



Language and social functioning in children and adolescents with epilepsy



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ABSTRACT

Individuals with epilepsy have difficulties with social function that are not adequately accounted for by seizure severity or frequency. This study examined the relationship between language ability and social functioning in 193 children with epilepsy over a period of 36 months following their first recognized seizure. The findings show that children with persistent seizures have poorer language function, even at the onset of their seizures, than do their healthy siblings, children with no recurrent seizures, and children with recurrent but not persistent seizures. They continue to demonstrate poorer language function 36 months later. This poor language function is associated with declining social competence. Intervention aimed at improving social competence should include consideration of potential language deficits that accompany epilepsy and social difficulty.

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1. Introduction

Individuals with epilepsy have difficulties with social function that are not adequately accounted for by seizure severity or frequency. There are multiple aspects of social function, including social competence and social problems. Social competence has been defined in a variety of ways. Rubin and Rose-Krasnor [1] refer to the ability to develop and maintain positive relationships with others while achieving one's own goals in social interactions [1]. Cavell [2] proposed a three-component model consisting of social adjustment, social performance, and social skills. In contrast, social problems are those characteristics, situational or intrinsic, that the individual demonstrates such as difficulty getting along with peers and peer rejections [1] and may result from social skill deficits [2], although such deficits are not the only determinant of social problems.

In childhood, as a group, individuals with epilepsy are more likely to have behavior and mental health problems than their peers [2,3]. As adults, they are more likely than controls to be underemployed, to never marry, and to remain childless [4–7]. Rantanen and colleagues

[8] pointed out that in addition to skill deficits, epilepsy-related factors may affect social competence in children with epilepsy.

Several studies have investigated predictors of social function in children with epilepsy; most have focused on seizure-related variables or on family functioning factors. In general, seizure-related variables are only modestly associated with social problems or social competence [9,10], although control of seizures and shorter duration of epilepsy have been associated with better social outcome [11]. Family factors such as overall family function and socioeconomic status [11] are also associated with social function.

There have also been investigations of the relationship between cognition and social function in children with epilepsy. Poor neuropsychological functioning is associated with low social competence in children with epilepsy [12]. Similarly, children with epilepsy and learning disability are more likely to demonstrate social problems than those without learning disability [10]. Caplan et al. [10] found that lower Full Scale IQ, as well as subtle language problems, was predictive of poorer overall social competence in a group of children with complex partial seizures or absence epilepsy. Drewel, Bell, and Austin [13] showed that lower neuropsychological functioning, younger age at onset of epilepsy, and active seizure status were associated with peer difficulties in children with epilepsy. In contrast, a population-based study from Finland showed that individuals with epilepsy who successfully completed their basic education, presumably indicating relatively

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unimpaired neuropsychological status, did not differ from healthy controls with regard to higher education, employment, or social functioning [14].

Taken together, these findings suggest that both global neuropsychological weakness (IQ) and specific neuropsychological deficits, such as language [9] or attention [13], may contribute to the development of social problems in children with epilepsy. Children with lower language ability may demonstrate poor social competence. Conversely, children with epilepsy who have unimpaired general intelligence and intact language are likely to demonstrate better social competence. These neuropsychological strengths and weaknesses can be conceptualized as protective and risk factors for the development of poor social function and poor social outcome over the course of epilepsy.

The purpose of this study was to examine the relationship between language ability and social functioning in children with epilepsy over a period of 36 months following their first recognized seizure.

2. Method

2.1. Participants

Children were prospectively recruited from July 2000 through March 2004 at two large academic medical centers in Indianapolis and Cincinnati and through private practice physicians and school nurses throughout Indiana. Inclusion criteria were age 6–14 years, a first recognized unprovoked seizure (symptomatic, cryptogenic, or idiopathic) within 3 months of enrollment, and an IQ above 55. The Kaufmann Brief Intelligence Test, Second Edition [15] was administered to all children at baseline only. Children were excluded if their seizure was provoked (i.e., associated with toxin, infection, trauma, or mass lesion) or if they had a chronic illness or functional impairment limiting activities of daily living. Children were not excluded for having prior unrecognized seizures. Seizure type and epileptic syndrome were classified by a board-certified child neurologist using International League Against Epilepsy criteria [16] following review of the parent's description of the seizure, the child's EEG and/or neuroimaging findings, and all other relevant information available at the evaluation of the first recognized seizure. This study was approved by the institutional review boards at both participating institutions. Parents provided written consent, and children gave assent. Telephone follow-up took place at 9, 18, 27, and 36 months. Neuropsychological assessment was done at baseline (enrollment), 18 months, and 36 months.

