Published in final edited form as:
Dev Med Child Neurol. 2009 May ; 51(5): 364–372. doi:10.1111/j.1469-8749.2008.03172.x.

Prevalence of Psychopathology in Childhood Epilepsy: Categorical and Dimensional Measures

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Abstract

Objective—Few studies have utilized both categorical and dimensional measures of psychopathology in children with epilepsy.

Methods—We evaluated 173 children, 9-14 years (49% female), who had epilepsy (generalized 36%, partial 61%) for at least 6 months. The primary caregiver completed a dimensional measure, the Child Behavior Checklist (CBCL), and a categorical measure, either the Child Symptom Inventory (CSI) or the Adolescent Symptom Inventory (ASI). Correlation coefficients were computed between the CBCL scores and CSI/ASI symptom scores.

Results—For all children, diagnostic risk was higher than norms on CSI/ASI for ADHD Inattentive Type, ADHD combined type, Oppositional Defiant Disorder, and Dysthymic disorder. For children 9-12 years, elevated scores were found on CBCL total, internalizing, and attention problems, and on CSI diagnostic risk for Conduct Disorder and Asperger Disorder. For children 13-14 years, ASI diagnostic risk was higher for Specific phobia, Obsessions, PTSD, Motor Tics, Antisocial Personality, Panic Attack, Somatization Disorder, and Enuresis. CBCL and symptom scores on the CSI/ASI were significantly correlated.

Conclusions—Children with epilepsy have high rates of behavioral difficulties on both dimensional and categorical measures. Concurrent validity for the CSI/ASI was supported.

Children with epilepsy, chronic recurrent seizures, are at increased risk for behavioral problems, as has been shown in both epidemiological[1] and clinic-based studies[2-4]. Furthermore, both children with new-onset and chronic seizures have an increased prevalence of behavioral problems compared to general population or control groups. Studies have varied in the definition of behavioral problems, with some using more global or dimensional classifications and others utilizing categorical measures of specific psychiatric disorders. Well established dimensional measures, such as the Child Behavior Checklist[5], determine the presence and severity of various symptoms and then cluster these symptoms into separate syndromes. The child's scores on these measures allow comparison to children in a normative sample. Furthermore, when a T-score threshold is used to define clinical risk status, the dimensional measure becomes a categorical measure. In contrast, categorical

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measures of psychopathology are used to determine if sufficient criteria are present to suggest the presence or absence of a specific psychiatric disorder. An advantage of the dimensional measures is the quantification of the severity of a symptom in comparison to that found in a normative sample. A weakness of the dimensional measure is often the inability to define a specific diagnosis. For example, the CBCL has a single measure, anxious/depressed, that does not define the specific type of anxiety disorder. In comparison, a categorical measure will allow determination of a specific diagnosis that can be used to guide treatment, but will not indicate the severity of the condition. Ferdinand et al.[6] assessed psychopathology in children and adolescents using both a categorical and a dimensional measure and compared the predictive value of the measures for outcome approximately 3 years later. They found that both approaches were useful, neither was superior, and each gave important but different information for predicting outcomes. The authors suggested combining the two approaches for a more comprehensive assessment of the child in both research and clinical settings.

The majority of studies assessing behavioral problems in children with epilepsy have used dimensional measures, most commonly the CBCL. Hoare and Mann[7] used the CBCL to demonstrate more social, thought, and attention problems in children with epilepsy compared to children with diabetes mellitus. Austin et al.[2] have shown that, compared to siblings, children with new-onset seizures had significantly higher scores on CBCL total behavior problems, internalizing problems, attention problems, thought problems, and somatic complaints[2]. More than 15% of the children with new-onset seizures were in the clinical range for the internalizing, externalizing, and total problem scales and 10.7% were in the clinical range for attention problems. In children with chronic seizures, Austin et al.[8] found higher scores on internalizing, externalizing, attention, and thought problems compared to children with asthma. Schoenfeld et al.[9] found that children with complex partial seizures had elevated scores on the CBCL compared to sibling controls. There were significant differences in total behavior problems, internalizing problems, and in the syndrome scales: withdrawn, somatic complaints, social problems, thought problems, and attention problems. Datta et al.10 found psychopathology as measured by CBCL in 53.8% of a sample of children with epilepsy. Keene et al.11 and Freilinger et al.12 also used the CBCL and noted significant problems in children with epilepsy compared to normative CBCL samples. Social problems and attention problems were more common in both samples. Berg et al.[13] evaluated children 8 to 9 years after an initial seizure and described elevated CBCL scores in children with epilepsy compared to siblings. Although the children with seizures had more problems with behavior, none of these studies identified exact Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)[14] diagnoses.

