Challenges to School Success and the Role of Adverse Childhood Experiences

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Abstract

Objective: To examine the association between adverse childhood experiences (ACEs), by multiple types and counts of ACEs, and challenges to school success.

Methods: A cross-sectional study was conducted using data from the 2016 National Survey of Children's Health using the ACE module and 3 measures of challenges to school success: lack of school engagement, school absenteeism, and repeated grade.

Results: In multivariable analysis adjusting for selected demographic and other characteristics, children with 4 or more ACEs had higher odds of nonengagement in school (adjusted odds ratio [aOR] 2.15; 95% confidence interval [CI], 1.51−3.07), reported school absenteeism (aOR 1.75; 95% CI, 1.12−2.73), and of repeating a grade (aOR 1.71; 95% CI, 1.19−2.47, Table 4) than children with exposure to less than 4 ACEs. Risk factors for all 3 challenges to school success included age of child and special health care needs, with older children and children with special health care needs more likely to have challenges to school success, across all 3 measures.

Conclusions: Our findings confirm that ACEs can have an impact in childhood and adolescence, not just later in adulthood, as demonstrated by the association between ACEs and measures of school success. These findings further illuminate the connection between ACEs and childhood outcomes of education and health. Future research should examine frameworks that effectively support collaboration between educators, social service providers, and pediatricians as they seek to prevent or reduce the impact of ACEs and other childhood trauma.

Keywords: adverse childhood experiences; child development; school absenteeism; school engagement

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What's New

Adverse childhood experiences, such as economic hardship, living in disrupted households, and household violence, are associated with school absenteeism, repeated grades, and nonengagement in school. Pediatricians have a role to communicate with families about childhood trauma and school performance.

Success in school encompasses academic skills as well as social-emotional development, physical health, language development, motivation, and creativity and is important to a student's well-being in both immediate- and long-term measures.[1] Students who have higher educational goals and academic achievement are more likely to have higher self-esteem, to delay sexual activity, to engage in fewer risky health behaviors, and have less young adult deviant behavior, such as criminal conduct and alcohol or substance abuse.[2–4] Adolescents who drop out of school have higher rates of chronic disease, substance abuse, and poorer mental health.[5] Students who remain in school and obtain a high school diploma are more likely to have higher long-term earnings potential and overall better health than students who drop out of school.[6,7] The American Academy of Pediatrics recently published a policy statement on the link between school attendance and good health, as school absenteeism puts children at higher risk of poor school performance, which puts them at higher risk for school dropout and poor long-term health outcomes.[8] Thus, school success is important as both an educational and a public health concern.

A child's success in school may be put at risk by a number of factors. At the individual level, children with special health care needs and overall poorer health are more likely to have challenges to school success.[9] At the household and family level, children exposed to caregiver substance abuse, conflict, and poverty are more likely to have school absenteeism.[5,9] Additional household or family characteristics such as the early home environment, the quality of early caregiving, and level of parent involvement are associated with high school drop-out rates.[10] At the neighborhood and community level, the safety and security of the school climate and neighborhood also affect school success.[9,11] Pediatricians also have a role in

supporting school success by providing preventive care, treatment, and screenings, as well as monitoring social-emotional development, referring families and children to family supports, and advocating for children to be in optimal environments for learning and development.[1]

Of particular interest is how childhood adversity risk factors may be associated with many individual school success metrics. Adverse childhood experiences (ACEs), as described in a seminal manuscript, are experiences in childhood that include exposure to traumatizing abuse or household dysfunction.[12] Subsequent research has expanded types of ACEs to include additional childhood experiences such as neglect, economic hardship, and racial discrimination.[13] Extensive evidence has associated ACEs with poorer long term physical and mental health conditions, as well as higher risk of chronic disease and costs of care across the lifespan.[14]

Prior research has examined the relationship between ACEs and school success factors, such as school absenteeism, school engagement, school performance, and/or grade repetition.[15–17] These findings demonstrated that children with 2 or more ACEs were much more likely to repeat a grade, compared to children with no ACEs, and that children with no ACEs were more likely to be engaged in school than children who had been exposed to 2 or more ACEs.[15] By examining the association between challenges to school success and ACE counts, this study will examine the cumulative effect of ACE exposure on those school-success-related challenges. We hypothesize that children with higher counts of ACEs will be more likely to experience challenges to school success than their counterparts exposed to fewer ACEs. Specific types of ACEs, such as caregiver substance abuse and neighborhood violence, are associated with higher school absenteeism.[5,16] Thus, we hypothesize that specific types of ACEs may be stronger risk factors for challenges to school success.[5,16]

