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Role of Individual, Family, and Community Resilience in Moderating Effects of Adverse Childhood Experiences on Mental Health Among Children

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ABSTRACT: ***Objective:*** **Mental health outcomes such as attention-deficit/hyperactivity disorder (ADHD), behavior disorders, anxiety, depression, and adverse childhood experiences (ACEs) are common disorders among children in the United States. Little is known on how potential resilient factors may moderate the relationship between exposure to ACEs and mental health outcomes. This study examines associations between ACEs and resilience on mental health outcomes using the 2018 National Survey of Children's Health (N = 26,572).** ***Method:*** **Logistic regression and interactions examined the association between ACEs, resilience, and mental health outcomes. ACE exposure and low resiliency were associated with an increased likelihood of mental health outcomes.** ***Results:*** **There were significant interactions between exposure to ACEs and family resilience as well as significant interactions between ACE exposure and community resilience. On stratification, the presence of individual resilience and having all resilience measures decreased the odds of ADHD, behavioral disorders, anxiety, and depression and the presence of community resilience decreased the odds of depression among individuals who had experienced 4 or more ACEs.** ***Conclusion:*** **These results illustrate the need to promote resilience measures for tackling mental health problems and reducing the negative effect of trauma in children.**

(*J Dev Behav Pediatr* 43:e452–e462, 2022) **Index terms:** adverse childhood experiences, resiliency, moderation, mental health.

Adverse childhood experiences (ACEs) are an important measure that reflects traumatic or stressful events (such as abuse, neglect, and family dysfunction) that occur during childhood. The relationship between ACEs and longer-term health outcomes, behaviors, disease, cognitive impairment, and premature mortality has been well documented.[1] These experiences can occur in various combinations during childhood, and the cumulative experience of various types of trauma has been shown to have greater negative implications.[2,3]

Adverse childhood experiences trigger stress responses in children that could be positive, tolerable, or toxic. Tolerable stress is due to severe and longer difficulties, and toxic stress is due to prolonged adversity.[4] Toxic stress can create structural changes in the brain and lead to impaired memory, learning difficulties, and compromised mood control in the absence of any buffers or protective factors to create a positive stress response.[4] Few studies have examined whether exposure to ACEs differentially affects anxiety and depression.[5] Although a large portion of research has been conducted in adults with retrospective reporting of ACEs, understanding the biological pathway between mental health problems and early trauma requires studying the immediate consequences of ACEs.

Although previous research has noted the association between ACEs and adverse health outcomes, this relationship is not uniform, suggesting that other factors may be important for moderating the long-term impact of ACEs. One such factor is resilience. Resilience can be described as a dynamic and interactive process whereby individuals increase the ability through which they navigate and negotiate with their psychological, biological, familial, social, cultural, and community resources within the context of significant adversity.[6] In the context of a socioecological model, resilience may occur across individual, familial, and community factors that allow children to adapt, cope, and take advantage of assets when faced with significant stress. Conditions of chronic stress become accumulated when resilient factors are

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G. Okwori performed the conceptualization, data curation, formal analysis, investigation, methodology, project administration, visualization, writing, review, and editing.

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absent, which can negatively affect the development in children and ultimately their life trajectories.[7] Future studies on resilient factors are necessary to understand and address these adverse events.[8,9]

Although the initial ACE studies were important for operationalizing the measure and examining associations with adverse health outcomes, 2 important limitations have been noted. The initial studies focused on adult outcomes, and they also do not account for protective measures that may also moderate the effect of ACEs on health.[8,10] This study addresses these gaps by examining ACEs among children and examining the moderating role of protective factors on observed outcomes. Furthermore, there is a lack of studies examining childhood resilience assets in the community. Even when children view their homes as safe havens, the dysfunction of their immediate neighborhood can have negative effects. It has been stated that an improved understanding of socioecological resilience can attenuate the problems for individuals with increased ACE scores.[6] Thus, this study fills the gap by providing data on community resilience, which have been limited or absent from prior research.

There is limited research on how potential resilient factors mitigate the relationship between exposure to ACEs and common mental health outcomes in children. This study uses the 2018 National Survey of Children's Health to (1) provide updated national estimates of the prevalence of select mental health problems; (2) explore the relationship between ACEs, resilience, and mental health; and (3) examine how individual, family, and community measures of resilience moderate the relationship between ACEs and mental health outcomes in children within the United States.

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METHODS

Study Design and Study Population

A cross-sectional study using secondary data from the 2018 National Survey of Children's Health (NSCH) was used. The 2018 NSCH sample consisted of 176,000 households across the nation from the Census Master Address File. A screener questionnaire identified occupied households with eligible children between the ages of 0 to 17 years.[11] There were a total of 30,530 surveys completed nationally and approximately 600 surveys per state. The weighted overall response rate for the survey was 43.1%.[12] A detailed description of the survey design is available elsewhere.[11] The study population consisted of noninstitutionalized children aged 3 through 17 years within the United States whose parents or guardians completed the survey (N = 26,572).

Outcome Variables

The dependent variables were 4 mental health outcomes as follows: attention-deficit/hyperactivity disorder (ADHD), anxiety, behavior disorders, and depression. The presence of current mental conditions was assessed using survey parent/caregiver's responses to questions asking whether the doctor had ever told the parent/caregiver that the child had ADHD, anxiety, behavior disorders, or depression (yes/no). If yes, a secondary question asked whether the child currently had the condition. A dichotomous variable measuring whether the child currently has the condition was created.

Independent Variables of Interest

Adverse childhood experiences (ACEs) and resiliency are the primary independent variables. The questions regarding ACEs were derived from modified versions of the Centers for Disease Control and Prevention and Kaiser Permanente ACE study.[1] Within the NSCH data set, there are 9 items that measure exposure to ACEs: socioeconomic hardship, parental separation or divorce, parental death, parental incarceration, witnessing household violence, witnessing neighborhood violence, household mental illness, household substance abuse, and racial/ethnic discrimination (details are provided in the Appendix, Supplemental Digital Content 1, http://links.lww.com/JDBP/A355).