Fewer studies have utilized categorical measures of psychopathology. Caplan et al.3 used structured diagnostic interviews for 60 children with complex partial epilepsy and 40 children with generalized epilepsy (defined by 3cps spike and wave discharges on EEG). They found psychopathology in 63% of children with partial seizures and in 55% of the children with generalized seizures. Disruptive disorders were found in 25-26%, anxiety and/or affective disorders in 13%, and comorbid disruptive and anxiety/affective disorders in 14-16% of the children with seizures. Thome-Souza et al.15 evaluated 55 children with epilepsy, including 28 with an IQ<70. They screened children with a structured psychiatric history and assessed those positive on the screen with structured diagnostic interviews. They found a psychiatric disorder in 70.5% of the children, most commonly depression (36.4%) and ADHD (29.1%). Jones et al.16 also used structured diagnostic interviews to assess children and adolescents within 1 year of the onset of epilepsy. They found depressive disorders in 22.6%, anxiety disorders in 35.8%, and attention deficit hyperactivity disorder (ADHD) in 26.4%.

We found only two studies that combined dimensional and categorical measures of behavior in children with epilepsy. In a nationwide population survey of mental health problems in children 5-15 years of age, Davies et al.[1] combined a dimensional measure with a structured psychiatric interview to establish a categorical diagnosis. They found that 37% of children with epilepsy had behavioral problems compared to 11% of children with diabetes mellitus and 9% of controls. They reported behavioral problems in 56% of the children with epilepsy and additional neurological problems and in 26.2% of those with uncomplicated epilepsy. Psychiatric diagnoses were reported only as emotional disorders, conduct disorder, ADHD, or pervasive developmental disorders. Caplan et al.[4] evaluated 101 children with complex partial epilepsy using both the CBCL and a structured interview for categorical diagnosis. On the structured interview, 56% of children with complex partial epilepsy had psychiatric problems. They found disruptive disorders in 17%, affective/anxiety disorders in 14%, and combined disruptive and affective/anxiety disorder in 23%. The CBCL Total Behavior Problem score was greater than 65 in 40% of the children with epilepsy compared to 16% of controls. Elevated internalizing scores were found in 42% and externalizing scores in 19%.

Because of the frequency and severity of emotional and behavioral problems in children with epilepsy, a comprehensive seizure disorder clinic must provide evaluation and treatment of psychiatric problems. Unfortunately, problems are often either unrecognized or assessment and care are not available. One study found that two thirds of children with epilepsy and behavioral problems had received no mental health treatment[17]. As a practical issue, child psychiatrists and psychologists might not be available in the average epilepsy clinic and structured diagnostic interviews require trained interviews and time for administration. The neurologist needs a way of assessing behavioral problems that can be administered and scored by personnel without substantial training in psychopathology. If children are found to have emotional or behavioral disorders, appropriate treatment or referral can be provided.

In this study, we evaluated DSM-IV-referenced measures of psychopathology, the Child Symptom Inventory18 (CSI) and the Adolescent Symptom Inventory[19] (ASI). We are not aware of any published studies utilizing the CSI/ASI for children with epilepsy. Although it is mostly used in the assessment of children with psychiatric problems, the CSI and ASI have been used to measure psychopathology in children with chronic illnesses including spina bifida, tic disorder, somatic disorders, and migraine20-23. The CSI and ASI are questionnaires about the children's behavior that are completed by parents. They are reasonably short and can be completed in the waiting room. In addition, there are teacher forms and an early childhood inventory for children 3-6 years of age. The symptom inventories are easy to score and do not require a trained interviewer. Most importantly, they provide a practical screening instrument for behavioral problems using DSM-IV criteria that can be used in comprehensive epilepsy clinics.

