Adverse Childhood Experiences and Protective Factors With School Engagement

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abstract

OBJECTIVES: To determine the associations of adverse childhood experiences (ACEs) and protective familial and community factors with school performance and attitudes in children ages 6 to 17.

METHODS: A cross-sectional analysis of the 2011–2012 National Survey of Children's Health was performed. All data were demographically weighted and included 65 680 children ages 6 to 17. The survey identified up to 9 ACEs in each child. ACE scores were categorized as 0, 1, 2, 3, and ≥4 ACEs. Children's protective factors (PFs) included the following: safe neighborhood, supportive neighbors, 4 neighborhood amenities, well-kept neighborhood, no household smoking, ≥5 family meals per week, and a parent who can talk to the child. PFs were categorized into ≤3, 4, 5, 6, and 7 PFs. School outcomes included the following: child repeated ≥1 grade; never, rarely, or sometimes completes homework; and never, rarely, or sometimes cares about school. χ^2 tests and logistic regressions assessed the relationships between ACEs and school outcomes, PFs and school outcomes, and both ACEs and PFs and school outcomes, adjusting for sex, age, race, ethnicity, and maternal education.

RESULTS: Each negative school outcome is associated with higher ACE scores and lower PF scores. After adding PFs into the same model as ACEs, the negative outcomes are reduced. The strongest PF is a parent who can talk to the child about things that matter and share ideas.

CONCLUSIONS: As children's ACE scores increase, their school performance and attitudes decline. Conversely, as children's PF scores increase, school outcomes improve. Pediatric providers should consider screening for both ACEs and PFs to identify risks and strengths to guide treatment, referral, and advocacy.

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WHAT'S KNOWN ON THIS SUBJECT: Few studies have identified the negative impact of adverse childhood experiences (ACEs) on child development and behavior. ACEs may lead a child to develop toxic stress, leading to poor outcomes into adulthood. This has led some pediatric practices to screen for ACEs.

WHAT THIS STUDY ADDS: In addition to demonstrating the association of ACEs with poor school outcomes, this study identifies an association of several modifiable factors in the family and community with positive school outcomes.

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Many studies have explored the prevalence and effects of adverse childhood experiences (ACEs).[1–3] In the original ACE study, adults were asked to recall adverse events that occurred during their childhood. A total number of ACEs was used to assess childhood stress. A graded dose-response relationship between the number of ACEs and negative outcomes was reported.[1–3] More recently, studies have identified the negative effects of ACEs on child development and behavior.[4–6]

School is an important component of children's daily lives. Measuring school outcomes and attitudes may provide essential information on the overall well-being of the child. It may even predict the direction of the child's life course trajectory. Studies have shown that adolescents with higher academic performance are less likely to engage in health-risk behaviors, drink or binge alcohol, be sexually active, use drugs, and engage in physical acts of violence.[7,8] Social benefits of higher educational attainment include increased public revenue, crime reduction, improved social cohesion, technological innovations, and intergenerational benefits.[9] Currently, there are few studies that measure the effect of ACEs on school performance and attitudes. As the total number of ACEs a child encounters increases, lower levels of school engagement and increased absenteeism has been reported.[10,11] More studies are needed to identify factors that buffer the negative impact of ACEs. There is some evidence supporting the protective roles of parental and community factors.[10,11] Our objective is to determine if there is an association between ACEs and several modifiable protective familial and community factors with school performance and attitudes in children 6 to 17 years old.