All ACE measures were dichotomized to measure whether the child had experienced the ACE or not. Participants received 1 point per question if they responded yes. The aggregate ACE count was calculated as the sum of "yes" responses across the questions. This approach can be compared with other studies.[2,3,13] A categorical measure of ACE count was constructed to represent children with <4 ACEs and ≥ 4 ACEs. This cutoff point has been shown to be a valid threshold for studies that used the NSCH, in which persons who had 4 or more ACEs had a higher probability of adverse health outcomes.[1,5,14] Also, ACE scores were categorized using traditional Kaiser coding: 0 ACEs, 1 to 3 ACEs, and ≥ 4 ACEs.[15]

The socioecological model categorized resilient factors at the individual, family, and community levels. Resilience at the individual level for children between the ages of 6 and 17 years is indicated by an established 3-item index within the NSCH data set. These questions were developed by a technical expert panel based on a review of positive health indicators.[16] Questions measuring children's persistence in completing tasks, interest and curiosity in learning new things, and capacity to regulate emotions were used to measure resilience at the individual level. Children were grouped according to whether they demonstrated 0, 1, 2, or all 3 flourishing items. These were further dichotomized into 2 categories as high resilience (all 3 items) and low resilience (less than 3 items). Children with 2 items were considered to be midlevel.

For children below 6 years, 4 questions were asked that aimed to capture resilience at the individual level that include discovery and curiosity about learning, attachment with parent, and contentment with life. Children were grouped according to whether they demonstrated 0 to 2, 3, or all 4 flourishing items. These were further dichotomized into 2 categories as high

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resilience (all 4 items) and low resilience (less than 4 items). Children with 3 items were considered to be midlevel. Children with a score of 3 for ages 6 to 17 years or 4 for ages 6 months to 5 years are usually classified as flourishing.[16]

Resilience at the family level was measured by a 4-item Family Resilience Index that is an established index within the data set.[16] The index asked parents, "When your family faces problems, how often are you likely to": "talk together about what to do," "work together to solve our problems," "know we have strengths to draw on," and "stay hopeful even in difficult times." The Family Resilience Index score was grouped into the following categories: "all or most of the time to 0 to 1 items," "all or most of the time to 2 to 3 items," and "all or most of the time to all 4 items." These were further dichotomized into 2 categories as high resilience (all 4 items) and low resilience (less than 4 items). Children with 2 to 3 items were considered to be midlevel. According to a study, the adjusted odds of child flourishing were highest for children with a Family Resilience Index score of 4.[16]

Validated tools that measure childhood resilience within the community or ones that have been used in surveys nationally were not found. Thus, questions consistent with established resilience measures, such as the Child and Youth Resilience Measure, were used in addition to having access to a trusted adult or mentor, which is a measure previously related to resilience and ACEs.[17] A variable to assess participation in sports, clubs, or organized activities was examined by the survey questions, "During the past 12 months, did this child participate in: a sports team or did he or she take sports lessons after school or on weekends, any clubs or organizations after school or on weekends, and any other organized activities or lessons, such as music, dance, language, or other arts?" Access to a trusted adult was evaluated by the survey question "Other than you or other adults in your home, is there at least one other adult in this child's school, neighborhood, or community who knows this child well and who he or she can rely on for advice or guidance?" Residence in a supportive neighborhood was measured by the question "Does this child live in a supportive neighborhood?" A cumulative continuous variable was created to measure community resilience using these 3 items. One point was awarded for answers of "yes" or "agree" consistent with coding for the individual and family resilience measures. These were dichotomized into 3 categories as high resilience (all 3 items), mid resilience (2 items), and low resilience (less than 2 items). Two categories of high (all 3 items) and low (less than 3 items) were also examined for interactions.

Data Analysis

Characteristics of the study population are described using χ^2. SAS survey procedures were used with survey design procedures (sampling weights, cluster, and stratum) to account for the complex survey design of the NSCH to produce nationally representative results. Unadjusted and adjusted logistic regression models were conducted for each independent variable predicting mental health outcomes to obtain odds ratios. Demographic variables were included as potential confounders. Thus, the logistic regression models controlled for characteristics of children, such as race, age, sex, insurance, adult education, family structure, income level, and caregiver mental health. This is also consistent with other studies that examined adjusted models.[18–20] The independent ACE variable and resilience variables were examined as categorical predictors (high, mid, and low).

The main effects of ACEs and resilience variables as predictors of mental health outcomes (ADHD, anxiety, behavior disorders, and depression) were examined using logistic regression to obtain adjusted odds ratios. Mental health outcomes significantly associated with both resilience and ACEs (measured as dichotomies) were examined in interaction models. The ameliorative potential of resilience was examined by testing moderation effects. ACE exposure was interacted with the dichotomous resilience category in adjusted logistic regression models. Least square means were used to estimate the predicted values of each mental health outcome at varying levels of ACE exposure and resilience. These values are presented as odds ratios comparing 4 or more ACEs and high resilience with 4 or more ACEs and low resilience for each mental health outcome, as appropriate.

RESULTS

Mental Health Prevalence

Nine percent of the study population had current attention-deficit/hyperactivity disorder (ADHD), 7% had current behavioral disorders, 8% had current anxiety, and 4% had current depression (Table 1). ADHD and behavior disorders were most common among males, whereas anxiety and depression were most common among females. ADHD and anxiety were most common for White children, behavior disorders were most common for Black children, and White and Black children were equally likely to have depression. Children with public and private insurance were most likely to experience all mental health outcomes. ADHD and behavior disorders were most common for children living with relatives or nonparents, whereas anxiety and depression were most common for children living in single parent households. Behavior disorders and depression were most common for children living in households with a family income below 100% Federal Poverty Level. Children who had caregivers with fair or poor mental health and those who did not receive care in a medical home were more likely to have all 4 mental health outcomes. Anxiety and depression were most common for children who did not reside in safe neighborhoods. Among children with 4 or more adverse childhood experiences

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(ACEs), 19% had ADHD, 19% had behavioral disorders, 20% had anxiety, and 15% had depression compared with 11%, 9%, 10%, and 5% of children who experienced between 1 and 3 ACEs and 6%, 4%, 5%, and 1% of children without any ACEs. Among children with high individual resilience, 4% had ADHD, 2% had behavioral disorders, 4% had anxiety, and 2% had depression compared with 12%, 9%, 12%, and 5% of children with midlevels of individual resilience and 29%, 30%, 23%, and 12% of children with none. Mental health outcomes were less common for children with high levels of all resilience measures compared with children with mid and low levels of resilience.

