

Assessing Stress in Families of Children With ADHD: Preliminary Development of the Disruptive Behavior Stress Inventory (DBSI)

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This paper describes the initial development of the Disruptive Behavior Stress Inventory (DBSI). This 40-item measure, which provides indices of the number of stressors experienced during the past 6 months and the rated stressfulness of these events, is designed to assess behavior-related family stress experienced by families of children with attention-deficit/hyperactivity disorder (ADHD). Findings provide strong support for the internal consistency of the DBSI and suggest adequate test-retest reliability. Support for the validity of the measure is suggested by findings that DBSI stress indices differentiate between parents of children with ADHD and those with no history of this disorder. Additional support is provided by findings that scores on the DBSI also differentiate between parents of children with ADHD, combined type and parents of children with ADHD, inattentive type. It is suggested that this measure may provide useful clinical information regarding stress levels in families of children with ADHD and that it may be of potential value as an ADHD treatment outcome measure.

KEY WORDS: ADHD; disruptive behavior disorders; family stress; parent stress; ADHD assessment.

INTRODUCTION

Attention-Deficit/Hyperactivity Disorder (ADHD), with a prevalence of 3–5% in the general population (American Psychiatric Association [APA], 1994), is the most common neurodevelopmental disorder of childhood and among the most prevalent chronic health conditions affecting school-aged children (American Academy of Pediatrics, 2000). This disorder is characterized by developmentally inappropriate patterns of inattention and/or hyperactive/impulsive behaviors that are displayed across situations and result in impairments in social, academic and/or family functioning.

The Diagnostic and Statistical Manual of Mental Disorders (DSM IV; APA, 1994) provides for the

diagnosis of three ADHD subtypes, a Predominantly Inattentive type where attention deficits predominate, a hyperactive/impulsive type, characterized by impulsiveness and heightened activity, and a combined type characterized by both problems of inattention and hyperactive/impulsive behavior.

Formally classified under the heading of Disruptive Disorders of Childhood (APA, 1994), children with ADHD vary in the degree to which their behaviors are experienced as disruptive or place excessive stress or caretaker burden on parents or others in their environment. As a preface to later discussion, it can be noted that the stress experienced by parents of children with ADHD does not result solely from dealing with the symptoms of inattention, impulsivity, and activity level but also from the other demands placed on parents as a *result* of child problem behaviors. Thus, parents of children with ADHD must often deal with repeated phone calls from teachers regarding their child's misbehavior, they often have to "explain" their child's behavior to other parents, they are often restricted socially due to their inability to get

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a “babysitter,” they often must miss work to attend clinic appointments, and they often worry incessantly (and with some justification) about the possibility of accidental injury to their child as a result of his/her behavior. These represent only a few of the stressors that are commonly reported by parents of children with ADHD.

To the extent that research findings suggest that behaviors exhibited by children with ADHD represent significant family stressors *and* that these stressors are associated with negative outcomes, it seems essential that the nature and extent of ADHD related family stress be considered in the assessment of children with ADHD and in developing comprehensive treatment programs for children with this disorder and their families.

Parenting Behaviors and Caretaker Stress

Relevant to the often disruptive quality of behaviors displayed by children with ADHD, researchers have begun to emphasize the role of everyday parenting events as sources of caretaker stress (Crnic & Acevedo, 1995; Webster-Stratton, 1990). Crnic and Acevedo highlight “daily parenting hassles,” and describe them as routine caregiving and childrearing responsibilities that parents may, in the form of chronic demands, find irritating, frustrating, annoying, and distressing. High levels of daily parenting hassles have been shown to relate to lower life satisfaction, more negative mood and affect, and increased maternal distress (Crnic & Acevedo, 1995; Crnic & Greenberg, 1990). In considering the potential impact of these daily stressors on parents, it is noteworthy that Crnic and Greenberg (1990) have found daily parenting hassles to be even more stressful to parents than major life events.

That daily parenting hassles can also have significant implications for parent–child interactions is suggested by research indicating that mothers who report more daily parenting hassles tend to display more negative affect towards children and respond in ways that increase children’s negativity. For example, individual studies by Dumas (1986) and Patterson (1983) found that mothers engaged in significantly more aversive or irritable/coercive interactions with children on days when they experienced high rates of minor stressors.

It would seem that the concept of daily parenting stress is of clear importance in understanding the functioning of families of children with ADHD, as parents of children with this disorder often have

to deal with problematic behaviors at much higher rates and at higher levels of intensity than is usually found in normal families. Indeed, research seems to indicate that, for parents of children with ADHD, parenting stressors may be of special significance as regards their potential impact on parent, child, and family functioning. These outcomes include the development of parenting styles that may increase negative child behavior, increased levels of perceived stress, increases in parental psychopathology, and strained marital relationships, as well as other potentially negative outcomes.

