVT–R scores were controlled (indicating that the original group difference may be cognitively mediated). Also, children from the spina bifida sample did not differ on the following items as compared with those in the comparison sample: Number of Friends, Gets Along With Brother and/or Sister, Gets Along With Peers, and Gets Along With Parents.

[6] As a follow-up to the group differences findings and given the heterogeneous nature of the items included in the CBCL Social Problems and Attention Problems subscales, two-way follow-up MANOVAs were run with items on these scales as dependent measures. For social problems, the group main effect was significant, $F(7, 123) = 7.80$, $p < .01$, and revealed that preadolescents with spina bifida scored higher on 4 of the 7 cross-informant items (in analyses with and without PPVT–R scores controlled): acts too young for his or her age, clings to adults or too dependent, poorly coordinated or clumsy, and prefers being with younger kids. For attention problems, the group main effect was again significant, $F(10, 120) = 6.48$, $p < .01$, revealing that children with spina bifida scored higher on 6 of the 10 cross-informant items: acts too young for his or her age, can't concentrate and/or can't pay attention for long, confused or seems to be in a fog, poor school work, poorly coordinated or clumsy, and stares blankly.

Global Observational Measures of Preadolescent Behavior

In this section, MANOVA findings are provided for the following observational variables: interaction style, conflict behavior, affect, power/control, and dependent behavior.

Interaction Style

A multivariate group main effect was significant for this domain, $F(5, 124) = 15.93$, $p < .01$ (see Table 3). Although this group effect was significant in both PPVT–R conditions, an SES main effect was significant only when PPVT–R scores were not controlled. Therefore, only the univariate findings for group are considered. Compared with the able-bodied participants, preadolescents with spina bifida spoke with less clarity and confidence, listened less to others, were less involved in the family interaction tasks, and provided fewer explanations for their assertions. All of these univariate effects remained significant after controlling for PPVT–R scores, except for the "listens to others" effect. Thus, most of the group differences in verbal interaction style cannot be attributed to differences in receptive verbal skills.

Conflict Behavior

Although there were significant multivariate main effects for group, $F(3, 126) = 6.01$, $p < .01$, and SES, $F(3, 126) = 4.51$, $p < .01$, under both PPVT–R conditions, none of the univariate findings remained significant after PPVT–R scores were controlled (Table 3). For example, children with spina bifida were less likely to disagree with others and to attempt resolutions of conflicts during the interaction, but these effects appear to be attributable, at least in part, to group differences in verbal skills.

Affect

No significant multivariate effects emerged for the affect domain (Table 3).

Power/Control

A multivariate main effect emerged for group, $F(2, 127) = 10.40$, $p < .01$, but there was no effect for SES (Table 3). In both PPVT–R data-analytic conditions, preadolescents with spina bifida were less likely to exhibit overt power in the family system during task discussions, and they were also less likely to pressure others to agree.

Dependent Behavior

As with the power/control domain, a multivariate main effect emerged for group, $F(5, 120) = 8.51$, $p < .01$, but not for SES (Table 3). Regardless of whether PPVT–R scores were controlled, preadolescents with spina bifida were less likely to express their own viewpoints and less likely to exhibit nonverbal exploration. They were also more likely to be perceived as "needy," seek physical contact, and act in an age-inappropriate manner.

"Micro" Observational Measures of Preadolescent Behavior

MANOVA findings are provided for the following micro-observational domains: preadolescent behavior directed toward mother and preadolescent behavior directed toward father.

Preadolescent Behavior Directed Toward Mother

Multivariate group, $F(10, 115) = 3.96$, $p < .01$, and SES, $F(10, 115) = 3.12$, $p < .01$, main effects emerged for this domain (see Table 4). All of the univariate group findings and four of five univariate SES findings were significant in both PPVT–R conditions. Specifically, preadolescents with spina bifida and children from lower SES homes were less likely to provide reasons for their assertions to their mothers (a finding which is consistent with an additive effects interpretation and with the earlier global coding results). Moreover, and consistent with the global coding, children with spina bifida were less likely to speak with confidence and pressure their mothers to agree. They were also more likely to recant their positions when speaking with their mothers and more likely to validate their mothers' positions than able-bodied children. Preadolescents from lower SES homes were more likely to exhibit hostility toward their mothers. Although children from low-SES families were also more likely to ask questions of their mothers, they were also less likely to be engaged with them during the interaction than children from high-SES homes.