Mental Health, Adverse Childhood Experiences, and Resilience

After adjustment, the ACE count remained strongly and positively related to all mental health outcomes; the strongest relationship was with depression (Table 2). Children with 4 or more ACE counts compared with children with less than 4 ACE counts had higher odds of ADHD (adjusted odds ratio [aOR] 3.16; confidence interval [CI]: 2.29–4.37), behavior disorders (aOR 4.51; CI, 3.16–6.45), anxiety (aOR 4.30; CI, 3.12–5.94), and depression (aOR 10.11; CI, 6.21–16.5). Children who experienced between 1 and 3 ACEs compared with children with less than 4 ACEs had higher odds of ADHD (aOR 1.92; CI, 1.56–2.33), behavior disorders (aOR 2.38; CI, 1.89–2.99), anxiety (aOR 2.02; CI, 1.66–2.44), and depression (aOR 3.06; CI, 2.15–4.36).

In the adjusted model, individual resilience remained negatively associated with all mental health outcomes, with behavioral disorders having the least odds (Table 2). Children with high individual resilience compared with children with low individual resilience had lower odds of ADHD (aOR 0.11; CI, 0.09–0.14), behavior disorders (aOR 0.05; CI, 0.04–0.07), anxiety (aOR 0.14; CI, 0.11–0.17), and depression (aOR 0.14; CI, 0.10–0.20). Children with midlevels of individual resilience compared with children with low individual resilience had lower odds of ADHD (aOR 0.38; CI, 0.31–0.48), behavior disorders (aOR 0.26; CI, 0.21–0.34), anxiety (aOR 0.48; CI, 0.38–0.59), and depression (aOR 0.48; CI, 0.35–0.66). Children with high family resilience had fewer odds of ADHD (aOR 0.66; CI, 0.51–0.86), behavior disorders (aOR 0.59; CI, 0.42–0.81), anxiety (aOR 0.43; CI, 0.33–0.56), and depression (aOR 0.37; CI, 0.24–0.57) compared with children with low family resilience. Children with high community resilience had lower odds of ADHD (aOR 0.61; CI, 0.46–0.82), behavior disorders (aOR 0.56; CI, 0.36–0.87), anxiety (aOR 0.58; CI, 0.43–0.78), and depression (aOR 0.37; CI, 0.24–0.57) compared with children with low community resilience. Children who had high measures of all resilience combined had lower odds of ADHD (aOR 0.23; CI, 0.14–0.37), behavior disorders (aOR 0.20; CI, 0.12–0.31), anxiety (aOR 0.56; CI, 0.32–0.97), and depression (aOR 0.53; CI, 0.26–1.05) compared with children with low resilience, whereas children with midlevels of resilience had lower odds of ADHD (aOR 0.60; CI, 0.36–0.98) and anxiety (aOR 0.56; CI, 0.32–0.97) compared with children with low resilience.

The results with ACEs and individual, family, and community resilience categories as predictors of mental health outcomes are shown in Table 3. Children exposed to 4 or more ACEs had higher odds of ADHD (aOR 2.13; CI, 1.68–2.71), behavior disorders (aOR 3.00; CI, 2.34–3.86), anxiety (aOR 2.66; CI, 2.09–3.38), and depression (aOR 5.23; CI, 3.89–7.03) compared with children exposed to less than 4 ACEs. Children with high individual resilience had lower odds of ADHD (aOR 0.17; CI, 0.14–0.20), behavior disorders (aOR 0.10; CI, 0.08–0.13), anxiety (aOR 0.22; CI, 0.19–0.27), and depression (aOR 0.21; CI, 0.16–0.28) compared with children with low individual resilience. With the interaction term introduced, the strength of the association between ACEs and mental health outcomes was reduced, whereas the association between individual resilience and mental health outcomes remained the same, and children with high community resilience had lower odds of behavioral disorders (aOR 0.57; CI, 0.38–0.88).

Interactions

After stratification, children with 4 or more ACEs and high individual resilience compared with children with 4 or more ACEs and low individual resilience had lower odds of ADHD (aOR 0.14; CI, 0.08–0.23; Table 4), behavior disorders (aOR 0.10; CI, 0.06–0.16), anxiety (aOR 0.21; CI, 0.13–0.35), and depression (aOR 0.24; CI, 0.13–0.43). The presence of community resilience decreased the odds of depression disorders among children exposed to more than 4 ACEs (aOR 0.25; CI, 0.10–0.61). Children with 4 or more ACEs and all measures of resilience together compared with children with 4 or more ACEs and low resilience had lower odds of ADHD (aOR 0.37; CI, 0.24–0.59), behavior disorders (aOR 0.31; CI, 0.19–0.49), anxiety (aOR 0.40; CI, 0.25–0.64), and depression (aOR 0.44; CI, 0.26–0.75).