The purpose of this study was to define the prevalence of psychopathology in a sample of children with epilepsy. We used both a dimensional (CBCL) and a categorical measure (CSI/ASI) to assess psychopathology in children with chronic seizures. Our initial hypothesis was that children with epilepsy would have higher scores than normal population controls on the CBCL. Second, we expected that many of these children would meet initial screening criteria for a possible DSM-IV diagnosis of behavioral problems as determined by the CSI or ASI. Finally, we assessed the concurrent validity for the CSI-4 or ASI-4 in this chronic illness sample by correlating the symptom count scores of the CSI and ASI with the relevant subscale scores of the CBCL.

METHOD

The children for this study were recruited for a larger ongoing study of youth adaptation outcomes in epilepsy. The children were between 9 and 14 years of age at entry into the study and had been treated for epilepsy for at least 6 months. They were recruited from a university-based child neurology clinic, from the private practices of child neurologists, and through school nurses. The university's institutional review board approved the research protocol and the parents signed informed consents and the children signed assents prior to beginning the study.

Seizure variables were determined by author DWD, a board-certified child neurologist and a child and adolescent psychiatrist. Seizure type was based on parent description of the episode and on the review of the EEG results. Seizure syndrome was based on parent description of the episode, review of the clinical chart, physician examinations, neuroimaging, and EEG results.

The primary measures of behavior were the CBCL and either the CSI or ASI depending on the age of the child. The child's mother completed the CBCL and either the CSI or ASI. The CBCL has 20 items that measure social competence and 118 items that measure behavioral problems. Behavioral problems are measured on 3-point rating scales. Parents were asked not to include any behaviors that seemed to occur only during or immediately before or after a seizure when completing the CBCL. All items on the CBCL were completed as a prior study has shown that elevated scores are the result of true behavioral difficulties and not confusion with epileptic phenomenon[24]. The CBCL is a well-recognized instrument with strong reliability and validity. Scores on the CBCL have been normed by age and gender. By using T-scores, the normative sample can become the comparison group. CBCL scores are given for total behavior problems, two second-order factors (internalizing and externalizing problems), and eight syndrome scales (withdrawn, somatic complaints, anxious/depressed, social problems, thought problems, attention problems, delinquent behavior, aggressive behavior).

The CSI is a 97-item checklist that contains symptoms of 20 behavioral disorders and the ASI is a 120-item checklist with symptoms of 24 behavioral disorders. The CSI is used for children 6-12 years of age and the ASI for adolescents 13 years of age or older. In both rating scales most items are rated 0 to 3 (“never” to “very often”). For both the CSI and the ASI, items are scored for severity by summing item scores for each disorder. A symptom criterion score utilizing DSM-IV criteria is employed to obtain a screening cutoff score that gives a yes or no answer as to the presence of sufficient criteria to warrant consideration of a diagnosis.

For each child, we obtained T-scores for total, internalizing, and externalizing problem scales and for the eight subscales. CSI and ASI were scored both by the symptom count score method and the screening cutoff score method. We compared scores for the 9-12 age group with scores for the 12-14 age group with respect to CBCL T-scores and clinical risk and CSI/ASI screening cutoff scores using two-sample t-test, chi-square tests, or Fisher's exact tests as appropriate. To adjust for multiple testing, within each instrument and age group we computed adjusted p-values based on the Hochberg Step-up Bonferroni method. Ninety-five percent exact binomial confidence intervals were calculated for selected diagnosis risks. In addition, we obtained Spearman correlation coefficients (r_s) between symptom count scores of the CSI-4 or ASI-4 and the scale scores of the CBCL for the following a priori cases (CBCL subscale scales listed first and CSI/ASI symptom count scores listed second): 1) Attention Problems and ADHD; 2) Aggressive Behavior Problems and both Oppositional Defiance Disorder and Conduct Disorder; 3) Anxious/Depressed and