METHODS

A cross-sectional analysis of data derived from the 2011–2012 National Survey of Children's Health (NSCH) was performed. The Maternal and Child Health Bureau (MCHB) of the Health Resources and Services Administration sponsored this survey. MCHB's mission is to "eliminate health barriers and disparities, improve the health infrastructure and systems of care, assure quality care, and acquire the best available evidence to develop and promote guidelines and practices for communities, states, and the nation."[12] The survey's content aligns with MCHB's efforts. It addresses physical, emotional, and behavioral health along with children's experiences within the health care system. It includes extensive questions about the family, stress and coping, family activities, and the child's neighborhood.[12]

The NSCH was conducted by the National Center for Health Statistics through the State and Local Area Integrated Telephone Survey program to "create meaningful and comparable estimates of health and well-being across the 50 states and [District of Columbia] for all children."[13] The sample was weighted and designed to be representative of various populations and large enough to provide precise estimates of children ages 0 to 17 years within each state. Households were selected if children $<$18 years old resided in the home. Each child's sex and age were then recorded. If $>$1 child in the household was eligible, only 1 was randomly selected by a computer system. Several years of this survey have been conducted. The 2011–2012 survey was the third, followed by the 2016 and 2017 surveys. The 2011–2012 questionnaire and methodology report, including the design and procedures, is available for review online.[12,13]

The 2011–2012 survey includes 95 677 children from 0 to 17 years old. All data are weighted. Our study only includes children 6 to 17 years old. For our ACE model, there is a total of 65 680 children. In our protective factor (PF) model, there is a total of 63 467 children with complete data.

A panel of experts assembled by the Health Resources and Services Administration included 9 survey questions based on the original Centers for Disease Control and Prevention ACE study.[1–3] ACEs were provided by caregiver report and include whether the child was exposed to domestic violence, neighborhood violence, economic hardship, substance abuse in the home, mental illness in the home, death of a caregiver, incarceration of a caregiver, divorce or separation of caregivers, and unfair judgment and/or treatment secondary to race. We developed a total child ACE score based on these responses and categorized them into 5 groups: 0, 1, 2, 3, and $\geq$4 ACEs.

This study also focuses on modifiable family and community PFs. We selected 7 modifiable PFs from the survey. The 3 familial factors chosen were no smoking in the household, 5 or more family meals per week, and if the parent and child usually or always talk about things that matter and share ideas. Questions regarding maternal and paternal mental and physical health were excluded because ~6% of children in the survey were not living with a mother in the household, and ~20% of children in the survey were not living with a father in the household. The 4 community factors chosen were a safe neighborhood, supportive neighbors, a neighborhood with 4 amenities (pathways, parks, a library, and a recreational center), and a well-kept neighborhood. We developed a total child PF score based on these responses and then categorized them into 5 groups: $\leq$3, 4, 5, 6, and 7 PFs.

TABLE 1 Distribution of Demographics by Number of ACEs Among Children Ages 6 to 17 (2011–2012 NSCH)

	0 ACEs (44.4%; 32 773)	1 ACE (24.7%; 14 937)	2 ACEs (11.4%; 6631)	3 ACEs (6.5%; 3564)	≥4 ACEs (13.0%; 7775)	Total (100%; 65 680)
	Weighted % (*n*)	Weighted % (*n*)	Weighted % (*n*)	Weighted % (*n*)	Weighted % (*n*)	Weighted % (*n*)
Child sex						
Female	48.7 (15 853)	48.9 (7195)	49.2 (3198)	49.9 (1708)	47.9 (3653)	48.8 (31 607)
Male	51.3 (16 878)	51.1 (7722)	50.8 (3425)	50.1 (1853)	52.1 (4108)	51.2 (33 986)
Child age, y						
6–10	44.8 (13 976)	41.0 (5684)	36.3 (2265)	39.1 (1176)	34.9 (2667)	41.2 (25 768)
11–13	24.2 (7819)	24.6 (3691)	27.9 (1752)	22.9 (900)	25.3 (1983)	24.8 (16 100)
14–17	31.0 (10 978)	34.4 (5562)	35.8 (2614)	38.0 (1488)	39.7 (3170)	34 (23 812)
Child race						
White	71.9 (25 995)	64.7 (10 618)	62.0 (4471)	58.7 (2432)	57.9 (4277)	66.4 (47 793)
African American	10.5 (2223)	17.1 (1888)	21.0 (965)	21.3 (482)	20.0 (990)	15.2 (6548)
Other	17.7 (4146)	18.2 (2217)	17.1 (1121)	20.0 (613)	22.1 (1529)	18.4 (9626)
Child ethnicity						
Non-Hispanic	78.7 (29 076)	75.7 (12 714)	77.1 (5632)	79.0 (3065)	78.5 (5812)	77.8 (56 299)
Hispanic	21.3 (3472)	24.3 (2122)	22.9 (961)	21.0 (477)	21.5 (1041)	22.2 (8073)
Maternal education						
More than high school	71.4 (25 665)	58.1 (9315)	58.3 (3803)	55.6 (1916)	55.1 (3327)	64.0 (44 026)
Less than high school or high school graduate	28.6 (6269)	41.9 (4208)	41.7 (1951)	44.4 (1039)	44.9 (1889)	36.0 (15 356)

