Neighborhood Cohesion Moderating the Association Between Adverse Childhood Events and Epilepsy in Children

Makaela Johnson[1], Em Long-Mills[2], Dmitry Tumin[2]

[1]Brody School of Medicine, East Carolina University, [2]Department of Academic Affairs, Brody School of Medicine at East Carolina University, Greenville, NC

Makaela Johnson
Brody School of Medicine
East Carolina University
Greenville, North Carolina 27858
johnsonmak16@students.ecu.edu

INTRODUCTION

- In the United States, 0.53% of children (ages 5 – 17) have epilepsy.
- **Adverse childhood events (ACEs)**, stressful or traumatic events that occur before the age of 18 years within a child's family or social environment, have been proposed as a risk factor for pediatric seizures and epilepsy.
- Children with epilepsy are ~ 4x more likely to have been exposed to ACEs and are associated with higher odds of experiencing >3 ACEs. Children who experience ≥ 1 ACE are more likely to live in a less cohesive neighborhood.
- Cohesive neighborhoods weaken the association between ACEs and the overall health status of a child.
- **Aim**: To test whether neighborhood cohesion moderates the association between ACEs and the prevalence of epilepsy in children.

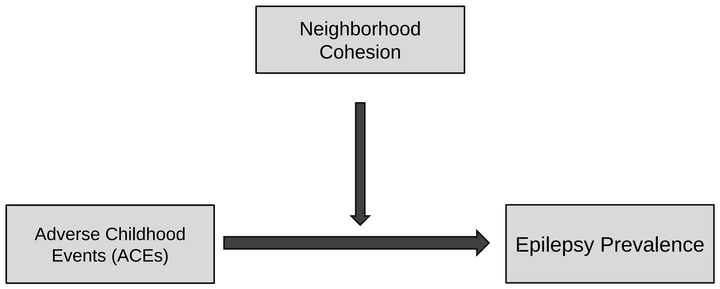

Figure I. Moderator Relationship Diagram: Lower neighborhood cohesion is expected to strengthen the association between ACE exposure and the odds of epilepsy diagnosis in children.

RESULTS

Table 1. Study exposures and child characteristics of children ages 0-17 years by varying epilepsy condition status (N=262,054).

Variable	*No current epilepsy condition (N=260,449)	*Currently has an epilepsy condition (N=1,605)	P
Neighborhood Cohesion			
High	0.73 (0.72, 0.73)	0.60 (0.55, 0.65)	<0.001
Medium	0.13 (0.13, 0.14)	0.18 (0.15, 0.22)	0.016
Low	0.14 (0.13, 0.14)	0.22 (0.18, 0.27)	<0.001
ACE exposure			
0	0.59 (0.59, 0.60)	0.42 (0.37, 0.46)	<0.001
1	0.22 (0.22, 0.23)	0.30 (0.26, 0.35)	<0.001
2+	0.18 (0.18,0.19)	0.28 (0.24, 0.33)	<0.001

ACE, Adverse Childhood Experience; CI, confidence interval. * Weighted mean or proportion (95% CI)

Table 2. Multivariable regression analysis of epilepsy (N=262,054).

Variable	OR	95% CI	P
ACE exposure			
0	Ref.	Ref.	Ref.
1	1.48	1.10, 1.99	0.010
2+	0.98	0.70, 1.36	0.900
Neighborhood cohesion			
High	Ref.	Ref.	Ref.
Medium	1.10	0.73, 1.66	0.641
Low	1.40	0.80, 2.46	0.244
ACE exposure x neighborhood cohesion			
1 ACE x medium cohesion	0.89	0.48, 1.63	0.705
1 ACE x low cohesion	0.83	0.40, 1.70	0.609
2+ ACEs x medium cohesion	1.61	0.88, 2.93	0.119
2+ ACEs x low cohesion	0.81	0.42, 1.56	0.525

ACE, Adverse Childhood Experience; CI, confidence interval.

DISCUSSION

- Our results revealed that neighborhood cohesion does not moderate the relationship between ACEs and epilepsy.
- Studies have pointed to a possible association between ACEs and epilepsy. However, our findings reveal a more complex picture, as we found no association between ACE exposure and epilepsy.
- Neighborhood characteristics, such as cohesion and safety, were not associated with higher odds of epilepsy.
- Limitations: Difference in cohesion perceptions, non-response bias, discrepancy in caregiver reports, and underdiagnosis.
- Further investigation is crucial to determine if other characteristics of neighborhoods are associated with epilepsy diagnosis, such as access to care.

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MATERIALS & METHODS

Deidentified data from the 2016-2022 National Survey of Children's Health (NSCH), a caregiver reported survey, was used for this study.

- **Primary outcome (Figure II) -** epilepsy occurrence

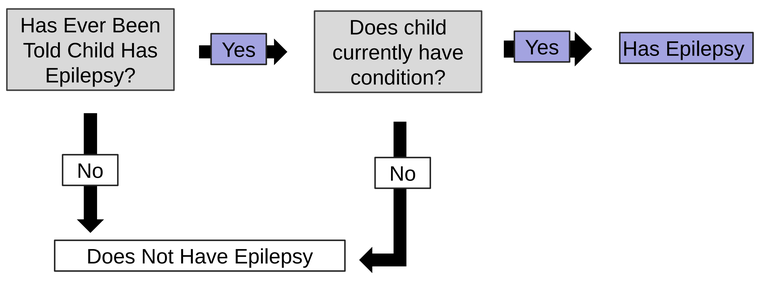

Figure II. Categorization of epilepsy occurrence in children

- **Primary exposure (Figure III)-** neighborhood cohesion data collected with 3 prompts.

1. "People in this neighborhood help each other out"
2. "We watch out for each other's children in this neighborhood"
3. "When we encounter difficulties we know where to go for help in our community"

Neighborhood Cohesion Rating	Responses
Low	≥ 2 responses = somewhat or definitely disagree
Medium	1 response = somewhat or definitely disagree & 2 responses = somewhat or definitely agree
High	3 responses = definitely agree **OR** ≥ 1 = somewhat agree & Remainder = definitely agree

Figure III. Categorization of neighborhood cohesion

- **Secondary exposure -** the number of ACEs, capped for each child (0, 1, and 2 or more):
  - Divorce or separation, death, or incarceration of parent or guardian
  - Witnessed violence amongst adults in household
  - Witnessed or experienced neighborhood violence
  - Experienced unfair treatment because of race/ethnic background
  - Lived with someone who was mentally ill or suffered from substance abuse
  - Lived in household where it was hard to pay for food and housing