Previous studies examining ACEs and school success factors used either older nationally representative datasets (2011−12) or nonrepresentative national datasets and did not examine the association between ACEs, by both types and counts, and challenges to school success. Our study fills a gap in the literature by using a more recent nationally representative dataset (the 2016 National Survey of Children's Health [NSCH]) to examine the relationship between ACEs (type and count) and challenges to school success, specifically lack of school engagement, school absenteeism, and repeated grade, and subsequently provides more generalizable information that may be useful for pediatricians and policymakers.

METHODS

This cross-sectional study was conducted using data from the 2016 NSCH, a mail and online survey conducted by the Data Resource Center for Child and Adolescent Health (DRC). Respondents had to have been a parent or caregiver with at least 1 child between the ages of 0 and 17 living in the home during the time of the interview. For both the mail and online survey, the parent or caregiver fills out an initial screener with the age and sex of all children in the household. From that screener, 1 child from each household is randomly selected by the NSCH to be the subject of the questionnaire. Participants then complete 1 of 3 versions of the study, depending on the child's age. Information on the sampling methods and selection of participants is available on the DRC website (http://www.childhealthdata.org/learn/NSCH).

The 2016 NSCH had 50,212 complete interviews. Our sample was limited to children whose parents or caregivers answered the school age questions (ages 5 and up), n = 35,718 children. An additional 4011 children were excluded from the sample because of incomplete answers to the ACE questions, demographic questions, or school success questions. The final study sample included 31,707 respondents.

The NSCH asks 9 ACE questions about parental separation or divorce, parental death, witnessing household violence, witnessing neighborhood violence, household mental illness, household incarceration, household substance abuse, racial/ethnic mistreatment, and economic hardship (Table 1). Individual ACE counts were calculated and then categorized into less than 4 ACEs or 4 or more ACEs.[12] The 4 or more cut off point for ACEs has long been established among adults, but has also demonstrated to be a significant cut point for higher likelihood of at-risk social and developmental outcomes among children using a variety of ACE screening devices: the NSCH, Family Map Inventories, and the Child Behavior Checklist.[18,19] Particularly for the NSCH ACE questionnaire, a response of 4 or more ACEs has been shown to be a powerful predictor of emotional, mental, or behavioral health conditions among children.[20] Furthermore, in order to describe the exposure of children to particular categories of ACEs, the low prevalence ACEs were grouped into categories. These categories, parental incarceration, violence, household mental illness, and substance abuse, have been established by prior literature and are common constructs to nearly all ACE assessment methods.[20] The group "exposure to violence" comprises 2 ACEs: children reported to have witnessed household or neighborhood violence. The group "living in a disrupted household" comprises 3 possible ACEs: children reported to have a parent/guardian in jail, live with someone with mental illness, or live with someone with substance abuse.

Our 3 measures of challenges to school success included lack of school engagement, school absenteeism, and repeated grade. Lack of school engagement was measured based on the response to the following question: "How well do each of the following phrases describe this child?" The phrases chosen for school engagement included "the child cares about doing well in school" and "the child does all required homework." If caregivers responded, "not true to any item," then the child was categorized as lack of school engagement. This measure of school engagement corresponds with how school engagement has been measured in earlier versions of the NSCH and with prior studies.[15] Repeated grade was measured as affirmative if the caregiver responded yes to the following question: "since

Table 1. ACE Survey and Supplemental Questions Included in the 2016 National Survey of Children's Health

Adverse Childhood Experience		Survey Questions
Group		*To the best of your knowledge, has this child experienced any of the following?*
Parental separation/divorce		1) Parent or guardian divorced or separated?
Parental Death		2) Parent or guardian died
Living in a disrupted household	Household incarceration	3) Parent or guardian served time in jail?
	Household mental illness	4) Lived with anyone who was mentally ill, suicidal, or severely depressed?
	Household substance use	5) Lived with anyone who had a problem with alcohol or drugs?
Witness to violence	Witnessing household violence	6) Saw or heard parents or adults slap, hit, kick, punch one another in the home?
	Witnessing neighborhood violence	7) Was a victim of violence or witnessed violence in the neighborhood?
Racial/ethnic mistreatment		8) Treated or judged unfairly because of his or her race or ethnic group?
Economic Hardship		9) Hard to get by on family's income—hard to cover basics like food or housing?