Preadolescent Behavior Directed Toward Father

As was the case for behavior toward mothers, multivariate group, $F(10, 88) = 4.60$, $p < .01$, and SES, $F(10, 88) = 3.60$, $p < .01$, main effects emerged for behavior toward fathers (Table 4). Several univariate effects were significant in both PPVT–R conditions. Specifically, and consistent with an additive effects model, children with spina bifida and those from lower SES homes provided fewer reasons when speaking with fathers and were more likely to recant their positions. Children with spina bifida also spoke with less confidence to their fathers. Preadolescents from lower SES homes were more likely to ask questions of their fathers but were also less likely to be engaged with them. Finally, children from lower SES homes were more likely to ignore, distract, or cut off their fathers during conversation.

Discussion

This study examined the psychosocial adjustment of preadolescents with spina bifida as well as the clinical utility of a multimethod, multi-informant, and multidimensional narrowband assessment strategy when examining the psychological functioning of children with pediatric conditions. Preadolescents (i.e., children aged 8 and 9 years old) with spina bifida exhibited less adaptive levels of functioning; such findings were robust across reporters, methods, and psychosocial adjustment domains. As expected, significant group differences were found in areas that are impacted by the physical, neurological, and psychological limitations associated with this chronic physical condition. The findings of this study are an advance for the literature in providing a more complete clinical picture of the functioning of these children across multiple settings. Specifically, in comparison to their able-bodied

Table 3
Group Means (and Standard Deviations) for Global Observational Data With MANOVA and Univariate ANOVA Follow-Up Findings

	Spina bifida		Able-bodied		PPVT–R not controlled		PPVT–R controlled	
Global observation scale	Low SES	High SES	Low SES	High SES	Multi	Uni	Multi	Uni
Child Interaction Style					G***, S*		G***	
Clarity of thought	3.15 (0.62)	3.61 (0.51)	4.01 (0.36)	4.17 (0.42)		G***, S***		G***
Listens to others	3.61 (0.62)	3.85 (0.48)	3.93 (0.49)	3.97 (0.47)		G*		*ns*
Confidence in stating opinions	3.26 (0.68)	3.64 (0.58)	4.00 (0.37)	4.10 (0.49)		G***, S*		G***
Involvement in task	3.42 (0.72)	3.89 (0.52)	3.96 (0.47)	4.04 (0.50)		G***, S**		G*
Provides explanations	2.08 (0.61)	2.53 (0.63)	2.73 (0.51)	3.01 (0.62)		G***, S***		G***
Child Conflict Behavior					G***, S**		G*, S*	
Frequently disagrees	2.11 (0.52)	2.23 (0.40)	2.36 (0.52)	2.32 (0.53)		G*		*ns*
Tolerates disagreements	4.03 (0.53)	4.23 (0.49)	4.12 (0.43)	4.25 (0.46)		*ns*		*ns*
Attempted resolution	2.82 (0.56)	3.21 (0.48)	3.26 (0.50)	3.31 (0.41)		G**, S**		*ns*
Child Affect					*ns*		*ns*	
Intensity of affect	3.39 (0.70)	3.49 (0.55)	3.69 (0.59)	3.68 (0.52)		*ns*		*ns*
Warmth	3.26 (0.48)	3.46 (0.50)	3.20 (0.44)	3.36 (0.52)		*ns*		*ns*
Supportiveness	2.96 (0.28)	3.13 (0.41)	3.01 (0.29)	3.04 (0.37)		*ns*		*ns*
Anger	1.72 (0.50)	1.57 (0.42)	1.77 (0.42)	1.64 (0.47)		*ns*		*ns*
Humor and laughter	2.77 (0.75)	2.99 (0.52)	2.99 (0.57)	3.06 (0.57)		*ns*		*ns*
Child Power Control					G***		G**	
Overt power	2.68 (0.56)	3.04 (0.40)	3.18 (0.36)	3.20 (0.39)		G***		G**
Pressures others to agree	1.92 (0.54)	2.01 (0.38)	2.25 (0.47)	2.23 (0.55)		G**		G**
Child Dependent Behavior					G***		G***	
Lack of exploratory behavior	2.57 (0.71)	2.12 (0.70)	1.75 (0.56)	1.83 (0.58)		G***		G**
Lack of opinion expression	2.65 (0.84)	2.23 (0.66)	1.81 (0.57)	1.85 (0.57)		G***		G***
Child is needy	2.49 (0.74)	2.11 (0.54)	1.99 (0.66)	1.75 (0.52)		G***		G**
Seeking of physical contact	1.38 (0.49)	1.43 (0.63)	1.18 (0.35)	1.15 (0.20)		G**		G***
Acts like a baby	2.16 (0.83)	1.93 (0.52)	1.75 (0.66)	1.46 (0.44)		G***		G***