School performance and attitude outcomes are assessed by 3 survey questions, which include if the child repeated 1 or more school grades; if the child never, rarely, or sometimes (N/R/S) completes homework; and if the child N/R/S cares about school.

Stata version 13.1 (Stata Corp, College Station, TX) was used for data analysis and to account for weighting and the complex survey design in all analyses. First, we assessed the distribution of demographics by ACEs and PFs. Next, we used multiple logistic regressions to assess the relationships between (1) ACEs and school outcomes, (2) PFs and school outcomes, and (3) both ACEs and PFs and school outcomes. All models controlled for sex, age, race, ethnicity, and maternal education. Poverty was not included as a covariate because economic hardship was identified as an ACE. We also assessed the effect of adding family income into the PF models. Because the association between the number of PFs and each outcome was essentially unchanged, we present the models without family income as a covariate.

Lastly, each familial and community PF was individually analyzed in separated multivariable logistic regression models to assess its

TABLE 2 Distribution of Demographics by Number of PFs Among Children Ages 6 to 17 (2011–2012 NSCH)

	≤3 PFs (4.0%; 2519)	4 PFs (9.8%; 6220)	5 PFs 26.2% (16 630)	6 PFs (37.8%; 23 994)	7 PFs (22.2%; 14 104)	Total (100%; 63 467)
	Weighted % (*n*)	Weighted % (*n*)	Weighted % (*n*)	Weighted % (*n*)	Weighted % (*n*)	Weighted % (*n*)
Child sex						
Female	48.1 (1207)	49.9 (3018)	49.7 (8050)	48.1 (11 582)	47.3 (6687)	48.5 (30 544)
Male	51.9 (1309)	50.1 (3196)	50.3 (8557)	51.9 (12 389)	52.7 (7393)	51.5 (32 844)
Child age, y						
6–10	37.3 (906)	39.9 (2175)	38.0 (5963)	41.0 (9371)	46.3 (6361)	41.0 (24 776)
11–13	23.8 (611)	23.7 (1501)	24.8 (3998)	25.7 (5984)	24.8 (3474)	24.9 (15 568)
14–17	38.9 (1002)	36.3 (2544)	37.3 (6669)	33.3 (8639)	29.0 (4269)	34.1 (23 123)
Child race						
White	48.0 (1389)	59.6 (4152)	66.2 (12 309)	69.8 (18 439)	69.5 (10 761)	66.5 (47 050)
African American	29.0 (562)	19.6 (932)	16.4 (1801)	13.0 (2065)	11.6 (1044)	15.2 (6404)
Other	22.9 (531)	20.9 (1056)	17.4 (2373)	17.2 (3259)	18.9 (2150)	18.3 (9369)
Child ethnicity						
Non-Hispanic	71.5 (2027)	73.5 (5236)	78.8 (14 569)	79.8 (21 180)	79 (12 400)	78.2 (55 412)
Hispanic	28.5 (480)	26.5 (957)	21.2 (1991)	20.2 (2721)	21.0 (1633)	21.8 (7782)
Maternal education						
More than high school	41.6 (1161)	48.4 (3228)	59.0 (10 597)	69.1 (1268)	78.1 (11 172)	64.6 (43 426)
Less than high school or high school graduate	58.4 (1087)	51.6 (2321)	41.0 (4583)	30.9 (4891)	21.9 (2044)	35.4 (14 926)

adjusted contribution to reciprocal positive school performance and attitude outcomes (child never repeated a school grade, child usually or always completes homework, and child usually or always cares about school).