ACE indicates adverse childhood experience.

starting kindergarten, has this child repeated any grades?" School absenteeism was quantified using the question "during the past twelve months, about how many days did this child miss school because of illness or injury?" If the caregiver responded that the child missed 11 or more days, the highest option given in the responses, then the child was categorized as having school absenteeism.

Covariates in the model were included based on the developmental-ecological child maltreatment model, which encompasses both characteristics of the child and the caregiver, as well as sociodemographic, household, caregiver-child interactions, and neighborhood characteristics.[21] The developmental-ecological child maltreatment model was chosen as a framework for covariate selection. We chose this model because, while the NSCH ACE questions do not specifically ask about maltreatment due to the potential for underreporting due to social desirability, the inter-relatedness and validity of the ACE questions measured by NSCH have demonstrated strong potential for maltreatment in the household.[20] The child characteristics included sex, age, race/ethnicity, and whether a child had special health care needs. The age of the child was grouped into 2 categories: 6−12 or 13−17 years of age, per the NSCH interview questionnaire ages. The race/ethnicity of the child was categorized into the following: non-Hispanic White, non-Hispanic Black, Hispanic, and Multiracial/Other, non-Hispanic. The NSCH identifies children with special health care needs using a 5-criteria tool. If a respondent provides a positive response to any 1 of 5 questions related to prescription medication, elevated used of services, functional limitations, specialized therapy, and continuous emotional, developmental, or behavioral conditions, the child is flagged as having special health care needs.

Characteristics of the caregiver or family included the respondent's relation to the child, the highest educational attainment of a parent or guardian in the household, primary language spoken in the home, family structure, and poverty/income level. The respondent's relation to the child was classified as mother, father, or other. The highest educational attainment of a parent or guardian was grouped into those with less than or equal to high school degree/GED and those with some level of college education. The primary language in the home was English or not English. Family structure included the following: 2 parents, currently married; 2 parents, not currently married; and single mother/other. Finally, poverty/income levels were 0%−99% of the federal poverty level (FPL), 100%−199% FPL, 200%−300% FPL, and 400% FPL or above.

Analyses were performed using the survey sampling weights, cluster, and stratum outlined in the NSCH codebook, in order to account for distributions in race, ethnicity, and gender of children in the United States. These weights, cluster, and stratum were also used to account for nonresponse. Further sampling plan information is documented on the DRC website (http://www.childhealthdata.org/NSCH). All analyses were completed using statistical software (SAS, version 9.3; SAS Institute Inc, Cary, NC). Due to our large sample size, the alpha value was set at .01. The study was approved by the University of South Carolina institutional review board as exempt.

For each variable, descriptive and bivariate analyses were conducted to estimate the frequencies and proportions between each variable and school success factor. Multivariable logistic regression models were used to examine the relationship between ACEs of 4 or more and challenges to school success, and the relationship between types of ACEs and challenges to school success.

Per NSCH guidelines, results are reported in terms of the child instead of the caregiver or family. This NSCH reporting guideline is based on the fact that the reporting weights reflect the population of children in the United States, not the population of caregivers or families (http://www.childhealthdaa.org/learn/NSCH).

RESULTS

The majority of our sample was male (51.0%), between the ages of 6 and 12 years old (58.4%), and non-Hispanic

white (53.0%, Table 2). Nearly a quarter (23.3%) of children had special health care needs. Nearly two thirds (64.1%) of children had their mother as the survey respondent. Most children lived in a household with a guardian who had some college education or more (70.4%) and had 2 parents who were currently married (66.8%). Over 10% (13.8%) of children lived in a household where English was not the primary language. One in 5 children (20.6%) resided in households with income below the federal poverty line.

Approximately 5.7% of children were reported as not being engaged in school, with significant differences in engagement reported by sex, age, special health care needs, relation, guardian education, family structure, and poverty/income level. Exactly 4.0% of children were reported with chronic absenteeism. Significant differences associated with chronic absenteeism included age of child, special health care needs, respondent's relation to child, family structure, and poverty/income level. Over 6% (6.6%) of children had repeated a grade, with a higher percentage of male children repeating a grade (8.1%) than female children (5.1%, $P < .0001$). Other significant differences by repeated grade included age of child, special health care needs, respondent's relation to child, guardian education, family structure, and poverty/income level (Table 2).