Parent/ADHD–Child Interactions

Regarding parent/ADHD-child interactions, Cunningham and Barkley (1979) have found mothers of hyperactive children to be less likely to respond positively to their child’s social interactions, their solitary play activities and their compliant on-task behavior and to display a more controlling and intrusive interaction style as compared to mothers of normal children. Research by Tallmadge and Barkley (1983) and Befera and Barkley (1985) have similarly found parents of hyperactive children to display more controlling and directive behaviors than do parents of normal children.

Although the correlational nature of such studies does not yield information regarding the directionality of these relationships, Mash and Johnston (1990) argue that in most families with hyperactive children, the “behaviors of hyperactive children . . . drive the negative and control-oriented parent–child interactions” (p. 317). They argue that this view is supported by stimulant medication studies that have shown that children with ADHD treated with stimulants display increased compliance and decreased frequencies of negative behavior *and* that these changes are accompanied by reduced levels of directive and controlling behavior on the part of parents (Barkley & Cunningham, 1979; Barkley, Karlsson, Pollard, & Murphy, 1985; Humphries, Kinsbourne, & Swanson, 1978). Existing evidence seems consistent with the notion that the negative behaviors of children with ADHD can elicit negative parenting behavior. This disruption in positive parenting seems to lead to increases in negative child behaviors (Barkley, 1998) which, in turn, may further increase parent stress levels. A coercive cycle may ensue in which parent and child reciprocally elicit negative behaviors from each other, resulting in both increased stress

and adverse impacts on parent and child functioning (Webster-Stratton, 1990).

ADHD and Parental Adjustment

Regarding the potential impact of ADHD related stress on the family, studies have shown that mothers of children with ADHD have higher rates of psychological difficulties (Fischer, 1990) and seek treatment for personal psychopathology significantly more often than mothers of normal children (Gillberg, Carlstrom, & Rasmussen, 1983). In the latter study, treatment-seeking behavior was also found to be correlated with the severity or pervasiveness of the child's hyperactivity (Gillberg et al., 1983).

More specifically, several studies have shown that mothers of children with ADHD show higher rates of depressive symptoms in comparison to mothers of normal children (Befera & Barkley, 1985; Brown & Pacini, 1989; Cunningham, Benness, & Siegel, 1988; Mash & Johnston, 1983a). Alcohol consumption has also been found to be elevated in parents of children with ADHD (Cunningham et al., 1988; Pelham & Lang, 1999) and several studies have found increased levels of marital discord and strained interpersonal relationships in ADHD families (Befera & Barkley, 1985; Brown & Pacini, 1989; Johnston, 1996).

Although not specifically related to ADHD, research designed to assess parental and family correlates of similar types of disruptive behavior (e.g., children with difficult temperament) has also shown high levels of difficult child behavior to be related to maternal anxiety and depression, feelings of being restricted in the parenting role, a decreased sense of parenting competence, poorer parent-child attachment, more negative relationship with spouse, and increased levels of family related stress (Sheeber & Johnson, 1992).

Taken together, these findings strongly suggest that having a disruptive child within the home is often associated with a range of psychological or interpersonal difficulties or both experienced by parents, as well as perhaps more general problems of family functioning.

Parenting Stress Investigations

There have been a number of studies designed to investigate the degree of stress experienced by parents of children with ADHD using parent report measures. Most of these studies have used the Parenting Stress Index (PSI; Abidin, 1995), a parent

report measure which assesses characteristics of the child (e.g., hyperactive/inattentive, mood, demand-ingness), characteristics of the parent (e.g., competency, role restriction, isolation, attachment), and situation/demographic life stress factors that can place a strain on the parent-child system. A variety of studies have found parents of children with ADHD to show significantly elevated levels of parenting stress as indexed by this measure.

For example, Mash and Johnston (1983a) found mothers of hyperactive children to report higher levels of parenting stress than parents of normal children and that child characteristics including "distractibility" and "perceived degree of bother" accounted for the most variance in parenting stress scores. In this study, mothers of hyperactive children also reported more feelings of social isolation and role restriction compared to parents of normal children.

Breen and Barkley (1988) found mothers of hyperactive clinic-referred girls to display higher PSI stress levels than mothers of normal girls, although stress levels of parents of children with ADHD did not differ significantly from stress levels of parents of nonhyperactive clinic-referred girls. They also found the severity of child aggression, conduct problems, and hyperactivity to be significantly related to parental stress levels. These findings suggest that stress levels, not only increase with increased severity of ADHD symptomatology, but they also increase as a function of comorbid features that may accompany ADHD. This view is also supported by findings from Anastopoulos, Guevremont, Shelton, and DuPaul (1992) who, in addition to finding increased levels of stress among parents of children with ADHD, found severity of ADHD symptoms and aggressive and oppositional-defiant behavior to account for some 43% of the variance in parenting stress scores. Studies such as these provide significant support for the notion that ADHD related behavior is associated with significant levels of parental stress.