RESULTS

A majority of school-aged children in the 2011–2012 NSCH are white and non-Hispanic with mothers who continued education after high school (Tables 1 and 2). Approximately 44% of American school-aged children had no ACEs, 25% had 1 ACE, 11% had 2 ACEs, 6% had 3 ACEs, and 13% had ≥4 ACEs (Table 1). Approximately 4% of school-aged children had ≤3 PFs, 10% had 4 PFs, 26% had 5 PFs, 38% had 6 PFs, and 22% had all 7 PFs (Table 2). Approximately 9% repeated >1 school grade, 13% N/R/S complete homework, and 14% N/R/S care about school.

Each negative school outcome is associated with higher ACE scores and lower PF scores. As the total number of ACEs increases, the percentage of children who have repeated at least 1 school grade increases. The same is seen with poor homework completion and children not caring about school (Fig 1). Conversely, as the number of PFs increases, the percentage of children who have repeated a school grade decreases. Similar trends are seen in poor homework completion and children not caring about school (Fig 2).

In adjusted models controlling for age, sex, race, ethnicity, and maternal education, the same general association of increasing child ACE scores with increasing odds of all 3 negative school outcomes persists (Table 3). Conversely, as the total number of child PFs increases, the odds of children repeating 1 or more school grade, poor homework completion, and children not caring about school decreases (Table 4).

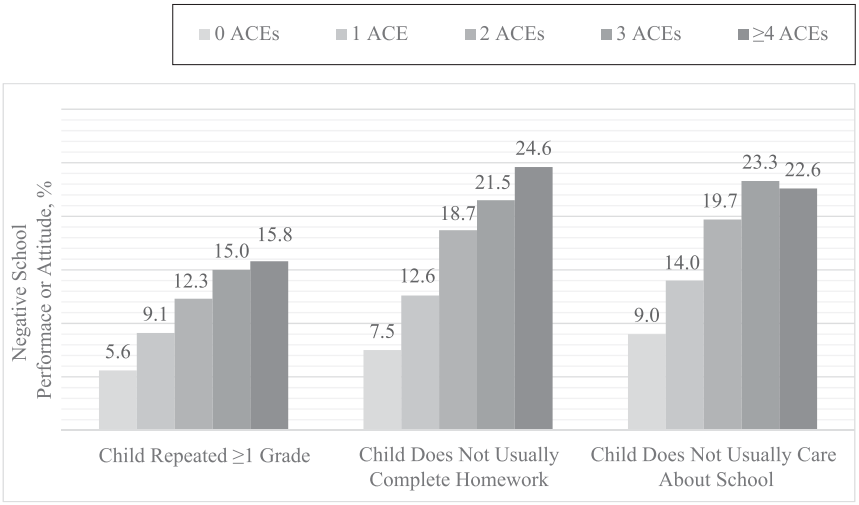

FIGURE 1
Prevalence of negative school performance and attitude outcomes by number of ACEs among children ages 6 to 17 (2011–2012 NSCH).

When adding PFs into the same model with ACEs, there is a modest decrease in the likelihood of children having all 3 negative school outcomes for each child ACE score. However, there is also an increase in the odds of these same negative outcomes for each child PF score (Tables 3–5). This suggests that there may be an interaction between ACEs and PFs.

Table 6 includes adjusted models looking at the association between each PF and our 3 school outcomes, now presented as their reciprocal positive outcomes. Almost every child PF is significantly associated with these positive school outcomes. Most notably, the strongest PF for each outcome is a parent who can talk about things that matter and share ideas with the child.