Note. ANOVA = analysis of variance; MANOVA = multivariate analysis of variance; PPVT–R = Peabody Picture Vocabulary Test—Revised; SES = socioeconomic status; multi = multivariate; uni = univariate; G = Group, S = SES.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4
Group Means (and Standard Deviations) for "Micro" Observational Data With MANOVA and Univariate ANOVA Follow-Up Findings

	Spina bifida		Able-bodied		PPVT–R not controlled		PPVT–R controlled	
Microcode scale	Low SES	High SES	Low SES	High SES	Multi	Uni	Multi	Uni
Preadolescent → Mother					G***, S***		G***, S**	
States reasons clearly	0.94 (0.56)	1.33 (0.42)	1.38 (0.53)	1.56 (0.59)		G***, S**		G**, S**
Confidence in stating opinions	1.48 (0.84)	1.82 (0.64)	1.96 (0.61)	2.14 (0.62)		G**, S*		G*
Recanting position	0.53 (0.60)	0.50 (0.60)	0.36 (0.56)	0.16 (0.39)		G**		G**
Overpersonalizing	0.68 (0.61)	0.85 (0.75)	0.83 (0.82)	0.86 (0.71)		*ns*		*ns*
Pressures mother to agree	0.72 (0.60)	0.78 (0.69)	1.27 (1.01)	1.07 (0.95)		G**		G*
Information seeking/queries	0.93 (0.61)	0.59 (0.48)	1.07 (0.49)	0.79 (0.52)		S***		S**
Validates mother	1.24 (0.60)	1.20 (0.64)	0.91 (0.57)	1.02 (0.64)		G*		G*
Engages with mother	1.72 (0.63)	1.99 (0.46)	1.82 (0.44)	2.08 (0.49)		S**		S**
Distracts/ignores/cuts off	1.79 (0.95)	1.39 (0.73)	1.66 (0.78)	1.58 (0.88)		*ns*		*ns*
Hostile/devaluing to mother	0.33 (0.55)	0.09 (0.23)	0.23 (0.49)	0.12 (0.24)		S*		S*
Preadolescent → Father					G***, S***		G***, S***	
States reasons clearly	0.91 (0.45)	1.32 (0.43)	1.45 (0.54)	1.58 (0.52)		G***, S**		G***, S**
Confidence in stating opinions	1.46 (0.78)	1.81 (0.65)	2.01 (0.65)	2.20 (0.57)		G***, S*		G**
Recanting position	0.62 (0.61)	0.46 (0.59)	0.40 (0.59)	0.14 (0.38)		G*, S*		G*, S*
Overpersonalizing	0.73 (0.66)	0.83 (0.72)	0.82 (0.84)	0.86 (0.71)		*ns*		*ns*
Pressures father to agree	0.69 (0.46)	0.78 (0.70)	1.17 (0.89)	1.04 (0.87)		G*		*ns*
Information seeking/queries	0.93 (0.59)	0.59 (0.48)	0.96 (0.46)	0.66 (0.47)		S**		S***
Validates father	1.00 (0.57)	1.14 (0.63)	0.69 (0.53)	1.03 (0.56)		S*		G*
Engages with father	1.66 (0.63)	1.97 (0.50)	1.90 (0.46)	2.07 (0.47)		S*		S*
Distracts/ignores/cuts off	1.98 (0.88)	1.29 (0.72)	1.57 (0.67)	1.44 (0.88)		S**		S**
Hostile/devaluing to father	0.45 (0.54)	0.19 (0.50)	0.17 (0.31)	0.10 (0.22)		G*, S*		*ns*

Note. PPVT–R = Peabody Picture Vocabulary Test—Revised; SES = socioeconomic status; multi = multivariate; uni = univariate; G = Group, S = SES.
* $p < .05$. ** $p < .01$. *** $p < .001$.