The most prevalent types of ACE exposure were parental separation/divorce, economic hardship, and living in a disrupted household; these were experienced across all challenges to school success (Table 3). Children who repeated a grade, as well as those with school absenteeism, were more likely to report each type of ACE than their counterparts ($P < .01$), with the exception of racial/ethnic mistreatment and parental death. Exposure to violence was highest among children with lack of school engagement (21.6%).

In multivariable analysis adjusting for aforementioned covariates, children with 4 or more ACEs had higher odds of reported school absenteeism (adjusted odds ratio [aOR] 1.75; 95% confidence interval [CI], 1.12−2.73), nonengagement in school (aOR 2.15; 95% CI, 1.51−3.07), and of repeating a grade (aOR 1.71; 95% CI, 1.19−2.47, Table 4) than children with exposure to less than 4 ACEs. Risk factors for all 3 challenges to school success included age of child and special health care needs, with older children and children with special health care needs more likely to have

Table 2. Characteristics of Respondents to the 2016 National Survey of Children's Health, in Total and Stratified by School Success Challenge, n = 31,707

Characteristic	All (%)	Lack of School Engagement (%)	*P* value	School Absenteeism (%)	*P* value	Repeated Grade (%)	*P* value
		5.7		*4.0*		*6.6*	
Characteristics of child							
Sex of child			<.0001		.4912		<.0001
Male	51.0	7.4		*4.1*		*8.1*	
Female	49.0	3.9		*3.8*		*5.1*	
Age of child			<.0001		<.0001		<.0001
6−12 years old	58.4	4.4		*3.0*		*5.5*	
13−17 years old	41.6	7.4		*5.2*		*8.3*	
Race/Ethnicity of Child			.7271		.5382		.0084
Non-Hispanic White	53.0	5.4		*4.2*		*5.7*	
Non-Hispanic African-American	12.4	6.6		*2.8*		*9.5*	
Hispanic	24.5	5.8		*4.0*		*7.4*	
"Other" Non-Hispanic	10.1	5.5		*4.1*		*5.9*	
Special health care needs			<.0001				
Yes	23.3	15.6		*10.7*	<.0001	*10.9*	<.0001
Characteristics of parent/household							
Respondent's relation to child			<.0001		.0006		<.0001
Mother	64.1	5.7		*4.7*		*6.6*	
Father	28.4	4.1		*2.4*		*4.9*	
Other	7.4	10.8		*4.0*		*13.7*	
Primary Language			.9681		.1840		.2005
Not English	13.8	5.6		*2.5*		*5.1*	
Guardian Education			.0026		.0642		<.0001
Less than high school or high school	29.6	7.3		*4.8*		*10.5*	
Some college or more	70.4	5.0		*3.6*		*5.0*	
Family Structure			<.0001		.0010		<.0001
Two parents, currently married	66.8	4.2		*3.2*		*4.6*	
Two parents, not currently married	7.8	8.9		*5.5*		*12.0*	
Single mother	16.9	7.8		*6.1*		*8.3*	
Other	8.5	10.2		*4.1*		*14.0*	
Poverty/income level			<.0001		<.0001		<.0001
0%−99% federal poverty level	20.6	8.3		*6.3*		*11.3*	
100%−199% federal poverty level	22.1	5.6		*3.7*		*7.4*	
200%−399% federal poverty level	26.5	5.5		*3.5*		*5.2*	
400% federal poverty level or above	30.8	4.1		*3.0*		*4.1*	

Table 3. Types and Numbers of ACEs Reported by Respondents to the 2016 National Survey of Children's Health, n = 31,707

ACE Exposure	Total Sample Weighted %	Lack of School Engagement (%)	*P* value	School Absenteeism (%)	*P* value	Repeated Grade (%)	*P* value
ACE summary score			<.0001		<.0001		<.0001
Zero	48.6	23.4		23.1		29.5	
One to three	43.6	54.8		56.9		52.1	
Four or more	7.8	21.8		20.0		18.4	
ACE Types[*]							
Parental separation/divorce	29.9	45.0	<.0001	43.6	<.0001	29.0	<.0001
Parental death	4.2	7.8	.0014	6.0	.0995	9.2	<.0001
Living in a disrupted household	20.5	43.0	<.0001	42.4	<.0001	37.0	<.0001
Exposure to violence	9.4	21.6	<.0001	17.3	<.0001	19.8	<.0001
Racial/ethnic mistreatment	4.9	10.1	.0003	9.4	.0152	5.7	.3781
Economic hardship[†]	25.9	43.9	<.0001	49.1	<.0001	39.8	<.0001

*First 8 items are responses to the stem question, "Has this child ever experienced. . ."