Generalized Anxiety, PTSD, and Panic Attack; and 4) Withdrawn and Major Depressive Disorder. In cases in which the CSI/ASI score was based on a single item, point biserial rank correlations (r_{pb}) were obtained. We considered concurrent validity to be demonstrated if the correlation between the CBCL subscale score and CSI/ASI symptom count score was significantly different from zero at the .05 level. As above, we controlled for multiple comparisons among the correlation tests using the Hochberg Stepdown Bonferroni method.

After completion of the first portion of this study, we contacted families of the children who had a possible diagnosis in any area on the CSI/ASI. Families that agreed to participate were interviewed using the module from the computer-assisted version of the Diagnostic Interview for Children and Adolescents (DICA)[25] that corresponded to the presumptive diagnosis from the CSI/ASI. The DICA is a structured, respondent-based interview. A trained interviewer called the families and read the questions over the telephone. Responses about symptoms and behaviors were recorded on two or three-point scales and impairment was graded on a four-point scale. IRB approval and parent consent were obtained separately for this portion of the study.

RESULTS

Demographics

There were 173 children recruited into the study, 88 boys and 85 girls. The sample was predominantly white (91.3%), similar to the ethnic composition of Indiana. The most common seizure type was partial (60.7%) followed by generalized tonic/clonic (17.9%) and absence (16.8%). CBCL data were obtained for 170 children (98%) and CSI/ASI data were obtained for 169 children (98%). Refer to Table 1 for further demographic information. There were no differences in demographics between the children ages 9-12 vs. 13-14 years other than what would be expected (age, age of onset, and duration of disorder).

CBCL

Children were separated into two age groups, reflecting the age ranges for the CSI and the ASI. See Table 2 for means, standard deviations, and percent in the clinical range for the CBCL by age group and overall. In the children ages 9-12 years, the means (with standard deviations) for the CBCL total and second-order factor scales were higher than 60 (referred to as “at-risk” for problems according to Achenbach 20015) for Total Behavior Problems and Internalizing Problems. Mean syndrome scale scores that were above 67 (referred to as “at-risk” for problems according to Achenbach 20015) included Attention Problems only. Percentages in the clinical range for these three variables were 58%, 55%, and 39%, respectively.

The mean CBCL scores were lower in the children over age 12, with mean total and second-order factor scores less than 60 for Total Behavior Problems, Internalizing Problems, and Externalizing Problems. No mean syndrome scale scores were at or above 67. Although the scores tended to be lower in the older age group, the only statistically significant differences between the two age groups were found on Total Behavior Problems, Anxious/Depressed, and Withdrawn for the scale scores and on Total Behavior Problems and Internalizing Problems for the percentages in the clinical range.

ASI/CSI

Using the screening cutoff score method for the ASI/CSI, we identified children at risk for diagnosis of each disorder. The results are displayed in Table 3 by age group and overall for diagnoses evaluated for both age groups. In both children and adolescents, diagnosis risk was higher than the normative values for ADHD Inattentive Type (24.2 [95% CI: 16.0,34.1]

in children and 21.6[95% CI: 12.9,32.7] in adolescents), ADHD combined type (13.7 [95% CI: 7.5,22.3] in children and 9.5[95% CI: 3.9,18.5] in adolescents), Oppositional Defiant Disorder (20.0 [95% CI: 12.5,29.5] in children and 20.3[95% CI: 11.8,31.2] in adolescents), and Dysthymic Disorder (9.5 [95% CI: 4.4,17.2] in children and 5.4[95% CI: 1.5,13.3] in adolescents). In children 9-12 years of age, diagnosis risk was also higher for Conduct Disorder and Asperger's Disorder. For the 13-14 age group, diagnosis risk was also higher for Specific Phobia, Obsessions, PTSD, Motor Tics, Antisocial Personality, Panic Attack, Somatization Disorder, and Nocturnal Enuresis. There were no differences between children ages 9-12 vs. 13-14 on any variables except for Enuresis.