peers, children with spina bifida tended to be socially immature and more dependent on adults, less likely to initiate social contacts, less scholastically competent in the school setting, less physically active, less likely to make independent decisions, more likely to exhibit attention difficulties, and more passive and less engaged during observed family interactions. As is discussed later, more specific narrowband findings emerged within each of the psychosocial domains. Resilience in children with spina bifida also emerged across several domains (i.e., externalizing symptoms, most types of internalizing symptoms, expressed affect in family discussions, and global self-worth did not differ across samples). Some group differences findings became nonsignificant after instituting controls for receptive verbal abilities (i.e., PPVT–R scores), particularly in the area of scholastic competence. Finally, SES effects also emerged, such that low SES was associated with more psychosocial adjustment difficulties. Although some of these SES effects were similar to those for group status, SES was also associated negatively with frequency of self-reported and observed externalizing symptoms.

The significant group status main effects, in combination with the SES main effects, suggest that low-SES status and spina bifida status may be additive or cumulative risk factors for psychosocial adjustment difficulties (Holmes et al., 1999; Rutter, 1987). For most variables included in this study, the low-SES/spina bifida sample (i.e., those with two risk factors) exhibited more adjustment difficulties than the other three groups. The two groups with one risk factor (i.e., the low-SES/comparison and the high-SES/spina bifida samples) often appeared similarly well-adjusted but less well adjusted than the group with no risk factors (i.e., the high-SES/comparison subsample).

Children with spina bifida (and particularly those from low-SES homes) tended to have fewer social contacts outside of school and scored higher on a parent- and teacher-rated scale of social problems. On the basis of item-level analyses for the Social Problems scale, it appears that these children are more socially immature, dependent on adults, and less socially-engaged than their able-bodied peers. Similarly, findings in the autonomy development domain suggest that children with spina bifida are more dependent on adults for direction and guidance, exhibit less intrinsic motivation in the school setting, and make fewer of their own decisions. Such findings support past work in the areas of social functioning and autonomy development (Blum et al., 1991; Shine, 1998) but also extend such work by providing more behavioral specificity in the findings as well as documenting effects across settings.

Unexpectedly, the two groups in this study did not differ on parent and teacher report of internalizing symptoms (e.g., depression, anxiety), except on a scale of somatic complaints where children with spina bifida were rated higher. Such findings for somatic symptoms are common in studies of pediatric populations and are likely due to actual symptoms of spina bifida (Drotar, Stein, & Perrin, 1995; although see Holmes, Respess, Greer, & Frentz, 1998). More generally, preadolescents with spina bifida did not differ from their able-bodied counterparts on most measures that tapped the affective functioning of the participants (e.g., measures of affect during family interactions, measures of anxiety or depression). The only significant finding for an affect-oriented variable was a group main effect for a child-report depression measure, but this finding was not maintained after controlling for receptive verbal abilities (suggesting that some children with spina bifida may endorse items on this scale because of misinterpretations of item content).

The lack of significant differences between the groups on measures of internalizing symptoms is not consistent with past findings (Ammerman et al., 1998; Appleton et al., 1997). Such inconsistencies may be a function of the age of our sample. The Ammerman et al. (1998) and Appleton et al. (1997) studies both included samples with wide age ranges (6–18 years and 9–18 years, respectively); the average age of our sample was much younger (8- to 9-year-olds). It may be that children with spina bifida develop social difficulties *prior to* adolescence, making it more likely that they will experience depressive affect *during* adolescence (a hypothesis that can be examined as the children in this longitudinal study move into the adolescent period). A similar interpretation could be offered for the lack of gender differences in this study. Studies that have found gender differences typically include participants across a wider age range (e.g., Appleton et al., 1997). With respect to the lack of findings for the CBCL Withdrawn subscale, it is interesting to compare the item context of this subscale with the content of the Social Problems subscale (a subscale that yielded significant group differences). Specifically, the Withdrawn subscale taps social isolation and behavioral inhibition, whereas the Social Problems subscale taps social immaturity and dependence behaviors. The findings of this study indicate that the latter are more problematic for children with spina bifida.