†The final item asks, "since this child was born, how often has it been very hard to get by on your family's income – hard to cover the basics like food or housing? If the parent/guardian answered "somewhat often/very often hard to get by on family income" then the answer was coded as a yes. Answers of "never/rarely hard to get by on family income" were coded as a no.

Table 4. Adjusted Odds Ratios[*] and 95% Wald Confidence Intervals Predicting Challenges to School Success by 4 or More Adverse Childhood Experiences (ACEs), Among Respondents to 2016 National Survey of Children's Health survey, n = 31,707

	Lack of School Engagement		School Absenteeism		Repeated Grade	
Variable	Point Estimate	95% CI	Point Estimate	95% CI	Point Estimate	95% CI
Four or more ACEs	2.15	1.51–3.07	1.75	1.12–2.73	1.71	1.19–2.47
Less than four ACEs	*Referent*		*Referent*		*Referent*	
Characteristics of child						
Sex of child						
Male	*Referent*		*Referent*		*Referent*	
Female	0.52	0.40–0.69	0.97	0.74–1.28	0.62	0.49–0.79
Age of Child						
6–12 years old	*Referent*		*Referent*		*Referent*	
13–17 years old	1.77	1.38–2.26	1.71	1.30–2.26	1.55	1.22–1.97
Race/Ethnicity of Child						
Non-Hispanic White	*Referent*		*Referent*		*Referent*	
Non-Hispanic African-American	0.85	0.59–1.21	0.45	0.28–0.73	1.12	0.80–1.56
Hispanic	0.99	0.73–1.35	1.06	0.73–1.55	1.25	0.88–1.79
"Other" Non-Hispanic	1.07	0.68–1.66	1.09	0.66–1.80	1.06	0.74–1.53
Special health care needs						
Yes	6.18	4.76–8.03	5.45	4.10–7.25	1.84	1.42–2.39
Characteristics of Parent/Household						
Respondent's relation to child						
Mother	*Referent*		*Referent*		*Referent*	
Father	0.93	0.70–1.25	0.68	0.45–1.04	0.91	0.69–1.19
Other	1.26	0.69–2.32	0.65	0.32–1.31	1.13	0.71–0.81
Primary language						
English	*Referent*		*Referent*		*Referent*	
Not English	1.34	0.79–2.26	0.58	0.26–1.27	0.53	0.31–0.90
Guardian education						
Less than high school or high school	1.25	0.93–1.68	1.20	0.91–1.60	1.76	1.36–2.29
Some college or more	*Referent*		*Referent*		*Referent*	
Family structure						
Two parents, currently married	*Referent*		*Referent*		*Referent*	
Two parents, not currently married	1.74	1.05–2.90	1.24	0.69–2.25	1.92	1.27–2.89
Single mother	1.09	0.77–1.55	1.06	0.76–1.47	1.02	0.72–1.43
Other	1.49	0.86–2.57	1.07	0.51–2.24	1.82	1.13–2.94
Poverty/Income Level						
0%–99% federal poverty level	1.32	0.86–2.02	1.89	1.23–2.90	1.76	1.19–2.60
100%–199% federal poverty level	1.08	0.71–1.62	1.18	0.79–1.76	1.31	0.95–1.81
200%–399% federal poverty level	1.24	0.92–1.68	1.12	0.78–1.63	1.07	0.79–1.44
400% federal poverty level	*Referent*		*Referent*		*Referent*	

*95% CI = 95% Wald confidence intervals; bold indicates significance.