Concurrent Validity

Concurrent validity in this sample of children and adolescents with epilepsy was shown by Spearman or point biserial rank correlations between CBCL subscale scores and symptom count scores from the CSI/ASI. All correlations described below were significant at the .05 level. For attention problems on the CBCL and ADHD on CSI/ASI, there was a correlation of r_s=0.74 in children and r_s=0.78 in adolescents. There were significant correlations between aggressive behavior problems and oppositional defiant disorder (r_s=.68 in children; r_s=.75 in adolescents) and conduct disorder (r_s=.66 in children; r_s=.52 in adolescents), respectively. The anxious depressed score on CBCL was significantly associated with generalized anxiety (r_s=.48 in children; r_s=.62 in adolescents), PTSD (r_{pb}=.46 in children; r_s=.43 in adolescents), and panic attacks (measured for adolescents only, r_{pb}=.53. Withdrawal on CBCL was associated, though to a lesser extent, with major depressive disorder (r_s=.36 in children; r_s=.27 in adolescents).

DICA

Based on the CSI/ASI screening of the 135 subjects who completed this instrument at 24 months, 26 (19%) did not screen positive for any of the disorders, 37 (27%) screened positive but were not available for DICA testing, and 72 screened positive and were available for DICA testing. There were no difference in any of the variables shown in Table 1 between those that screened positive but were not available for DICA testing vs. those that were, with the exception that those no available were younger on average (11.2 years old vs 12.0 years old, p=.03). After giving informed consent, the parent completed the DICA with a trained interviewer. The time between completion of the initial interview and the DICA averaged 7.7 months (median = 7.0 months, range =13 days to 2 years). The numbers of subjects meeting diagnostic criteria for a disorder according to the DICA are reported for the top 12 diagnoses screening positive on the CSI/ASI. Percentages meeting diagnostic criteria according to DICA ranged from 83% down to 0%. (Table 4)

DISCUSSION

The elevated scores on the CBCL and the number of possible diagnoses found by CSI or ASI confirm prior studies showing increased risk of behavioral disturbance in children with epilepsy. This study demonstrated an increased risk of behavioral problems utilizing both dimensional and categorical measures. Particularly notable was the elevation on total behavior problem scores and internalizing scores of the CBCL into the clinical range in more than half the children aged 9-12 and approximately one third of the children aged 13-14. On the categorical measures, CSI and ASI, scores above the respective clinical cutoff points suggested possible diagnoses of ADHD, disruptive behavior disorders, and anxiety disorders in approximately one third of the sample. Approximately one child in ten had evidence of a mood disorder.

To the best of our knowledge, this study was the first to use the CSI and ASI in a sample of children with epilepsy. Concurrent validity for the CSI and ASI were shown in this chronic illness sample by significant correlation with similar subscale scores on the CBCL. In addition, the prevalence of ADHD[26] is similar to that found in the literature. The prevalence of ODD (20.4%) and CD (18%) is higher than the 2-16% prevalence rate for ODD and the 6-16% for boys and 2-9% rate for girls of CD in the general population (DSM-IV)[14],but is similar to the 24% prevalence of ODD/CD in children with complicated seizures and the 17% rate in children with uncomplicated seizures found by Davies et al.1, the ODD/CD rate of 17% noted by Jones et al.16, and to the 16.4% rate of ODD reported by Thome-Souza et al.15 .

A lower rate of mood disorders compared to prior reports was found using scores above the cutoff range on the CSI/ASI. Jones et al.[16] found depression in 22.6% of patients with epilepsy aged 8 to 18 years and Thome-Souza et al.[15] reported a prevalence rate of 36.5%. In contrast, the rate of dysthymia and major depression was only 9.6% in this study, similar to the 12% rate reported by Caplan et al.[27]. This inconsistency in findings may be the result of the different samples. Thome-Souza et al.[15] had a much higher portion of children with intellectual disability than found in our sample or the children assessed by Caplan et al.[27]. Inconsistencies also may be because of the number of measures of depression used.