DISCUSSION

Resilience

This study found that exposure to 4 or more adverse childhood experiences (ACEs) was associated with increased odds of current mental health outcomes; however, individual, family, and community resilience moderated the effect of ACE exposure on the outcomes of interest. Among children with 4 or more ACEs, the presence of individual resilience as well as having all resilience measures together decreased the odds of all mental outcomes, and the presence of community resilience decreased the odds of depression, with individual resilience having the strongest effect. These results are consistent with prior literature showing that child resilience and parental engagement diminished the effect of ACEs on mental, emotional, or behavioral conditions.[21]

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Table 1. Characteristics of the Study Population in Total and by Current Mental Health Status Among Respondents to the 2018 NSCH

Characteristic	Total, N[a] (%)[b]	Current ADHD		Current Behavior Disorder		Current Anxiety		Current Depression	
		Yes, n (%)	No, n (%)	Yes, n (%)	No, n (%)	Yes, n (%)	No, n (%)	Yes, n (%)	No, n (%)
Total sample	26,572	2,677 (8.6)	23,895 (91.4)	1901 (6.9)	24,671 (93.1)	2719 (8.0)	23,853 (92.0)	1198 (3.7)	25,374 (96.3)
Individual level									
Sex		***		***		**		*	
Male	13,892 (51.1)	1845 (11.5)	12,047 (88.5)	1340 (8.7)	12,552 (91.3)	1277 (7.1)	12,615 (92.9)	531 (3.1)	13,361 (96.9)
Female	12,680 (48.9)	832 (5.6)	11,848 (94.4)	561 (5.0)	12,119 (95.0)	1442 (9.0)	11,238 (91.0)	667 (4.3)	12,013 (95.7)
Race/ethnicity		***		**		***		^	
Hispanic	3129 (25.6)	248 (6.4)	2881 (93.6)	221 (5.8)	2908 (94.2)	267 (5.9)	2862 (94.1)	121 (2.6)	3008 (97.4)
White, non-Hispanic	18,388 (49.9)	1981 (10.0)	16,407 (90.0)	1281 (6.9)	17,107 (93.1)	2086 (10.3)	16,302 (89.7)	884 (4.2)	17,504 (95.8)
Black, Hispanic	1739 (13.8)	193 (9.7)	1546 (90.3)	175 (9.7)	1564 (90.3)	122 (5.6)	1617 (94.4)	80 (4.2)	1659 (95.8)
Other, non-Hispanic	3316 (10.6)	255 (6.2)	3061 (93.8)	224 (5.7)	3092 (94.3)	244 (5.7)	3072 (94.3)	113 (3.1)	3203 (96.9)
Age, yrs		***		***		***		***	
3–5	4618 (19.3)	65 (1.4)	4553 (98.6)	205 (4.3)	4413 (95.7)	92 (2.1)	4526 (97.9)	8 (0.3)	4610 (99.7)
6–11	9367 (40.2)	1024 (9.8)	8343 (90.2)	863 (9.2)	8504 (90.8)	850 (7.6)	8517 (92.4)	187 (2.1)	9180 (97.9)
12–17	12,587 (40.5)	1588 (10.9)	10,999 (89.1)	833 (5.9)	11,754 (94.1)	1777 (11.3)	10,810 (88.7)	1003 (6.9)	11,584 (93.1)
Insurance status		***		***		*		***	
Public only	5333 (30.1)	754 (10.2)	4579 (89.8)	729 (10.5)	4604 (89.5)	714 (8.4)	4619 (91.6)	379 (5.1)	4954 (94.9)
Private only	18,629 (57.1)	1577 (7.6)	17,052 (92.4)	880 (4.5)	17,749 (95.5)	1679 (7.5)	19,650 (92.5)	661 (2.7)	17,968 (97.3)
Public and private	1005 (3.9)	214 (15.8)	791 (84.2)	192 (14.5)	813 (85.5)	197 (13.8)	808 (86.2)	97 (8.8)	908 (91.2)
Uninsured	1605 (8.9)	132 (6.6)	1473 (93.4)	100 (6.5)	1505 (93.5)	129 (8.0)	1476 (92.0)	61 (2.8)	1544 (97.2)
Family level									
Family structure		***		***		^		***	
Nonparent/other relatives	1594 (8.4)	263 (12.3)	1331 (87.7)	241 (11.9)	1353 (88.1)	205 (8.6)	1389 (91.4)	113 (5.1)	1481 (94.9)
Single parent	5268 (22.8)	657 (10.1)	4611 (89.9)	545 (10.0)	4723 (90.0)	690 (9.8)	4578 (90.2)	349 (5.6)	4919 (94.4)
Two parents unmarried	1666 (8.0)	178 (9.1)	1488 (91.0)	151 (8.2)	1515 (91.8)	174 (8.1)	1492 (91.9)	87 (4.3)	1579 (95.7)
Two parents married	18,044 (60.7)	1579 (7.5)	16,465 (92.5)	964 (4.8)	17,080 (95.2)	1650 (7.3)	16,394 (92.7)	649 (2.7)	17,395 (97.3)
Household educational level						^			
<High school/high school	4405 (29.8)	416 (7.5)	3989 (92.5)	416 (7.5)	3989 (92.5)	452 (6.8)	3953 (93.2)	236 (4.4)	4169 (95.6)
Some college or more	22,167 (70.2)	1485 (6.6)	20,682 (93.4)	1485 (6.6)	20,682 (93.4)	2267 (8.5)	19,900 (91.5)	962 (3.4)	21,205 (96.6)
Income/poverty level				***				*	
<100% FPL	3156 (19.7)	366 (9.4)	2790 (90.6)	366 (9.4)	2790 (90.6)	379 (8.3)	2777 (91.7)	208 (5.1)	2948 (94.9)
100%–199% FPL	4366 (22.1)	423 (8.0)	3943 (92.0)	423 (8.0)	3943 (92.0)	495 (7.6)	3871 (92.4)	247 (4.2)	4119 (95.8)
200%–399% FPL	8129 (27.1)	534 (6.5)	7595 (93.5)	534 (6.5)	7595 (93.5)	807 (8.3)	7322 (91.7)	335 (2.8)	7794 (97.2)
≥400% FPL	10,921 (31.1)	578 (4.8)	10,343 (95.2)	578 (4.8)	10,343 (95.2)	1038 (7.9)	9883 (92.1)	408 (3.2)	10,513 (96.8)
Caregiver mental health		***		***		***		***	
Excellent, very good/good	24,260 (88.3)	2280 (7.9)	21,980 (92.1)	1519 (5.9)	22,741 (94.1)	2332 (7.4)	21,928 (92.6)	974 (3.0)	23,286 (97.0)
Fair/poor	672 (2.9)	151 (23.2)	521 (76.8)	163 (25.1)	509 (74.9)	205 (28.8)	467 (71.2)	122 (18.3)	550 (81.7)
No response	1640 (8.8)	246 (11.1)	1394 (88.9)	219 (10.7)	1421 (89.3)	182 (7.9)	1458 (92.1)	102 (5.1)	1538 (94.9)
Community/societal									
Opportunities for play/activity									
Yes	19,965 (77.2)	1944 (8.5)	18,021 (91.5)	1408 (6.8)	18,557 (93.2)	2038 (7.9)	17,927 (92.1)	869 (3.7)	19,096 (96.3)
No	6607 (22.8)	733 (9.1)	5874 (90.9)	493 (7.1)	6114 (92.9)	681 (8.4)	5926 (91.6)	329 (3.7)	6278 (96.3)
Safe neighborhood						^		*	
Agree	25,207 (92.4)	2495 (8.5)	22,712 (91.5)	1746 (6.7)	23,461 (93.3)	2518 (7.8)	22,689 (92.2)	1111 (3.4)	24,096 (96.6)
Disagree	1365 (7.6)	182 (10.0)	1183 (90.0)	155 (9.0)	1210 (91.0)	201 (10.8)	1164 (89.2)	87 (6.5)	1278 (93.5)