ADHD Family Stress: Overview

Taken together, results of the studies presented here appear to provide strong support for the notion that the behavior of children with ADHD, and perhaps other disruptive disorders of childhood, can result in increased family stress. It is also suggested that this increased level of stress is often associated with negative outcomes including negative parenting

styles that may lead to a worsening of child behavior problems, increased psychological problems experienced by parents, and strained marital and family relationships. This would seem to make it essential that an assessment of family related stress be included as part of any ADHD evaluation and that these findings be taken into account in designing treatment programs.

A significant issue in the clinical assessment of ADHD related family stress is the current unavailability of measures that focus on specific stressors resulting from disruptive child behavior. At present we have well-validated and reliable measures to assess symptoms of ADHD and assist in clinical diagnosis. Also available are measures such as the Parenting Stress Index, which can be useful in documenting difficult child behavior as well as stress related outcomes in families of children with ADHD and other disorders. What is needed, however, are measures that provide information regarding the occurrence and impact of specific family related stressors that result from having a child with ADHD in the family. This type of measure would be of value in providing clinical information regarding the extent to which families of children with ADHD are characterized by high levels of stress that impact negatively on the family as well as information regarding the specific types of stressors that are experienced. Such a measure could also provide information that might be used in developing intervention efforts designed to reduce family stress as well as potentially serving as a treatment outcome measure, as one might expect reductions in family stress to be associated with positive treatment outcomes. The present paper describes preliminary research findings related to the development of such a measure.

METHOD

Phase 1: Test Item Development

Participants

Upon approval by the Institutional Review Board (IRB), 31 parents of children with a primary diagnosis of ADHD were recruited as volunteers for Phase 1 of the study. The subject pool for this phase included 28 mothers and 3 fathers between the ages of 18 and 50 who had children between the ages of 4 and 15. All children had undergone a thorough psychological assessment and had received a primary clinical diagnosis of ADHD based on *DSM-IV* criteria.

Recruitment of these parents was conducted through an interdisciplinary ADHD program and through the psychology clinic of a major teaching hospital, with parents giving their consent for their children's data to be utilized for research purposes. Parents of children with all subtypes of ADHD (combined, primarily hyperactive-impulsive, and primarily inattentive types) were recruited.

Procedure

An open-ended survey, labeled the "Family Stress Survey" was completed by parents (mothers and fathers) of children with a primary diagnosis of ADHD in order to create an initial item pool for the measure. This survey asked parents to list the five most frequent and/or most significant family related stressors that they experienced as a result of their child's behavior. Here, parents were provided with a one-page cover letter explaining the nature of the study, the "Family Stress Survey," and a short demographic information sheet. The information sheet asked parents to indicate their name, address, and telephone number, as well as the name, gender, date of birth, and ADHD subtype diagnosis (if known) of their child. These items were either given to parents in person or were sent to parents by mail. In the latter instance, a self-addressed stamped envelope was included so that parents could return completed surveys at no cost.

An initial pool of 134 total stressors resulted from the responses of parents to the "Family Stress Survey." During the subsequent item selection process, irrelevant items were discarded, and items with similar content and meaning were joined into single items. Items that simply described child behavior problems and symptoms of ADHD were purposefully excluded so as to decrease the likelihood of confounding the construct of parent/family stress and ADHD behavior. The resulting pool of items was then given to three doctoral-level clinical-child/pediatric psychologists for evaluation and input regarding item wording, relevance, and appropriateness. Forty items were eventually selected for inclusion in the preliminary measure. These items reflected a range of specific family related events, changes, hassles, and family disruptions reported to be experienced by parents of children with ADHD.

After the completion of the item selection process, the resultant pool of forty items was randomized to construct the initial measure, which has been labeled the Disruptive Behavior Stress Inventory

(DBSI).³ The format of the scale asks parents to respond to each item by circling *Yes* (scored as 1) or *No* (scored as 0) to indicate whether they have experienced a particular stressor within the past 6 months. If the parent reports experiencing a specific stressor, he/she is asked to rate the degree of stress associated with that stressor on a continuum: 0 (*not at all stressful*), 1 (*somewhat stressful*), 2 (*moderately stressful*), 3 (*very stressful*). If a stressor has not been experienced, no rating of event stressfulness is provided. When scored, the DBSI yields two stress indices: a Stress Experience score and a Stress Degree score. The Stress Experience score is obtained by summing the total number of stressors reported to be experienced by the parent (circled Yes) during the past 6 months (range = 0–40). The Stress Degree score is obtained by summing the stressfulness ratings for each item reported to have been experienced (range = 0–120). The DBSI is presented in the Appendix.

Phase 2: Preliminary Reliability and Validity Findings

Participants

Two groups of parents were asked to complete the DBSI. Demographic data are presented in Table I.

The ADHD group consisted of 55 parents (47 mothers and 8 fathers), aged 18–50, who had children between the ages of 4–15 with a primary *DSM IV* diagnosis of ADHD. Measures were completed on 47 boys and 8 girls. The mean age of children in the ADHD group was 9.6 ($SD = 2.84$). Of these children, 39 were currently taking medication to treat ADHD symptoms. Frequencies of medication usage within the overall ADHD group and by subtype is presented in Table II.