The prevalence of anxiety disorders found by the CSI/ASI is beyond that found in the general population. We found almost one-third had evidence of specific phobias, obsessions, PTSD, and panic attacks and a smaller number of cases of possible generalized anxiety disorder, social phobia, and separation anxiety disorder. Caplan et al.[27] found that 27% of a sample of 171 children with complex partial or absence epilepsy had evidence of anxiety alone or comorbid with depression or disruptive behavior disorder. Jones et al[16] reported anxiety disorders in 35.8% of their sample of children with epilepsy. Neither Caplan et al.[27] nor Jones et al.[16] divided anxiety disorder into subcategories. Our findings support the contention that anxiety disorders are more frequent than mood disorders in persons with epilepsy.

It is possible that the higher prevalence of certain disorders found using the CSI/ASI might represent false positives. This is expected as the CSI and ASI are intended to be screening measures that, when positive, require more detailed evaluation. In addition, the frequent endorsement of tics, enuresis, and panic attacks could be a reflection of epileptic phenomena. Although tics can be a sign of partial elementary seizures, enuresis evidence of generalized or secondary generalized seizures, and panic a manifestation of complex partial seizures, review of our data found no association between seizure type and any of these three symptoms.

The CSI/ASI utilize single-item screens for simple phobias, obsessions, and compulsions and a two-item screen for PTSD. The 38% prevalence of possible PTSD was a surprise and might either indicate a response to seizures or be a false positive. The prevalence of PTSD in our study is very similar to the 37% prevalence reported by Rosenberg et al.[28] in a sample of adults with intractable seizures. Seizures are traumatic events that carry a threat of physical injury consistent with the first criterion for posttraumatic stress disorder. The anxiety felt by the parent on observing a seizure in their child could serve as a model for the child. For the child the fear of recurrent seizures could reinforce the initial panic experienced during a first seizure. To further assess the possibility of posttraumatic stress disorder we used the DICA to interview 30 parents of children with possible PTSD. Using the stricter criteria of the DICA, 23 of the 30 children met no criteria for PTSD and only about one fourth met at least one criterion.

Limitations

The sample in this study was not identified by epidemiological means but was recruited from university-based and private practice child neurology clinics and from schools. The children in this study may have had a more severe form of epilepsy than generally found in pediatric or family medicine practices. Information was obtained from parents and not children, adolescents, or teachers. Adding additional informants might have increased the prevalence rates of certain psychiatric disorders. Finally, the DICA was obtained after the CBCL and CSI/ASI and surveyed only those conditions identified by the CSI/ASI. Had parents of the entire sample completed the entire DICA, additional problems might have been found. It is possible that some behavioral problems may have resolved between the administration of the CSI/ASI and the DICA and that this accounted for some of the differences in findings.

Clinical implications

The goal of a comprehensive epilepsy clinic should be to provide assessment and treatment not only for seizures but also for the cognitive and behavioral problems experienced by the child with epilepsy. This study demonstrates the significant mental health needs of children with epilepsy. The high prevalence of problems emphasizes the need for behavioral assessment and treatment as a part of any comprehensive epilepsy clinic. Although the combination of a dimensional measure such as the CBCL and a categorical measure such as the CSI/ASI might be optimal for assessing behavioral problems, time and costs are practical concerns. We found that the CSI/ASI was a good screening measure for behavioral problems in this chronic illness population. There are several advantages to the CSI/ASI. The forms can be completed by parents quickly, scoring is uncomplicated, and costs are relatively low. Additional questionnaires for adolescents are available. The forms can be rapidly reviewed by the clinician to identify specific DSM-IV diagnoses that can be addressed in the clinic or be used as a basis for referral. The use of this relatively uncomplicated, focused assessment for behavioral and emotional problems in the comprehensive epilepsy clinic has the potential to significantly improve mental health care of children and adolescents with epilepsy.