Table 5. Adjusted Odds Ratios* and 95% Wald Confidence Intervals Predicting Challenges to School Success by Types of Adverse Childhood Experiences (ACEs), Among Respondents to 2016 National Survey of Children's Health survey, n = 31,707

	Lack of School Engagement*		School Absenteeism*		Repeated Grade*	
Variable	Point Estimate	95% CI†	Point Estimate	95% CI†	Point Estimate	95% CI†
*ACE types**						
Parental separation/divorce	1.33	0.99–1.80	1.20	0.85–1.74	1.09	0.82–1.45
Parental death	1.20	0.75–2.33	1.02	0.60–1.73	1.45	0.92–2.29
Living in a disrupted household	2.30	1.75–3.04	2.06	1.41–3.00	1.71	1.26–2.31
Exposure to violence	1.68	1.24–2.29	1.18	0.84–1.64	1.60	1.15–2.22
Racial/ethnic mistreatment	1.96	1.18–3.25	1.71	0.96–3.05	0.96	0.62–1.49
Economic hardship†	1.70	1.28–2.28	2.12	1.52–2.95	1.30	0.99–1.70

*Adjusted for sex, age, race/ethnicity, and special health care needs of the child, as well as parent/household characteristics including relation to the child, primary language, guardian education, family structure, and poverty/income level.

†95% CI = 95% Wald confidence intervals; bold indicates significance.

challenges to school success, across all 3 categories. Children 13–17 years of age had higher odds of school absenteeism (aOR 1.71; 95% CI, 1.30–2.26), nonengagement in school (aOR 1.77; 95% CI, 1.38–2.26), and repeated grade (aOR 1.55; 95% CI, 1.22–1.97) than children 6–12 years old. Children with special health care needs were more likely to have reported school absenteeism (aOR 5.45; 95% CI, 4.10–7.25), nonengagement in school (aOR 6.18; 95% CI, 4.76–8.03), and repeated grade (aOR 1.84; 95% CI, 1.42–2.39) than children without special health care needs.

Children living in a disrupted household had higher odds than children who did not, across all categories of challenges to school success. Children living in a disrupted household had higher odds of school absenteeism (aOR 2.06; 95% CI, 1.41–3.00, Table 5), nonengagement in school (aOR 2.30; 95% CI, 1.75–3.04), and repeated grade (aOR 1.71; 95% CI, 1.26–2.31) than children not in a disrupted household. Children with economic hardship were more likely to have reported school absenteeism (aOR 2.12; 95% CI, 1.52–2.95) and nonengagement in school (aOR 1.70; 95% CI, 1.28–2.28) than children without economic hardship. Children exposed to violence had higher odds of nonengagement in school (aOR 1.68; 95% CI, 1.24–2.29) than children not exposed to violence. Children exposed to racial/ethnic mistreatment had higher odds of nonengagement in school (aOR 1.96; 95% CI, 1.18–3.25) than children not exposed to racial/ethnic mistreatment.

DISCUSSION

This study expands upon prior literature, examining the relationship between ACEs and challenges to school success, measured as school absenteeism, school engagement, and repeated grade with a more recent dataset from the NSCH.[15–17,22] In 2016, over half (51.2%) of children and adolescents experienced ACEs, with nearly 8% exposed to 4 or more ACEs. Rather than the presence (or absence) of the 6 ACE types, we found that the exposure to 4 or more ACEs had a consistently positive relationship with children's challenges to school success. Experiencing 4 or more ACEs was strongly associated with the experience of all 3 challenges to school success, adjusted for various child and household characteristics. This study explored the association between school success and by both types of ACEs, as well as counts of ACEs. While cumulative risk scoring is the strongest predictor of outcomes such as school success or emotional, mental, or behavioral health conditions among children, categories of ACEs provide information for intervention opportunities.[20,23] Our findings confirm that ACEs can have an impact in childhood and adolescence, not just later in adulthood, as demonstrated by the association between ACEs and school success factors.[15–17,22] Furthermore, these findings further illuminate the connection between ACEs and childhood outcomes of education and health.[22]

Despite long-standing national prevention initiatives, the rates of ACE exposures among children between the ages of 0 and 17 were still 51.2% in 2016, increased from 47.9% in 2011.[15] How ACEs were associated with school success depends on type of ACE exposure. We observed that, on average, among the 6 ACE types, economic hardship, living in a disrupted household, and exposure to violence were significantly associated with at least 2 school success factors. Economic hardship, a top common ACE, affected over a quarter of children in 2016. Children experiencing economic hardship had substantially higher rates of school absenteeism and nonengagement in school, compared to their counterparts who might or might not experience other types of ACEs. Because our variable "living in a disrupted household" includes the ACE question about living with someone who "has a problem with alcohol or drugs," our findings are consistent with previous findings that parental substance abuse is associated with poorer school outcomes.[5,16] Children exposed to violence were more likely to be not engaged in school, again supporting prior literature documenting the relationship between neighborhood violence and lower school success.[24] The investigation of particular types of ACEs is important for pediatricians, as clinical practice guidelines are geared towards the screening of particular ACEs upon which there can be interventions.[25]