A normal comparison control group comprised 38 parents (34 mothers and 4 fathers), similarly aged between 18 and 50 who also had children between the ages of 4 and 15. Children in this group had no reported diagnosis of ADHD or other psychological condition. Measures were completed on 20 boys and 18 girls. Mean age of children in this group was 8.0 ($SD = 3.11$).

³While the present measure has been developed primarily to assess stress in families of children with ADHD, the name of the scale relates to the belief that ultimately the measure will prove useful in assessing stress in families of children displaying other types of disruptive behaviors as well.

Table I. Demographic Data

	<i>n</i>	<i>M</i>	<i>SD</i>
Child age			
Normal	38	8.00	3.11
ADHD (Total)	55	9.60	2.84
ADHD (Subtypes)			
Combined	29	9.31	3.24
Hyperactive–Impulsive	6	8.17	2.40
Inattentive	12	10.50	2.07
Unknown	8	10.37	2.26
Child gender			
Normal			
Boys	20		
Girls	18		
ADHD			
Boys	47		
Girls	8		
Parent respondent			
Normal			
Mothers	34		
Fathers	4		
ADHD			
Mothers	47		
Fathers	8		

Parents in the ADHD group were recruited through the same interdisciplinary ADHD program and psychology clinic and using the same methods as described in Phase 1. Parents who had participated in Phase 1 of the study were again contacted and invited to participate, as were parents of other children with ADHD seen by these clinical services. After obtaining permission from the coordinator, study materials were also mailed to parents who were members of the local chapter of CHADD (Children and Adolescents with Attention Deficit Disorder), a community ADHD support group. Parents in the comparison group were recruited through flyers posted in the community and advertisements in the university medical center newsletter. After contacting the study coordinator, parents indicating an interest in participating in the study were screened to ensure their child did not have a prior diagnosis of ADHD or other psychological condition and was of the appropriate age.

Table II. Child Medication Usage

ADHD group	Medication	No medication
Total	39	16
Combined	20	9
Hyperactive–Impulsive	4	2
Inattentive	10	2
Unknown	5	3

Procedure

Parents in both groups were asked to complete the DBSI with regard to one of their children. In the ADHD group, if parents had more than one child with ADHD meeting the study age requirements, they were asked to select one child on which to base their responses. Similarly, parents in the comparison group with more than one child meeting study age requirements were asked to select only one child upon whom to base their responses. Parents in both groups were informed that their responses would be confidential and that they would have the opportunity to receive feedback regarding results of the study after its completion. Materials sent to parents contained self-addressed stamped envelopes so they could return completed materials at no cost.

Materials for parents in the ADHD group included a cover letter explaining Phase 2 of the study, the DBSI, and a short demographic information sheet. The demographic information sheet asked parents for general information (name, address, phone numbers, name of child, child's date of birth, and child's gender), whether the child had officially been diagnosed with ADHD (if so, by whom), and the type of ADHD diagnosis (if known). It also asked whether the child was on medication to treat ADHD symptoms, whether the child had been formally diagnosed with any other psychological condition (if so, what), and if the parent would be willing to complete the DBSI on a second occasion (to obtain test-retest reliability data). If the parent indicated their willingness to complete a second measure, they were contacted approximately 1 week later, provided with an additional copy of the DBSI, and asked to complete and return it. Twenty-two parents (19 mothers and 3 fathers) in the ADHD group completed the measure a second time.

Parents in the comparison group were given a cover letter explaining the nature of the study, a copy of the DBSI, and a demographic information sheet. Parents were asked to complete a shorter demographic information sheet that asked them to indicate their relationship to the child (mother, father, or other), child's gender and date of birth, and whether the child had ever received a diagnosis of ADHD or any other psychological condition. Parents expressing their willingness to participate in the study were either sent materials in the mail or, if the parent was located in close proximity to the hospital, a study investigator brought materials to that location to have them completed.

Statistical Analyses

Descriptive data concerning subject demographics (means, standard deviations, gender frequencies) was obtained prior to conducting the main analyses. Using data from completed measures, initial analyses evaluated the reliability characteristics of both the Stress Experience and Stress Degree scales. Reliability analyses were conducted only on measures completed by parents of children in the ADHD group.

Corrected item-total correlations were obtained to assess the degree of consistency between individual items and the total scale score, while excluding that item's contribution to the total score. The internal consistency of the Stress Experience and Stress Degree scales was analyzed to determine the degree of homogeneity, or the degree to which the items in each scale measure the same construct. Cronbach's coefficient alphas were calculated for both scales.

Test-retest reliability was evaluated by examining the Pearson's product moment correlation coefficients for both scale scores over a 1–2-week interval.