(*Table continues*)

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Table 1. Continued

Characteristic	Total, N[a] (%)[b]	Current ADHD		Current Behavior Disorder		Current Anxiety		Current Depression	
		Yes, n (%)	No, n (%)	Yes, n (%)	No, n (%)	Yes, n (%)	No, n (%)	Yes, n (%)	No, n (%)
Medical home		*		***		***		***	
Yes	14,165 (47.8)	1284 (7.6)	12,881 (92.4)	736 (5.3)	13,429 (94.7)	1192 (6.4)	12,973 (93.6)	437 (2.3)	13,728 (97.3)
No	12,407 (52.2)	1393 (9.5)	11,014 (90.5)	1165 (8.3)	11,242 (91.7)	1527 (9.5)	10,880 (90.5)	761 (4.6)	11,646 (95.4)
ACE exposure									
ACE score		***		***		***		***	
0 ACEs	15,433 (55.9)	1050 (5.5)	14,383 (94.5)	600 (3.5)	14,833 (96.5)	1033 (5.1)	14,400 (94.9)	314 (1.3)	15,119 (98.7)
1–3 ACEs	9245 (35.8)	1208 (11.1)	8037 (88.9)	910 (9.3)	8335 (90.7)	1218 (10.0)	8027 (90.0)	583 (4.7)	8662 (95.3)
≥4 ACEs	1894 (8.3)	419 (18.7)	1475 (81.3)	391 (19.3)	1503 (80.7)	468 (19.8)	1426 (80.2)	301 (15.0)	1593 (85.0)
Individual resilience		***		***		***		***	
Low	3071 (12.8)	1105 (29.5)	1966 (70.5)	1004 (29.7)	2067 (70.3)	941 (23.4)	2130 (76.6)	496 (12.4)	2575 (87.6)
Mid	4433 (18.1)	714 (12.2)	3719 (87.8)	522 (9.4)	3911 (90.6)	772 (12.2)	3661 (87.8)	324 (5.3)	4109 (94.7)
High	19,068 (69.1)	858 (3.8)	18,210 (96.2)	375 (2.0)	18,693 (98.0)	1006 (4.1)	18,062 (95.9)	378 (1.6)	18,690 (98.4)
Family resilience		***		***		***		***	
Low	2000 (8.7)	337 (13.0)	1663 (87.0)	303 (12.0)	1697 (88.0)	369 (16.1)	1631 (83.9)	210 (9.3)	1790 (90.7)
Mid	2851 (11.4)	390 (11.6)	2461 (88.4)	332 (11.4)	2519 (88.6)	446 (11.3)	2405 (88.7)	223 (6.4)	2628 (93.6)
High	21,721 (79.9)	1950 (7.7)	19,771 (92.3)	1266 (5.7)	20,455 (94.3)	1904 (6.7)	19,817 (93.3)	765 (2.7)	20,956 (97.3)
Community resilience		**		**				**	
Low	12,124 (53.2)	1167 (8.1)	10,957 (91.9)	1049 (7.7)	11,075 (92.3)	1215 (7.8)	10,909 (92.2)	568 (4.0)	11,556 (96.0)
Mid	10,361 (34.9)	1209 (10.0)	9152 (90.0)	707 (6.7)	9654 (93.3)	1162 (8.6)	9199 (91.4)	525 (3.8)	9836 (96.2)
High	4087 (11.9)	301 (6.9)	3786 (93.1)	145 (4.0)	3942 (96.0)	342 (7.3)	3745 (92.7)	105 (2.0)	3982 (98.0)
All resilience		***		***		***		***	
Low	399 (1.8)	142 (30.7)	257 (69.3)	147 (29.4)	252 (70.6)	133 (30.4)	266 (69.5)	86 (19.8)	313 (80.2)
Mid	1710 (7.0)	410 (19.4)	1300 (80.6)	380 (21.0)	1330 (79.0)	425 (19.2)	1285 (80.8)	236 (11.0)	1474 (89.0)
High	24,463 (91.2)	2125 (7.3)	22,338 (92.7)	1374 (5.3)	23,089 (94.7)	2161 (6.7)	22,302 (93.3)	876 (2.8)	23,587 (97.2)

$^{*}p \leq 0.05$, $^{*}p \leq 0.01$, $^{**}p \leq 0.001$, and $^{***}p \leq 0.0001$. [a]Unweighted frequencies. [b]Weighted percent. ACE, adverse childhood experience; ADHD, attention-deficit/hyperactivity disorder; FPL, Federal Poverty Level; NSCH, National Survey of Children's Health.