Observational data across three coding systems provided additional information on the social functioning of children with spina bifida, suggesting that their behavior is characterized by passivity and lack of assertiveness. Specifically, they tend to be less confident, less involved in discussions, more likely to exhibit dependent behavior, and more likely to recant their positions with both mothers and fathers. Such findings are similar to those reported in other studies of family interaction in special populations (Costigan, Floyd, Harter, & McClintock, 1997). Importantly, these findings are maintained even after controlling for verbal skills. On the basis of other data in this study, such passivity also appears to be multisituational and is likely to extend beyond observed interactions with family members (e.g., children with spina bifida were less involved in extracurricular activities and were responsible for fewer tasks at home). We speculate that this pervasive social passivity may be causally linked with the lack of peer social engagement that has been observed in this study and in other studies (e.g., Blum et al., 1991). Moreover, most children with spina bifida have hydrocephalus (80%), which is associated with nonverbal cognitive deficits (Fletcher, Francis et al., 1992; Fletcher et al., 1995). Rourke (1989) has argued that such deficits make it more difficult for the individual to understand nonverbal gestures, thus limiting a child's ability to negotiate and become fully engaged in social exchanges (Fletcher et al., 1995).

Verbal abilities appear to account for some of the group effect on scholastic competence. On the other hand, group differences in some areas of scholastic competence (e.g., mathematics) and other related domains (e.g., attention problems, parent-reported educational aspirations for the child) remained significant even after accounting for verbal abilities. With respect to attention problems, item-level analyses suggest that children with spina bifida are more likely to have difficulty focusing attention. Moreover, they appear "spacey" and confused—findings that support results of

past work based on neuropathological correlates of spina bifida (Fletcher et al., 2000; Hommeyer et al., 1999; Wills, 1993).[7]

As noted earlier, SES appears to be an important risk factor for some of the same outcomes as spina bifida status. Unlike spina bifida status, however, SES was associated with several outcomes that tapped externalizing symptoms (i.e., children with spina bifida exhibited resilience in this domain). Such findings are in line with previous studies that have found links between SES and conduct problems (Dodge, Pettit, & Bates, 1994)—links that may be mediated by factors such as maladaptive parenting strategies and parenting stress. Results are also supportive of the notion that different risk factors are significantly related to different outcomes (Holmes et al., 1999).

The utility of a narrowband assessment approach to the study of adjustment in pediatric populations is supported by findings of this study. As noted earlier, such studies provide a basis for more targeted within-sample or between-sample studies (including neuropsychological and neuropathological studies; Fletcher et al., 2000; Wills, 1993) that seek to determine underlying mechanisms for differences between those with and without chronic conditions. One may examine, for example, mediational factors (such as physical and neurological limitations) that may account for group differences in social passivity. Alternatively, one may be interested in examining whether the attention problems observed in this study moderate the effectiveness of certain parenting behaviors. A narrowband strategy also allows one to determine whether a given clinical picture is similar across settings, respondents, and assessment methods.

This study has several potential limitations. First, this study was cross-sectional, covered a very narrow age range, and only included participants with one type of pediatric condition. Thus, we are unable to generalize the findings to the larger population of children and adolescents with chronic conditions. On the other hand, by studying these 8- and 9-year-olds longitudinally, we will be able to determine whether the two samples move along similar developmental trajectories. Second, future studies should include a more representative sampling of Spanish-speaking families, particularly given the high rate of spina bifida in Hispanic populations (Lary & Edmonds, 1996). Representativeness was also compromised by the low participation rate in both subsamples. Third, the observational tasks used in this study represent novel tasks, and thus, we may not be able to generalize to actual family situations from these artificial conditions. Moreover, the raters were not blind to the group status of the families. On the other hand, the similarity in findings across questionnaire and observational data and across global-level and microlevel observational data as well as the high rates of rater reliability suggest that our results are relatively robust across method. Fourth, even though we found numerous differences between the two samples examined in this study, it is important to note that there is also considerable within-group variability in both samples. Predictors of such variability can be examined in future investigations. Finally, given the large number of analyses, some findings may have emerged by chance.

The present findings should be useful to clinicians and educators who work with this population. For example, professionals can target the social functioning and interpersonal passivity of children with spina bifida to prevent future, more serious, difficulties in the peer-relationship domain. Similarly, such children would benefit from interventions that facilitate their autonomy and self-reliance as they move into the adolescent developmental period.

[7] In analyses of data from the current study, Hommeyer et al. (1999) found that shunt status was associated with attention and school difficulties. Thus, the children with shunted hydrocephalus in our sample (as opposed to the children from the spina bifida sample without hydrocephalus) may have been responsible for the bulk of the significant findings in the scholastic competence and behavior problems domains (also see Fletcher et al., 1995).

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Received December 13, 2001
Revision received March 8, 2002
Accepted August 7, 2002 ■