Data from completed measures provided means and standard deviations for scale scores on the DBSI. The discriminate validity of the Stress Experience and Stress Degree scales was assessed by comparing scores of parents of children with ADHD with scores provided by parents of children in the comparison group. It was hypothesized that both scale scores would be significantly higher for parents of children with ADHD. Because of the fact that a *t* test indicated there was a significant difference between groups in terms of child age, $t(91) = -2.57, p < .01$, comparisons involved use of an analysis of covariance (ANCOVA) where age was used as a covariate. Additionally, because of the disproportionate number of boys ($n = 47$) compared with girls ($n = 8$) in the ADHD group, related to the comparison group (boys $n = 20$, girls $n = 18$), an *F* test was conducted to examine potential significant differences in scale scores between boys and girls in each group. There were no significant differences in scores between parents of boys with ADHD and girls with ADHD on either the Stress Experience or Stress Degree scale nor were there significant differences between parents of normal boys and girls.

Next, an ANCOVA (controlling for child age and child gender separately) with post hoc tests was conducted to assess for overall differences between scale scores of parents of each group of

children (normal children and each subtype of ADHD: combined, hyperactive-impulsive, inattentive, and unknown type). It was predicted that scores on both scales would be significantly higher in parents with a child diagnosed with ADHD, combined type compared with parents of normal children and children with ADHD, inattentive type. It was also predicted that parents of children with ADHD hyperactive-impulsive type would have significantly higher mean scale scores compared to parents of normal children and children with ADHD inattentive type.

A final analysis looked at whether scale scores significantly differentiated between parents of children with ADHD on medication and parents of children with ADHD not on medication. It was hypothesized that parents of children with ADHD on medication would show lower stress scores, regardless of ADHD subtype.

RESULTS

Reliability Findings

Corrected item-total correlations were calculated for all 40 items on both the Stress Experience and Stress Degree scales. The mean corrected item-total correlation for the Stress Experience scale was .48 (range = .09-.72), whereas for the Stress Degree scale it was .58 (range = .23-.81). On the basis of analyses of 43 measures, Cronbach's coefficient alpha was .93 for the Stress Experience scale. Because of the failure of two parents to complete the Stress Degree scale, analyses of 41 measures resulted in a coefficient alpha for the Stress Degree scale of .96. Test-retest reliability coefficients for both scales were based on analyses of 22 completed measures. The test-retest reliability coefficient for the Stress Experience Scale was .76 ($p < .001$), whereas for the Stress Degree scale it was .65 ($p < .001$).

Table III. Comparison of DBSI Mean Scale Scores Between Normal and ADHD Groups

Scale	Normal		ADHD		F (1)	d	(1 - β)
	M	SD	M	SD			
Stress Experience	8.42	5.38	19.05	9.09	36.89***	1.36	1.00
Stress Degree	12.18	12.68	35.98	24.43	28.55***	1.17	1.00

Note. Cohen's *d* = Effect size ; β = Power estimate.
 *** $p < .001$.

Discriminant Validity/Stress Experience Index

The results of contrasts between the ADHD and comparison group are shown in Table III, whereas contrasts across the comparison and ADHD subtype groups are displayed in Table IV. Using child age as a covariate (due to significant differences between groups on this factor), an ANCOVA was used to evaluate whether scores on the Stress Experience scale differentiated between parents of children with ADHD and parents of children without ADHD. The ANCOVA showed significant mean score differences between groups, $F(1, 90) = 36.89, p < .001$, with parents of children with ADHD indicating more experienced stress ($X = 19.05, SD = 9.09$) than parents of children without ADHD ($X = 8.42, SD = 5.38$). The effect size, calculated in terms of Cohen's *d*, was 1.36 and power was 1.00. Child age was a non-significant covariate.

An ANCOVA was conducted to test for differences in Stress Experience scale mean scores across all groups, including normals and the subtypes of ADHD (see Table IV). The ANCOVA was significant, $F(4, 87) = 14.89, p < .001$. Child age was once again a nonsignificant covariate. Post hoc analyses using Bonferroni's correction found that parents of children with combined type ADHD showed significantly higher stress experience scores than both parents of normal children ($p < .001$) and parents of children with inattentive type ADHD ($p < .005$). No other

Table IV. Comparison of DBSI Mean Scale Scores Across Normal and ADHD Subtype Groups

Scale	Normal		Combined		Hyperactive- Impulsive		Inattentive		Unknown		F(4)
	M	SD	M	SD	M	SD	M	SD	M	SD	
Stress Experience	8.42 _a	5.38	22.55 _{a,b}	9.13	14.00	8.29	13.50 _b	5.81	18.50	8.75	14.89***
Stress Degree	12.18 _c	12.68	44.78 _{c,d}	26.21	26.00	20.69	18.50 _d	8.49	40.00	23.13	12.88***

Note. Means in a row sharing subscripts are significantly different.
 *** $p < .001$.

comparisons were found to be significant. In a further exploratory analysis, it was found that entering child gender as a covariate did not change the results significantly. In both analyses, child gender was a non-significant covariate.