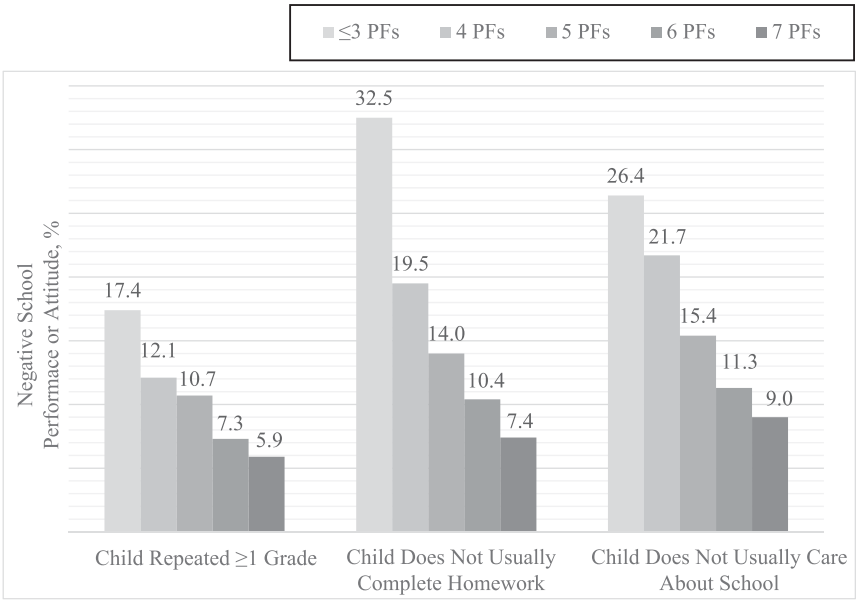

FIGURE 2
Prevalence of negative school performance and attitude outcomes by number of PFs among children ages 6 to 17.

TABLE 3 Adjusted Odds Ratios of Each of 3 Negative School Outcomes in 6- to 17-Year-Olds by Number of ACEs

ACEs	Child Repeated ≥1 Grade	Child Does Not Usually Complete Homework	Child Does Not Usually Care About School
0	1.00	1.00	1.00
1	1.55 (1.29–1.87)	1.78 (1.54–2.07)	1.70 (1.48–1.96)
2	2.07 (1.66–2.58)	2.86 (2.40–3.42)	2.61 (2.21–3.08)
3	2.77 (2.06–3.71)	3.49 (2.78–4.38)	3.16 (2.53–3.95)
≥4	2.76 (2.23–3.41)	4.04 (3.38–4.84)	2.99 (2.52–3.55)

Adjusted for sex, age, race, ethnicity, and maternal education.

DISCUSSION

The American Academy of Pediatrics (AAP) has identified the significant impact that toxic stress can have on a child. Toxic stress is defined as "the most dangerous form of stress response that can result from strong, frequent, or prolonged activation of the body's stress response systems in the absence of the buffering protection of a supportive, adult relationship." This stress can lead to lifelong changes affecting learning, behavior, and physiology. However, with the mediation of PFs, a child may develop resilience.[4–6]

Resilience is developed from PFs within the individual, the family, and the community.[14] Individual resilience has been described as an innate characteristic. However, familial and community factors are more pliable and an important area requiring more study.

The strongest PF identified in our study is a parent who can talk to the child about things that matter or share ideas. Parental engagement in a child's life and school is correlated with a positive parent-child relationship and increased goal orientation in the child. A stronger parent-child relationship has also been described to have positive effects on early brain development.[6, 15] Our finding supports the AAP's statement highlighting the positive impact of a supportive, adult relationship in a child's life.

Maslow's[16] hierarchy of needs describes basic necessities, including biological needs, safety, love, and esteem. In this model, only after these "deficiency cravings" are met may one reach self-actualization. Self-actualization is defined as "the desire to become more and more what one is, to become everything that one is capable of becoming."[16] Keeping this theory in mind, one may postulate that these "deficiencies" can in part be a result of ACEs and toxic stress. Therefore, as the number of ACEs a child encounters increases, the less likely the child is to become everything he or she is capable of becoming. Alternatively, the more PFs a child experiences, the more likely the child is to reach self-actualization.