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These findings suggest that resilience is an important factor when examining ACE exposure and mental health outcomes and validate more narrowly focused studies. Characteristics of child resiliency measured in this study include curiosity and interest in learning new things, ability to stay calm and in control when faced with a challenge, completion of tasks, contentment with life, and attachment with parent. Key components of resiliency similar to those described in this study as shown by the Devereux Adult Resilience Survey scale include self-efficacy, secure attachments to individuals to provide encouragement and emotional support, effective decision making, control of one's thoughts, and the ability to appropriately express one's feelings.[22] The Substance Abuse and Mental Health Services Administration mentions the following 3 prominent factors that contribute to childhood resilience: problem-solving skills, self-regulation, and relationship with caring adults.[23] These qualities have been shown to contribute to resiliency in adulthood, which is basically characterized by possessing meaning and engagement in life as well as positive relationships.[16] The promotion of such characteristics could strengthen the level of engagement, meaning that children possess within their relationships and activities in schools, homes, and the environment.

Self-regulation and engaging children in problem-solving activities is important for cognitive development, as well as social and academic success, and can play an important role in mental health outcomes.[23] Infants who can develop self-regulation as well as recognize and express their feelings are more able to control their behaviors as they become older, and self-regulation has been shown to be associated with improved coping, stress management, and resilience. These skills can be improved with mindfulness training and computer training programs.[24]

The findings from this study should not neglect the importance of the family and community resilience context because children should have access to a supportive environment. The foremost responsibility for the healthy development of children lies with their families. Families are entrenched within communities, and communities can enable or impede the abilities of families to provide for their children. Informal sources of support

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Table 2. Unadjusted and aORs and 95% Wald CIs for Current Mental Health Outcomes by ACEs and Resilience Among Respondents to the 2018 NSCH

	Current ADHD		Current Behavior Disorder		Current Anxiety		Current Depression	
Characteristic	**OR (95% CI)**	**aOR (95% CI)[a]**	**OR (95% CI)**	**aOR (95% CI)[a]**	**OR (95% CI)**	**aOR (95% CI)[a]**	**OR (95% CI)**	**aOR (95% CI)[a]**
ACE exposure								
ACE score								
0 ACEs	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
1–3 ACEs	2.13 (1.78–2.56) ***	1.92 (1.56–2.33) ***	2.81 (2.29–3.45) ***	2.38 (1.89–2.99) ***	2.08 (1.74–2.48) ***	2.02 (1.66–2.44) ***	3.66 (2.73–4.92) ***	3.06 (2.15–4.36) ***
≥4 ACEs	3.93 (3.06–5.06) ***	3.16 (2.29–4.37) ***	6.61 (5.03–8.69) ***	4.51 (3.16–6.45) ***	4.64 (3.61–5.98) ***	4.30 (3.12–5.94) ***	13.1 (9.31–18.5) ***	10.11 (6.21–16.5) ***
Individual resilience								
Low	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Mid	0.33 (0.27–0.42) ***	0.38 (0.31–0.48) ***	0.25 (0.20–0.31) ***	0.26 (0.21–0.34) ***	0.45 (0.36–0.56) ***	0.48 (0.38–0.59) ***	0.40 (0.30–0.53) ***	0.48 (0.35–0.66) ***
High	0.09 (0.08–0.12) ***	0.11 (0.09–0.14) ***	0.05 (0.04–0.06) ***	0.05 (0.04–0.07) ***	0.14 (0.11–0.17) ***	0.14 (0.11–0.17) ***	0.12 (0.09–0.16) ***	0.14 (0.10–0.20) ***
Family resilience								
Low	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Mid	0.88 (0.65–1.21)	0.96 (0.70–1.32)	0.94 (0.67–1.31)	1.15 (0.80–1.67)	0.67 (0.49–0.89)*	0.72 (0.53–0.98)^	0.67 (0.44–1.03)	0.78 (0.51–1.21)
High	0.56 (0.44–0.72) ***	0.66 (0.51–0.86)*	0.44 (0.33–0.58) ***	0.59 (0.42–0.81)*	0.38 (0.29–0.49) ***	0.43 (0.33–0.56) ***	0.27 (0.19–0.38) ***	0.37 (0.26–0.53) ***
Community resilience								
Low	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Mid	1.25 (1.05–1.49)^	0.84 (0.69–1.02)	0.86 (0.71–1.05)	0.79 (0.64–0.99)^	1.10 (0.93–1.30)	0.72 (0.60–0.86) **	0.96 (0.75–1.24)	0.68 (0.52–0.89)*
High	0.84 (0.65–1.09)	0.61 (0.46–0.82)*	0.50 (0.34–0.75) **	0.56 (0.36–0.87)*	0.93 (0.71–1.21)	0.58 (0.43–0.78) **	0.49 (0.33–0.74) **	0.37 (0.24–0.57) ***
All resilience								
Low	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Mid	0.54 (0.34–0.86) **	0.60 (0.36–0.98)^	0.64 (0.40–1.02)	0.81 (0.49–1.32)	0.54 (0.33–0.89)^	0.56 (0.32–0.97)^	0.50 (0.28–0.89)^	0.53 (0.26–1.05)
High	0.18 (0.12–0.27) ***	0.23 (0.14–0.37) ***	0.14 (0.09–0.21) ***	0.20 (0.12–0.31) ***	0.17 (0.11–0.26) ***	0.19 (0.11–0.33) ***	0.12 (0.07–0.20) ***	0.17 (0.09–0.31) ***

^$p \leq 0.05$, *$p \leq 0.01$, **$p \leq 0.001$, and ***$p \leq 0.0001$. [a]aOR adjusted for characteristics of the study population: race, age, sex, insurance, adult education, family structure, income level, and caregiver mental health. ACE, adverse childhood experience; ADHD, attention-deficit/hyperactivity disorder; aOR, adjusted odds ratio; CI, confidence interval; NSCH, National Survey of Children's Health.

such as relatives, neighbors, and friends are relevant in addition to formal sources of support such as child care services.