Discriminant Validity/Stress Degree Index

The results of contrasts between the comparison and ADHD group are shown in Table III while contrasts across the comparison and ADHD subtype groups are displayed in Table IV. Using child age as a covariate once again, an ANCOVA found that mean scores on the Stress Degree scale significantly differentiated parents of children with ADHD from parents of normal children, $F(1, 88) = 28.55, p < .001$. Parents of children with ADHD showed higher mean Stress Degree scores ($X = 35.98, SD = 24.43$) compared to parents of normal children ($X = 12.18, SD = 12.68$). The effect size as Cohen's d was 1.17 and power was 1.00. Child age was a nonsignificant covariate. A subsequent ANCOVA analysis found an overall significant difference in mean scores amongst all groups $F(4, 85) = 12.88, p < .001$. Post hoc analyses using Bonferroni's correction showed that parents of children with combined type ADHD showed significantly higher Stress Degree scores than parents of normal children ($p < .001$) and parents of children with inattentive type ADHD ($p < .001$). No other comparisons were found to be significantly different. Repeating the analyses with child gender as a covariate did not change results significantly, and child gender was not a significant covariate.

DBSI Scores and Medication Status

As noted earlier, it was predicted that parents of children with ADHD who were on medication would show lower stress scores than would parents of children with ADHD who were not on medication. It was further hypothesized that these differences would be found for both DBSI measures regardless of ADHD subtype.

F tests conducted to evaluate differences in Stress Experience and Stress Degree scores for parents of ADHD children on and off medication found no significant differences between groups. Likewise, additional analyses found no significant differences when medicated and nonmedicated groups were considered as a function of ADHD subtype. Although these analyses were hampered by relatively low power, because of the small number of participants

per group, there was little evidence that stress level was related to medication status.

DISCUSSION

The results of this study provide initial support for the adequacy of the DBSI in assessing the presence and degree of child behavior-related stressors experienced by parents of children with ADHD. In this preliminary study both the Stress Experience and Stress Degree scales displayed strong internal consistency, with alpha coefficients of .93 and .96, respectively. Both scales showed adequate mean item-total correlations (Stress Experience = .48; Stress Degree = .58). Test-retest reliability coefficients (Stress Experience; $r = .76$; Stress Degree; $r = .65$) were highly significant and of an acceptable level for this type of measure. It should be noted that while the test-retest reliability coefficients found here are somewhat lower than those found with some instruments, measures of this type may underestimate reliability. That is, during a time interval of one to two weeks, parents may actually experience new stressors related to child behavior that had not been experienced prior to the first testing. Therefore, attenuated reliability estimates may result from the actual experiencing of child related stressors during the test-retest interval. Indeed, the present reliability estimates are consistent with those found with existing life stress questionnaires, which also assess stressful events over time (Johnson, 1986; Sarason, Johnson, & Siegel, 1978). Taken together, despite a relatively small sample size, it can be argued that these preliminary findings provide reasonable support for the reliability of the measure.

The two DBSI scale scores also show good evidence of discriminate validity in differentiating between parents of children with and without ADHD and, in some instances, between ADHD subtypes. As predicted, mean scores on both the Stress Experience and Stress Degree scales were found to be significantly higher in parents of children with ADHD as compared to parents of children without ADHD. When analyses were conducted using ADHD subtype groupings, it was also found that mean scores on both the Stress Experience and Stress Degree scales were higher in parents of children with the ADHD Combined Type as compared to parents of normal children and parents of children with an ADHD Inattentive Type diagnosis. These results confirmed initial predictions that parents of children with ADHD would show higher levels of stress than parents of

normal children and further that DBSI stress indices may distinguish differential stress levels of parents of children diagnosed as having different subtypes of ADHD. The fact that no significant differences were found involving children with ADHD hyperactive-impulsive type may have resulted from the small number of subjects in this group ($n = 6$).

Contrary to prediction, parents of children with ADHD who were on medication did not have significantly lower scores on either DBSI scale than parents of children with ADHD who were not on medication. While the reason for this somewhat counterintuitive finding is not entirely clear, it may be that children who are and are not medicated differ in the initial severity of their symptoms. That is, children who are prescribed medication may have more severe symptoms and display greater degrees of impairment than those who are not. And, these more severe symptoms may be associated with higher levels of family stress. Although pharmacological treatment may positively impact on symptoms and thereby reduce family stress, given the initial higher level of symptom expression, this may not be sufficient to reduce child behavior problems and family stress levels below the level seen in children/families in the non-medicated group. Although such an explanation might reasonably account for the lack of observed differences between children who were and were not medicated in this study, data from the present investigation are not sufficient to determine the adequacy of this proposed explanation.