This theory aligns with the results of our study. As child ACE scores (childhood stress) increase, school performance and attitudes decline. Conversely, as the child PF scores (family and community PFs) increase, school outcomes improve. Generally, it is observed that negative school outcomes are improved when PFs are included in the same model with ACEs.

TABLE 4 Adjusted Odds Ratios of Each of 3 Negative School Outcomes in 6- to 17-Year-Olds by Number of PFs

PFs	Child Repeated ≥1 Grade	Child Does Not Usually Complete Homework	Child Does Not Usually Care About School
≤3	1.00	1.00	1.00
4	0.76 (0.57–1.02)	0.52 (0.41–0.66)	0.76 (0.60–0.95)
5	0.69 (0.54–0.89)	0.35 (0.28–0.44)	0.48 (0.39–0.59)
6	0.52 (0.40–0.67)	0.26 (0.21–0.33)	0.34 (0.28–0.42)
7	0.41 (0.31–0.56)	0.19 (0.14–0.25)	0.27 (0.21–0.34)

Adjusted for sex, age, race, ethnicity, and maternal education.

This study has its limitations. It is cross-sectional; therefore, we cannot make direct causation assumptions. The ACEs differ from the Centers for Disease Control and Prevention ACE study because they do not include questions directly assessing children's exposure to abuse and neglect and because they were obtained per parent report rather than child self-report. This may result in underreporting of ACEs. However, these questions were developed by an expert panel and evaluated by using standard cognitive interview-based survey items tested by the National Center for Health Statistics. They were worded to minimize underreporting due to social desirability bias.[17] It is possible that the prevalence of caregiver-reported familial factors may be overestimated, again secondary to social desirability. School-performance data were limited to the survey questions without the inclusion of report cards or teacher report to assess for validity. Use of a large, nationally representative, weighted sample makes these findings generalizable to most American school-aged children. However, it does not include children who are institutionalized or homeless.

This study is unique in that modifiable PFs of school performance and attitudes are identified. This analysis suggests that primary care providers and educators should not only screen children for ACEs but also identify these types of PFs. This study provides the framework for a novel positive scoring system that may be used by pediatric providers in conjunction with the ACE screening and scoring system. This information may be useful in targeting effective

TABLE 5 Adjusted Odds Ratios of Each of 3 Negative School Outcomes From Models With Both ACEs and PFs

	Child Repeated ≥1 Grade	Child Does Not Usually Complete Homework	Child Does Not Usually Care About School
No. ACEs			
0	1.00	1.00	1.00
1	1.42 (1.17–1.72)	1.60 (1.37–1.86)	1.55 (1.35–1.79)
2	1.90 (1.51–2.38)	2.48 (2.06–2.97)	2.26 (1.89–2.70)
3	2.52 (1.87–3.39)	2.82 (2.21–3.59)	2.53 (2.00–3.20)
≥4	2.39 (1.92–2.97)	3.29 (2.72–3.98)	2.46 (2.05–2.96)
No. PFs			
≤3	1.00	1.00	1.00
4	0.86 (0.65–1.15)	0.60 (0.46–0.77)	0.85 (0.67–1.08)
5	0.83 (0.64–1.07)	0.44 (0.34–0.56)	0.58 (0.46–0.72)
6	0.68 (0.52–0.88)	0.37 (0.29–0.47)	0.45 (0.36–0.57)
7	0.57 (0.42–0.78)	0.28 (0.21–0.37)	0.37 (0.29–0.48)

Adjusted for sex, age, race, ethnicity, and maternal education.

treatments at school-aged children, especially if they are struggling academically.

Lastly, the findings suggest that an effective intervention may be providing families with early positive parenting programs, such as The Incredible Years and Triple P, targeting improved parent-child relationships and communication. This could impact later school performance with its plethora of benefits into adulthood. It may also guide advocacy efforts aimed at building safe and nurturing neighborhoods.