Screening

The findings from this research support the utilization of ACE measures as a screening tool and emphasize the importance of assessing resilience in conjunction. This will maximize the development of personally tailored treatment that accounts for and creates additional resources that could mitigate the effect of ACEs. Formal screening in children's health happens within the larger context of social and family history taking, interaction with families over time, and establishing an interest on the lives of the families. The possibility for continual developmental surveillance and the evaluation of how the child is thriving over a period of time enables a trusting relationship between the family and the child health provider. This relationship can become a buffering influence against toxic stress and aid in the recognition of potential issues, such as behavioral health, violence, poor social capital, and socioeconomic distress.[25]

Developmental screening is an important aspect of most children's health care regimen within the United States; however, screening for psychosocial factors has been slowly integrated into office routines. Formal screening offers an understanding of the strengths of families and obstacles that affect the developmental trajectory of children. A barrier in the execution of integrated health care is the absence of consensus regarding the content of environmental, social, and mental health issues that should be examined.[26] There is an unwillingness to screen and identify problems that child health care providers are ill-equipped to address. Therefore, altering screening methods necessitates

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Table 3. aORs of ACEs and Resilience (Individual, Family, and Community) Predicting Current Mental Health Outcomes

	Current ADHD		Current Behavior Disorder		Current Anxiety		Current Depression	
	Model 1[a]	Model 2[b]	Model 1[a]	Model 2[b]	Model 1[a]	Model 2[b]	Model 1[a]	Model 2[b]
Independent Variables	**aOR (95% CI)**	**aOR (95% CI)**	**aOR (95% CI)**	**aOR (95% CI)**	**aOR (95% CI)**	**aOR (95% CI)**	**aOR (95% CI)**	**aOR (95% CI)**
Individual resilience								
ACEs								
Less than 4 ACEs	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
4 or more ACEs	2.13 (1.68–2.71) ***	2.23 (1.75–3.08) ***	3.00 (2.34–3.86) ***	3.03 (2.35–4.20) ***	2.66 (2.09–3.38) ***	2.74 (2.09–3.67) ***	5.23 (3.89–7.03) ***	5.00 (3.57–7.00) ***
Resilience (individual)								
Low	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
High	0.17 (0.14–0.20) ***	0.18 (0.15–0.21) ***	0.10 (0.08–0.13) ***	0.10 (0.08–0.13) ***	0.22 (0.19–0.27) ***	0.23 (0.19–0.27) ***	0.21 (0.16–0.28) ***	0.20 (0.15–0.27) ***
ACEs × resilience (individual)		0.79 (0.76–0.82)	N/A	0.95 (0.81–1.03)		0.91 (0.72–1.08)		1.17 (1.06–1.28)
Family resilience								
ACEs								
Less than 4 ACEs	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
4 or more ACEs	2.48 (1.96–3.16) ***	1.95 (1.46–2.97) ***	3.32 (2.59–4.28) ***	2.34 (1.56–3.48) ***	2.78 (2.17–3.55) ***	1.82 (1.26–2.62) *	5.18 (3.71–7.23) ***	2.50 (1.56–3.95) ***
Resilience (family)								
Low	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
High	0.70 (0.58–0.85) ***	0.64 (0.52–0.78) ***	0.57 (0.46–0.69) ***	0.48 (0.39–0.60) ***	0.55 (0.46–0.67) ***	0.47 (0.38–0.57) ***	0.46 (0.34–0.63) ***	0.29 (0.22–0.40) ***
ACEs × resilience (family)		1.55 (1.05–1.85)		1.92 (1.87–2.05) *		2.19 (2.03–2.35) *		3.93 (3.77–4.09) ***
Community resilience								
ACEs								
Less than 4 ACEs	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
4 or more ACEs	2.72 (2.16–3.43) ***	2.64 (2.15–2.92) ***	3.80 (2.98–4.86) ***	3.73 (2.95–4.86) ***	3.31 (2.63–4.17) ***	3.27 (2.79–3.43) ***	6.31 (4.75–8.39) ***	6.50 (4.85–8.70) ***
Resilience (community)								
Low	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
High	0.83 (0.65–1.07)	0.80 (0.53–1.01)	0.60 (0.41–0.89)^	0.57 (0.38–0.88)^	0.99 (0.77–1.28)	0.98 (0.77–1.04)	0.62 (0.42–0.93)^	0.69 (0.45–1.05) **
ACEs × resilience (community)		1.77 (1.53–1.93)		1.60 (1.47–1.69)		1.20 (1.09–1.47)		0.36 (0.22–0.50)^
All resilience								
ACEs								
Less than 4 ACEs	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
4 or more ACEs	2.23 (1.76–2.82) ***	1.98 (1.49–2.99) ***	3.00 (2.33–3.84) ***	2.32 (1.54–3.46) ***	2.66 (2.09–3.38) ***	2.09 (1.82–2.36) **	5.06 (3.71–6.90) ***	2.97 (2.50–3.44) ***
Resilience (all)								
Low	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
High	0.33 (0.26–0.41) ***	0.31 (0.28–0.36) ***	0.23 (0.18–0.29) ***	0.21 (0.18–0.23) ***	0.31 (0.25–0.39) ***	0.28 (0.24–0.33) ***	0.27 (0.20–0.37) ***	0.20 (0.15–0.27) ***
ACEs × resilience (all)		1.20 (0.73–2.33)		1.47 (1.34–1.82)		1.41 (1.20–1.62)		2.20 (1.80–2.60)^

^$p \leq 0.05$, *$p \leq 0.01$, **$p \leq 0.001$, and ***$p \leq 0.0001$. [a]aOR adjusted for ACEs and resilience. [b]Interaction term included. ACE, adverse childhood experience; ADHD, attention-deficit/hyperactivity disorder; aOR, adjusted odds ratio; CI, confidence interval.

modifications in the techniques that child health providers are trained to improve their capabilities to address new issues found through screening.