Taken together, the findings of this study not only provide preliminary support for the validity of the DBSI but they are also consistent with the results of previous studies, using different measures, that have found higher levels of stress in parents of children with ADHD in comparison to parents of normal children (Breen & Barkley, 1988; Gillberg et al., 1983; Mash & Johnston, 1983a).

As was noted earlier, most studies specifically designed to investigate stress in parents of children with ADHD have utilized the Parenting Stress Index (PSI; Abidin, 1995). These studies have consistently suggested higher levels of stress in families of children with this disorder. The present findings are consistent with the results of these investigations and further suggest that elevated levels of stress in parents of children with ADHD are also found when stress is operationally defined in terms of the occurrence of specific ADHD behavior-related family stressors. It would seem that a particular strength of the DBSI lies in its ability to provide information regarding both the presence and degree of stress that parents of children

with ADHD experience as a result of having a child with ADHD in the family. This measure would seem to have potential value in providing ADHD assessment information that can be useful in developing interventions designed to reduce family stress levels and it may also be of potential value as a treatment outcome measure, as one can reasonably expect successful treatment outcomes to be associated with reduction in family stress.

Despite data providing preliminary support for the reliability and validity of the DBSI there are several potential limitations of the present study. One is the lack of input from fathers in the initial development of the DBSI item pool. In this study the primary source of stress related items came from mothers, as these were the ones who typically brought children to the clinic. Indeed, in development of the item pool 28 mothers and only 3 fathers were included. As fathers and mothers may differ in the nature of stressors they experience and in the degree to which they find issues related to disruptive child behavior to be stressful, the failure to include fathers to a greater extent may limit the generalizability of the measure to some unknown degree.

A second limitation is the relatively small sample size used for determining reliability estimates and in conducting certain analyses comparing ADHD subtypes. Additional studies designed to investigate the validity and reliability of the DBSI with larger samples are clearly in order. It is noteworthy, however, that despite the relatively small number of participants, the present sample size appeared sufficient to provide reasonably strong preliminary support for the adequacy of the measure.

An additional potential limitation relates to the fact that this study did not isolate "pure" cases of ADHD by excluding children with comorbid disorders. The presence of possible comorbid disorders in the ADHD group may be considered at least a potential limitation in the sense that DBSI scores may have been measuring parent stress that is due, in part, to comorbid conditions rather than just ADHD-related behavior. However, if one considers the relatively low rates of "pure" ADHD and the high rates of comorbid disorders such as Oppositional Defiant and Conduct Disorder in the ADHD population (Barkley, 1998; Cantwell, 1996; Jensen, Martin, & Cantwell, 1997), our sample is likely to be reasonably representative of ADHD cases seen in many clinical settings.

Finally, additional potential limitations relate to the fact that ADHD and comparison groups were found to differ significantly in terms of age and the fact that males were disproportionately represented in

the ADHD group. Although there were group differences with regard to these variables, it is noteworthy that in covariance analyses designed to control for age, this variable did not emerge as a significant covariate in any of the analyses, making it unlikely that age differences accounted for any of the obtained findings.

Regarding the issue of sex differences, discrepancies in the number of male and female subjects (47 boys and 8 girls) seems consistent with research showing that in clinical settings, boys are diagnosed with ADHD far more frequently than girls, by a ratio of approximately 6:1 (Barkley, 1998). Thus, it appears the ratio of boys to girls in our ADHD sample is reasonably representative of that seen in clinical settings. Although low power values (because of the small number of female subjects) made tests of significance suspect, there were no significant differences on either stress score between parents of boys versus girls in either the ADHD or the comparison group. Although the nonequivalence of groups with regard to child age and gender represents a potential limitation, the findings that neither variable was a significant covariate in any analysis seems to suggest that the differences in stress scores between ADHD and control groups are not likely the result of the child's age and/or gender.

The results of this study clearly support the continued evaluation and development of the Disruptive Behavior Stress Inventory. Future research directions should include obtaining additional reliability data and stronger evidence of validity through studies of this type using larger samples. Studies documenting significant relationships between scores on the DBSI and other measures of parenting stress (such as the

Parenting Stress Index) would also be valuable. As indicated earlier, efforts to obtain additional information regarding family stressors from fathers would be highly desirable, as would be studies designed to determine the degree to which comorbid disorders displayed by children with ADHD serve to increase parent reports of stress on the DBSI. Also worthwhile would be factor analyses of the DBSI, employing large samples of ADHD children to determine relevant dimensions of parenting stress. Obtaining normative data and deriving clinical cut-off scores would also seem to be essential if the measure is to be used clinically. Finally, considering that research indicates that increased levels of parenting stress are associated with children displaying a range of externalizing behaviors (Baker & Heller, 1996; Donenberg & Baker, 1993), studies designed to demonstrate the usefulness of this measure with parents of children with other types of disorders would also seem desirable.