With the AAP, Ginsburg and Jablow[18] authored *A Parent's Guide to Build Resilience in Children and Teens: Giving Your Child Roots and Wings*. These guidelines build on communication strategies for parents by using the 7 C's Model of Resilience. This model helps parents build confidence in their children, notice and reinforce their children's competence, foster the vital connection with their children, develop character and a sense of contribution in their children, develop critical coping strategies, and help their children gain control by learning that the privileges they earn are linked to the responsibility they demonstrate.[18,19]

Additionally, there are currently several community-based resilience-building groups that may meet the needs of families: Search Institute, Communities That Care, Kids at Hope, and The Penn Resiliency Project. These programs may help assess the needs of the community, define interventions with measurable goals, and track progress over time.[20]

CONCLUSIONS

Pediatric providers may ask whether it is important to identify and screen for ACEs in childhood and how this might inform their practice. Unfortunately, events that have already occurred cannot be erased. However, with the assistance of a positive scoring system screening for PFs, we may be better equipped to collaborate with school psychologists, social workers, counselors, teachers, and community organizations to

TABLE 6 Adjusted Odds Ratios of Each of 3 Positive School Outcomes From Separate Models for Individual Familial and Community PFs Among Children Ages 6 to 17

	Child Has Not Repeated Any Grades	Child Usually or Always Completes Homework	Child Usually or Always Cares About School
Smoking in household	1.00 (ref)	1.00 (ref)	1.00 (ref)
No smoking	1.63 (1.41–1.88)	1.93 (1.71–2.17)	1.79 (1.60–2.01)
<5 family meals per wk	1.00 (ref)	1.00 (ref)	1.00 (ref)
≥5 family meals per wk	0.90 (0.78–1.05)	1.32 (1.18–1.48)	1.29 (1.16–1.44)
Parent cannot talk about things that matter or share ideas	1.00 (ref)	1.00 (ref)	1.00 (ref)
Parent can talk about things that matter or share ideas	1.89 (1.40–2.55)	6.10 (4.75–7.83)	6.60 (5.29–8.23)
Parent does not report safe neighborhood	1.00 (ref)	1.00 (ref)	1.00 (ref)
Safe neighborhood	1.37 (1.12–1.68)	1.88 (1.58–2.24)	1.66 (1.40–1.98)
Parent does not report supportive neighbors	1.00 (ref)	1.00 (ref)	1.00 (ref)
Supportive neighbors	1.40 (1.13–1.73)	1.85 (1.56–2.18)	1.60 (1.37–1.88)
<4 neighborhood amenities	1.00 (ref)	1.00 (ref)	1.00 (ref)
4 amenities[a]	1.31 (1.13–1.51)	1.09 (0.97–1.22)	1.18 (1.06–1.31)
Parent does not report well-kept neighborhood	1.00 (ref)	1.00 (ref)	1.00 (ref)
Well-kept neighborhood	1.33 (1.09–1.62)	1.80 (1.50–2.16)	1.31 (1.10–1.57)

Adjusted for sex, age, race, ethnicity, and maternal education. Ref, reference.

[a] Amenities are pathways and/or sidewalks, parks, a library, and a recreation center.

identify effective treatments for these children and their families. As a result, school-based professionals may then be better prepared to support adversity-exposed youth whom they encounter on a daily basis. This study identifies the negative associations of ACEs and the positive associations of protective family and community factors with school-aged children's attitudes toward school and their performance. Although we cannot necessarily determine if these PFs can help buffer the effects of ACEs, they appear to be associated with better child outcomes. Studies are needed to further identify modifiable PFs. Pediatric advocacy is needed to address ACEs, implement preventive interventions, and promote protective family and community factors.