A comparison group of 93 siblings, who were in the same age range as the children with seizures, was also recruited to participate.

Out of 349 children enrolled, 208 had recurrent seizures, and 44 had persistent seizures, defined as seizures reported at every follow-up interval. Out of the 97 children with no recurrent seizures, 48 (19 girls and 29 boys, mean (SD) age = 9.7 (2.7) years) had both baseline and 36-month neuropsychological and behavioral [Child Behavior Checklist (CBCL)] [17] data. Out of the 208 children with recurrent seizures, 123 (71 girls and 52 boys, mean (SD) age = 9.9 (2.5) years) had both baseline and 36-month neuropsychological and CBCL data. Out of the 44 children with persistent seizures, 22 (12 girls and 10 boys, mean (SD) age = 8.8 (2.4) years) had both baseline and 36-month data. There were 93 siblings (47 girls and 46 boys, mean (SD) age = 9.9 (2.7) years) who had both baseline and 36-month data. The children in the groups with seizures did not differ with respect to seizure type or syndrome. A significantly greater number of children in the group with persistent seizures were on antiepileptic medication at the 36-month time point than in the other two groups with seizures. None of the groups differed from each other with respect to age or IQ. The children in the groups with seizures did not differ with respect to the time between the first recognized seizure and baseline neuropsychological testing. These data are shown in Table 1.

The Child Behavior Checklist (CBCL) [17], which yields age- and sex-adjusted T-scores for social competence and social problems, was

Table 1
Clinical characteristics of groups with seizures and the sibling group.

Groups	Age at baseline in years			KBIT ^a IQ score at baseline			Time from first seizure to baseline neuropsychological testing in months		
	n	Mean	SD	n	Mean	SD	n	Mean	SD
Siblings	93	9.90	2.66	93	105	13	–	–	–
No recurrence	48	9.66	2.69	48	105	15	46	2.60	1.16
Recurrence	123	9.87	2.46	123	103	15	121	2.72	1.24
Persistent	21*	8.79	2.38	22	100	14	20	3.00	1.69

* $p < .05$.

^a KBIT = Kaufman Brief Intelligence Test [15].

administered to each child's parent or guardian at baseline, 18 months, and 36 months. Higher Social Competence T-scores indicate better social function; higher Social Problems T-scores indicate worse social function.

Children completed a test battery of standardized, well-established neuropsychological tests. Factor analysis of the results of this test battery yielded four neuropsychological factors that we labeled Language, Processing Speed, Executive/Attention/Construction, and Verbal Memory and Learning. The Language factor was made up of scores on the Phonological Memory and Phonological Awareness subscales of the Comprehensive Test of Phonological Processing [18] and the Formulated Sentences and Concepts & Directions subtests of the clinical Evaluation of Language Fundamentals, Third Edition [19]. The factors were derived from the larger study sample and have been described elsewhere [20]. Factor scores have a mean of 0 and a standard deviation of 1.

3. Statistical methods

3.1. Language

Paired T-tests were used to explore change in language scores in siblings and children with no recurrent, recurrent, and persistent seizures from baseline to 36 months following a first recognized seizure. Two-sample T-tests were used to investigate differences in language scores between children with no recurrent seizures, recurrent seizures, and persistent seizures at baseline and 36 months. Linear mixed models were used to compare the language scores of children in each of the three seizure groups with their siblings at both baseline and 36 months. Family was a random effect, and recurrence group (no recurrent, recurrent, or persistent seizures vs. sibling) was a fixed effect.

3.2. Social competence and social problems

Paired t-tests were used to explore change in social competence and change in social problem scores in siblings and children with no recurrent, recurrent, and persistent seizures from baseline to 36 months following first recognized seizure.

3.3. Association between change in language and change in social competence and problems

Linear mixed models were used to investigate the association between change in language and change in both social competence and social problems from baseline to 36 months (change scores calculated as 36 month – baseline), adjusting for the baseline social score and child age. The interaction term between the language change score and recurrence group was included. If the interaction term was not significant ($p > 0.10$), the interaction term was removed from the model, and results are presented based on the model including only main

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