Acknowledgments

This research was supported by grant PHS R01 NR04536 from the National Institute of Nursing Research to JKA. We acknowledge assistance from B Hale and the Epilepsy and Pediatric Neurology Clinics at Riley Hospital, Indiana University Medical Center, Indianapolis. We thank P Dexter for editorial comments and P Buelow for editorial assistance.

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Dev Med Child Neurol. Author manuscript; available in PMC 2010 April 28.

Table 1

Demographic and Clinical Characteristics of the Sample

	Total N=173		**Age 9-12 N=98**		**Age 13-14 N=75**	
	Means and Standard Deviations					
Age (Years)*	11.7	1.8	10.3	0.9	13.6	0.9
Age of Onset (Years)*	6.0	3.7	5.5	3.0	6.7	4.3
Duration of Disorder (Years)*	5.7	3.8	4.9	3.1	6.9	4.4
Caregiver's Education (Years Completed)	13.5	12.3	13.7	2.3	13.4	2.3
	Percentages					
Gender (% Female)	49		45		56	
Race						
White/Non-Hispanic	91		89		95	
African-American	6		7		4	
Other or Multiracial	3		4		1	
Primary Seizure Type						
Generalized Tonic-Clonic (GTC)	18		13		24	
Atonic, Akinetic, Myoclonic (AAM)	2		1		3	
Complex Partial Seizures (CPS)	33		31		36	
CPS with Secondary Generalization	18		22		13	
Simple Partial	7		9		4	
Simple Partial with Secondary Gen.	3		3		3	
Absence	16		17		16	
Unknown/Unclassified	3		4		1	
Seizure Status						
Active	68		71		64	
Controlled	31		27		36	
Unknown	1		2		0	

* significant differences between 9-12 year olds and 13-14 year olds (all p-values < .05)

Table 2

Child Behavior Checklist T-score Means, Standard Deviations (SD), and Percentages in Clinical Range by Age Group*

Scale	Total n=170		Ages 9-12 n=96		Ages 13-14 n=74		Adjusted p-values: 9-12 vs. 13-14
	Mean (SD)	%	Mean (SD)	%	Mean (SD)	%	Mean/%
Total Behavior Problems	61.7 (10.9)	47	63.7 (11.3)	58	59.2 (10.0)	32	.06/.01
Internalizing Problems	61.4 (11.3)	45	63.6 (11.3)	55	58.4 (10.7)	31	.02/.02
Externalizing Problems	55.9 (10.8)	28	57.6 (11.1)	37	53.8 (10.1)	18	.14/.06
Withdrawn	60.7 (8.7)	12	62.4 (8.5)	16	58.4 (8.4)	7	.03/.23
Somatic Complaints	63.2 (10.5)	18	63.7 (10.5)	20	62.5 (10.6)	15	.44/.81
Anxious/Depressed	59.7 (9.4)	13	62.0 (9.9)	18	56.8 (7.8)	7	.00/.21
Social Problems	64.3 (11.1)	22	65.3 (11.7)	28	62.9 (10.2)	14	.31/.15
Thought Problems	60.9 (8.7)	9	61.9 (9.1)	13	59.5 (7.9)	4	.24/.22
Attention Problems	66.4 (11.2)	31	68.2 (11.7)	39	64.2 (10.2)	22	.14/.15
Delinquent Behavior	56.3 (7.3)	5	57.6 (8.0)	8	54.5 (5.9)	1	.24/.22
Aggressive Behavior	58.5 (9.4)	10	59.8 (9.7)	10	56.8 (8.7)	10	.20/.84

*Normative means (SD) for Total, Internalizing, and Externalizing were 50(10). For syndromes the means (SD) are 53-54 (6). At risk cut-offs are defined as ≥ 60 for Total, Internalizing, and Externalizing, and ≥ 67 for the syndrome scales. Cutoffs for clinical range for Total, Internalizing, and Externalizing are ≥ 64, and for syndromes ≥ 71.