Implications: Interventions and Programs

Sometimes, the adult relationships may not be protective; rather, they provide insufficient responses to the

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Table 4. Interactions of ACEs and Resilience Predicting Current Mental Health Outcomes

	Current ADHD	Current Behavior Disorder	Current Anxiety	Current Depression
Independent Variables	**aOR (95% CI)**	**aOR (95% CI)**	**aOR (95% CI)**	**aOR (95% CI)**
ACEs × resilience (individual)				
≥4|low	Referent	Referent	Referent	Referent
≥4|high	0.14 (0.08–0.23)***	0.10 (0.06–0.16)***	0.21 (0.13–0.35)***	0.24 (0.13–0.43)***
ACEs × resilience (family)				
≥4|low	Referent	Referent	Referent	Referent
≥4|high	0.99 (0.65–1.51)	0.93 (0.59–1.44)	1.02 (0.67–1.57)	1.16 (0.71–1.90)
ACEs × resilience (community)				
≥4|low	Referent	Referent	Referent	Referent
≥4|high	1.41 (0.57–3.51)	0.92 (0.31–2.79)	1.18 (0.45–3.04)	0.25 (0.10–0.61)*
ACEs × resilience (all)				
≥4|low	Referent	Referent	Referent	Referent
≥4|high	0.37 (0.24–0.59)***	0.31 (0.19–0.49)***	0.40 (0.25–0.64)**	0.44 (0.26–0.75)*

$^{\cdot}p \leq 0.05$, $^{*}p \leq 0.01$, $^{**}p \leq 0.001$, and $^{***}p \leq 0.0001$. ACE, adverse childhood experience; ADHD, attention-deficit/hyperactivity disorder; aOR, adjusted odds ratio; CI, confidence interval.

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needs of the child. The American Academy of Pediatrics (AAP) committee on the psychosocial aspects of family and child health described that in such situations, the activities that support the function of the family, positive parenting techniques, and the social environment must then become available outside the home of the child.[26]

Families that have young children develop a relationship with the children's health professional at an early stage compared with other formal supports (home visitors, social workers, and early childhood educators). The frequency of contact between the family and health care providers of the children, however, also offers a platform for a variety of services focused on children and their families. Thus, for such reasons, family-centered medical homes offer an opportunity to create therapeutic associations, engage families, and use developmental surveillance to monitor the progress of children's mental health.

Indeed, the priority on providing support to children and their families is becoming a formal process incorporated into the outpatient family-centered medical home within the United States. The National Committee for Quality Assurance (NCQA) is one of the leading supporters of the family-centered medical home, and this organization has established standards that form the basis for quality primary care. One of the standards instituted by the NCQA is that medical homes should assist links to resources in the community and track referrals to such resources.[27]

Integral to the development of the child is a discussion with the family, which highlights their own abilities, cares, and resources. Techniques that can be integrated into the care of children include better screening for social risks and development within the child's home, increased comprehensive anticipatory guidance and affirmative support for families, and connecting child health care providers in a team fashion with similar professionals focused on child care services.[26]

A nationwide health promotion curriculum administered by the AAP is known as Bright Futures, which is the standard for health care prevention and promotion among children in the United States.[28] Bright Futures emphasizes the health needs of children within the context of the family and the community. An extensive theme of Bright Futures is the requirement for clinicians to provide family support. Where applicable, child health providers need to assess several family strengths and challenges as they advance optimal development.

The Healthy Steps model is one of the most effective models of team-based care within the home visitation model. This evidence-based model places an early childhood development professional within the medical home of children to offer more comprehensive support of family development activities.[29] A study showed the identification of behavioral concerns, receipt of suitable anticipatory guidance, improvements in discipline practices, promotion of knowledge, and receipt of care at the same location over time.[30]

Certain integrated care models that address health within the context of the social determinants, such as ACEs, and trauma-informed care models are arising. However, it is imperative to show and scale up such models to evaluate and address trauma. This is especially true of promising models associated with building child resilience, family dynamics, and community environments.

Pediatric providers may gain from the results of this study, as treatment and diagnosis for mental health outcomes among children are important to pediatric care. Thus, it is imperative that pediatric health care providers screen for these disorders. In addition, it was found that many children may have limited access to mental health specialists. Therefore, primary care providers represent the best hope for proper diagnosis and treatment among high-risk children.

This study contributes to the growing literature showing the positive associations between resilience and improved mental health outcomes among children

exposed to ACEs, which fills a critical gap. These results are relevant to the development and implementation of evidence-based methods to further resilience and can be used by child care professionals and policymakers to focus interventions to children at risk. Improving resiliency in children exposed to ACEs could help to mitigate the effect of ACEs and enable them to recover, thus supporting healthy and more productive lives. By enabling children to restore and improve their sense of control, meaning, and connections through characteristics described in this study, we can provide opportunities to thrive. This can help to reduce the effect of mental health problems on the life course and affect children at such a critical phase of development as they transition into adulthood.

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Strengths and Limitations

This is a cross-sectional study because of the nature of the survey. Unfortunately, the United States lacks a longitudinal population-based study that incorporates information on mental outcomes, ACEs, resilience, and other variables evaluated here. Such information, including integration with costs of care, medical services, and other environmental measures, is necessary to report causal effects and improve understanding of variations in outcomes among risk subgroups. The follow-back surveys provided by the National Survey of Children's Health (NSCH) hold promise in the absence of a longitudinal study. Other limitations include the lack of comprehensiveness for the measures that were evaluated and the reliance on doctors' reports to provide diagnoses regarding mental health conditions that could be biased. Usually, surveys such as the NSCH are subjective and influenced toward positive reporting, indicating that with improvement, the outcomes observed here possibly show greater effects of ACEs and resilience factors. The use of interviews with caregivers or parents of children to evaluate outcome and exposure measures offers more timely information to build intervention efforts rather than retrospective interviews conducted during adulthood regarding childhood exposures.

CONCLUSIONS

The eradication of adverse childhood experiences (ACEs) may be beyond the scope of many communities. However, investments in assets that develop resilience may counter some of the consequences disproportionately suffered by persons with ACEs, and the findings here may be beneficial to those with low or no ACEs. Many of the community resilience factors examined in this study portray thriving communities. An asset-based community development approach to developing resilience would identify and invest in current features within localities that enable friendship networks, community role models, cultural connectedness, and access to community support. The return on investments from such methods could be substantial in the short-term as seen in the improvements of the child's well-being and through long-term benefits for the life course of the individual. Although services and public policy consider ways to support such developments, we should ensure that these community features are not dismantled because they may inherently protect some of the most vulnerable children.

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