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ABBREVIATIONS

AAP: American Academy of Pediatrics
ACE: adverse childhood experience
MCHB: Maternal and Child Health Bureau
NSCH: National Survey of Children's Health
N/R/S: never, rarely, or sometimes
PF: protective factor

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REFERENCES

1. Felitti VJ, Anda RF, Nordenberg D, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. *Am J Prev Med*. 1998;14(4):245–258
2. Anda RF, Felitti VJ, Bremner JD, et al. The enduring effects of abuse and related adverse experiences in childhood. A convergence of evidence from neurobiology and epidemiology. *Eur Arch Psychiatry Clin Neurosci*. 2006;256(3):174–186
3. Felitti VJ. Adverse childhood experiences and adult health. *Acad Pediatr*. 2009;9(3):131–132
4. Shonkoff JP, Garner AS, Siegel BS, et al; Committee on Psychosocial Aspects of Child and Family Health; Committee on Early Childhood, Adoption, and Dependent Care; Section on Developmental and Behavioral Pediatrics. The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*. 2012;129(1). Available at: www.pediatrics.org/cgi/content/full/129/1/e232
5. Garner AS, Shonkoff JP; Committee on Psychosocial Aspects of Child and Family Health; Committee on Early Childhood, Adoption, and Dependent Care; Section on Developmental and Behavioral Pediatrics. Early childhood adversity, toxic stress, and the role of the pediatrician: translating developmental science into lifelong health. *Pediatrics*. 2012;129(1). Available at: www.pediatrics.org/cgi/content/full/129/1/e224
6. Bucci M, Marques SS, Oh D, Harris NB. Toxic stress in children and adolescents. *Adv Pediatr*. 2016;63(1):403–428
7. Centers for Disease Control and Prevention. Health and academics. Available at: https://www.cdc.gov/healthyschools/health_and_academics/index.htm. Accessed July 10, 2018
8. Langford R, Bonell CP, Jones HE, et alet al. The WHO Health Promoting School framework for improving the health and well-being of students and their academic achievement. *Cochrane Database Syst Rev*. 2014;4(4):CD008958
9. Vernez G, Krop RA, Rydell CP. The public benefits of education. In: *Closing the Education Gap: Benefits and Costs*. Santa Monica, CA: RAND Corporation; 1999:13–32
10. Bethell CD, Newacheck P, Hawes E, Halfon N. Adverse childhood experiences: assessing the impact on health and school engagement and the mitigating role of resilience. *Health Aff (Millwood)*. 2014;33(12):2106–2115
11. Bellis MA, Hughes K, Ford K, et al. Adverse childhood experiences and sources of childhood resilience: a retrospective study of their combined relationships with child health and educational attendance. *BMC Public Health*. 2018;18(1):792
12. Bramlett MD, Blumberg SJ, Zablotsky B. Design and operation of the national survey of children's health, 2011-2012.*Vital Health Stat 1*. 2017;(59):1–256
13. Centers for Disease Control and Prevention. National Survey of

Children's Health. Available at: https://www.cdc.gov/nchs/slaits/nsch.htm. Accessed November 26, 2018

14. Shumow L, Lowe Vandell D, Posner J. Risk and resilience in the urban neighborhood: predictors of academic performance among low-income elementary school children. *Merrill-Palmer Q*. 1999;45(2):309–331

15. Balistreri KS, Alvira-Hammond M. Adverse childhood experiences, family functioning and adolescent health and emotional well-being. *Public Health*. 2016;132:72–78

16. Maslow AH. A theory of human motivation. *Psychol Rev*. 1943;50:370–396

17. Bethell CD, Carle A, Hudziak J, et al. Methods to assess adverse childhood experiences of children and families: toward approaches to promote child well-being in policy and practice. *Acad Pediatr*. 2017;17(7S):S51–S69

18. Ginsburg K, Jablow M. *Building Resilience in Children and Teens: Giving Kids Roots and Wings*. 2nd ed.Elk Grove Village, IL: American Academy of Pediatrics; 2005

19. Ginsburg K. The 7 Cs: the essential building blocks of resilience. Available at: www.fosteringresilience.com/. Accessed November 27, 2018

20. HealthyChildren.org. Community-based resilience building. Available at: https://www.healthychildren.org/English/family-life/Community/Pages/Community-Based-Resilience-Building.aspx. Accessed November 27, 2018

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