Table 3

Child/Adolescent Symptom Inventory Percentages At Risk (N=169 – percentages significantly different from norms in bold)

	Total	Ages 9-12 (n=95)		Ages 13-14 (n=74)		Adjusted p-values: 9-12 vs. 13-14
		%	Norms	%	Norms	
All Children						
ADHD inattentive type	23.1%	**24.2%**	4.3%	**21.6%**	4.6%	.965
ADHD hyperactive type	2.4%	3.2%	3.6%	1.4%	0.4%	.965
ADHD combined type	11.8%	**13.7%**	2.4%	**9.5%**	0.4%	.965
Oppositional Defiant Disorder	20.1%	**20.0%**	8.1%	**20.3%**	5.3%	.965
Conduct Disorder	17.8%	**24.2%**	4.5%	9.5%	3.0%	.205
Generalized Anxiety Disorder	1.8%	3.2%	2.3%	0.0%	0.7%	.965
Specific Phobia	34.9%	36.8%	--	**32.4%**	13.8%	.965
Obsessions	34.9%	37.9%	--	**31.1%**	9.1%	.965
Compulsions	8.9%	11.6%	--	5.4%	4.5%	.965
Post-traumatic Stress Disorder	33.7%	25.3%	--	**44.6%**	12.5%	.143
Motor Tics	20.7%	22.1%	--	**18.9%**	4.7%	.965
Vocal Tics	20.1%	23.2%	--	16.2%	7.2%	.965
Schizophrenia[a]	0.6%	0.0%	0.0%	1.4%	0.1%	.965
Major Depressive Disorder	1.8%	1.1%	0.1%	2.7%	0.8%	.965
Dysthymic Disorder	7.7%	**9.5%**	1.1%	**5.4%**	0.4%	.965
Social Phobia[b,d]	1.9%	0.0%	1.5%	4.6%	1.3%	.965
Separation Anxiety Disorder[d]	6.0%	8.5%	3.0%	2.7%	0.1%	.965
Enuresis[a,d]	17.4%	28.7%	--	2.7%	1.5%	.002
Age 9-12 Only						
Autistic Disorder[d]		2.1%	0.8%			
Asperger's Disorder[d]		**6.4%**	0.0%			
Encopresis[d]		9.6%	--			
Ages 13-14 Only						
Antisocial personality				**12.2%**	0.0%	
Panic Attack				**36.5%**	9.9%	

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	Total	Ages 9-12 (n=95)		Ages 13-14 (n=74)		Adjusted p-values: 9-12 vs. 13-14
		%	Norms	%	Norms	
Somatization Disorder				**21.6%**	4.9%	
Schizoid Personality				5.4%	2.1%	
Nocturnal Enuresis[a]				**9.6%**	1.3%	
Bipolar Disorder				5.4%	0.9%	
Anorexia Nervosa[c]				8.3%	2.9%	
Bulimia Nervosa[a]				4.1%	1.2%	
Substance Abuse[a]				0.0%	--	

[a] n=73 for age 13-14 only

[b] n=65 for age 13-14 only

[c] n=72 for age 13-14 only

[d] n=94 for age 9-12 only

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Table 4

Number Screened Positive by CSI/ASI vs. Number Meeting DICA Diagnostic Criteria (of Top 12 Diagnoses Screened)

	Number Screened Positive by CSI/ASI	Number (percent) meeting DICA diagnostic criteria
PTSD	30	1 (3%)
ADHD, past	27	0 (0%)
ADHD, present	27	11 (41%)
Specific Phobias	20	10 (50%)
Panic Disorder	16	0 (0%)
Conduct Disorder	13	1 (8%)
Encopresis	13	1 (8%)
Enuresis	13	6 (46%)
Somatization	11	0 (0%)
Oppositional Defiant Disorder	10	7 (70%)
Social/specific phobia	8	5 (63%)
Obsessive Compulsive Disorder	6	5 (83%)