Given findings from this investigation, along with those from previous research, the importance of including a measure such as the DBSI for assessing family stress in ADHD evaluations seems clear. Indeed, it might be argued that an assessment of behavior-related family stress should be an essential aspect of all ADHD evaluations. In those families characterized by high levels of stress, the DBSI might also serve as a useful treatment outcome measure. Finally, as suggested above, the potential usefulness of the DBSI may not be limited to just the ADHD population—it may also have potential when used to assess stressors experienced by parents of children displaying other disruptive behavior disorder of childhood.

APPENDIX: DISRUPTIVE BEHAVIOR STRESS INVENTORY (DBSI)

Listed below are a range of potential stressors that are sometimes experienced as a result of having a child who displays behavioral difficulties. Read each of the following items carefully and indicate those situations you have experienced *as a result of your child's behavior* during the past six months. Circle "Yes" if you have experienced what is described in the item. Circle "No" if you have not. For each item where you circled "Yes," indicate on the following 4-point scale the extent to which it was/is stressful to you: 0 (*Not at all Stressful*); 1 (*Somewhat Stressful*); 2 (*Moderately Stressful*); 3 (*Very Stressful*). Please be sure to respond to each item.

	Experienced event?		Not at all stressful	Somewhat stressful	Moderately stressful	Very stressful
1. Not being able to leave your child with a baby-sitter.	Yes	No	0	1	2	3
2. Not being able to go out to eat because of your child's behavior.	Yes	No	0	1	2	3
3. Being interrupted by your child when trying to take care of other children.	Yes	No	0	1	2	3
4. Having to miss or leave church because of your child's behavior.	Yes	No	0	1	2	3
5. Dealing with teachers' complaints about your child.	Yes	No	0	1	2	3
6. Difficulties finding professional services for your child.	Yes	No	0	1	2	3
7. Having to miss work because of your child's problems.	Yes	No	0	1	2	3
8. Not being able to take your child shopping because of his/her behavior.	Yes	No	0	1	2	3
9. Not able to spend enough time with your other children.	Yes	No	0	1	2	3

Appendix (Continued)

	Experienced event?	Not at all stressful	Somewhat stressful	Moderately stressful	Very stressful	
10. Dealing with your child's academic difficulties.	Yes	No	0	1	2	3
11. Difficulties dealing with your child's doctors.	Yes	No	0	1	2	3
12. Difficulties getting your child to appointments with various professionals.	Yes	No	0	1	2	3
13. Spending an excessive amount of time helping your child with homework.	Yes	No	0	1	2	3
14. Not having enough time for yourself because of your child's behavior.	Yes	No	0	1	2	3
15. Having to explain your child's behavior to others.	Yes	No	0	1	2	3
16. Difficulties getting school-based services for your child.	Yes	No	0	1	2	3
17. Not knowing how to deal with your child's behavior.	Yes	No	0	1	2	3
18. Disagreements with spouse about managing your child's behavior.	Yes	No	0	1	2	3
19. Problems paying for services your child needs.	Yes	No	0	1	2	3
20. Dealing with your child's conflicts with other children.	Yes	No	0	1	2	3
21. Calls from school regarding your child's behavior problems.	Yes	No	0	1	2	3
22. Having to watch your child so he/she doesn't get into trouble.	Yes	No	0	1	2	3
23. Dealing with complaints from other parents about your child's behavior.	Yes	No	0	1	2	3
24. Having to miss important social events because of your child's behavior.	Yes	No	0	1	2	3
25. Not being able to get to bed at a decent hour because of child's behavior.	Yes	No	0	1	2	3
26. Dealing with complaints from neighbors about your child's behavior.	Yes	No	0	1	2	3
27. Being concerned about your child being injured.	Yes	No	0	1	2	3
28. Not getting work done at home because of your child's behavior.	Yes	No	0	1	2	3
29. Other people telling you how to parent your child.	Yes	No	0	1	2	3
30. Problems related to medication side effects (i.e. drowsiness, headaches, etc).	Yes	No	0	1	2	3
31. Not knowing how to explain your child's behavior to others.	Yes	No	0	1	2	3
32. Not being able to work outside home because of your child's behavior.	Yes	No	0	1	2	3
33. Conflicts with your child over homework.	Yes	No	0	1	2	3
34. Calls from school regarding your child's academic problems.	Yes	No	0	1	2	3
35. Getting complaints from school bus driver.	Yes	No	0	1	2	3
36. Having less time with partner because of your child's behavior.	Yes	No	0	1	2	3
37. Not getting support from others in dealing with your child's problems.	Yes	No	0	1	2	3
38. Being unable to take your child to public places.	Yes	No	0	1	2	3
39. Difficulties finding adequate after school placement for your child.	Yes	No	0	1	2	3
40. Having your child embarrass you in front of others.	Yes	No	0	1	2	3
Please feel free to add stressful situations not listed above and rate them.						
41. _____	Yes	No	0	1	2	3
42. _____	Yes	No	0	1	2	3
43. _____	Yes	No	0	1	2	3
44. _____	Yes	No	0	1	2	3
45. _____	Yes	No	0	1	2	3

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