IMPLICATIONS FOR POLICY AND PRACTICE

The findings from this study are relevant and important for a pediatric provider audience, as the American Academy of Pediatrics recommends that pediatricians screen for ACEs, as well as take a role in optimizing school readiness and addressing challenges to school success such as chronic

absenteeism.[1,8,25,26] The Bright Futures guidelines, a list of guidelines for the screening of behavioral and psychosocial risks, including ACEs, are supported by the American Academy of Pediatrics and the federal Maternal and Child Health Bureau.[27,28] These recommended screenings, assessments, and examinations must be paid for by health insurance plans under the Affordable Care Act and promote the role of pediatricians and social workers in providing care and addressing trauma.[29] However, there is concern about the time required to address all that is included in the Bright Futures guidelines. Because of time constraints, office-based interventions and community resources can be of benefit to pediatricians. Therefore, raising awareness among pediatricians and other social service providers of programs such as *Help Me Grow*, which is not currently in all states but would be extremely beneficial for pediatricians trying to connect their patients with support services, can promote and simplify the process of connecting vulnerable families to support services.[30]

Pediatric visits can also provide an opportunity for screening, prevention, and intervention, as pediatricians often inquire about school performance at well-child visits and provide guidance to children on attendance patterns and healthy development.[31] Due to recent policy changes, pediatricians now may be under more pressure for school attendance. Since the fall of 2017, the majority of states are required to report attendance for every child, not just an aggregate number of average daily attendance.[32,33] The Every Student Succeeds Act uses chronic absence as top pick for the state indicator to measure school quality and success.[33] Thus, pediatricians may now be under more pressure from parents of school age children to provide excuse notes so that parents may avoid truancy court. The American Academy of Pediatrics recommends that pediatricians address school attendance, and other related school success factors, using an office-based tiered approach including front office staff, assistants, nurses, and care coordinators to assist with the time burden on the pediatrician. The first tier is office-based interventions for pediatricians, such as asking about school attendance and other school issues at preventive care visits, asking for school reports, encouraging caregivers and patients when school is going well, and educating themselves about appropriate and inappropriate reasons that students may miss school. The second portion of the tier 1 approach is population based, such as collaborations with school professionals, working with AAP chapter leaders for advocacy efforts, supporting school districts as they improve children and families' access to health care services. Recommendations for tier 2 approaches include preventing and treating mental health issues that are contributing to lack of school success and identifying psychosocial and health factors of the patient's caregiver that may contribute to the child's challenges at school. Finally, tier 3 approaches include contacting the school district for case management and support services.[8]

These findings also provide further motivation for education systems to intervene on ACEs. Schools are one avenue to reach children and adolescents for childhood trauma-informed welfare practice and services.[34] Methods to introduce resilience-building techniques such as mindfulness training are being introduced in school settings.[35] School-based service delivery, such as the School-Wide Positive Behavior Interventions and Supports framework (www.pbis.org), has been shown to reduce reactions children may have to traumatic stress.[36] Training of educators on the role of trauma and adversity in learning may help to create a better learning environment.[37] School policies that create positive reinforcement for school attendance, particularly for adolescents, could improve both school absenteeism and school engagement.[38]

STRENGTHS AND WEAKNESSES

This study uses a dataset that interviews parents and caregivers, who may, due to social desirability and detection bias, underreport both childhood adversity and challenges to school success. The NSCH ACE questions do not capture exposure to neglect, or emotional, physical, or sexual abuse. This differs from the original Kaiser ACE study.[12] Typical of most ACE surveys, the NSCH questions do not measure severity or frequency of exposure to a specific ACE. The use of address-based sampling by the NSCH misses households that are homeless or transient. As well, there may be additional measures of challenges to school success not captured in the NSCH. For example, while we examine school absenteeism as 11 days or more of missed school, as this is the highest category in the NSCH, we recognize that the chronic absenteeism benchmark for school days is 15 or more days per year, per the US Department of Education Office of Civil Rights (https://www2.ed.gov/datastory/chronicabsenteeism.html). Finally, this study is limited by the cross-sectional data of the NSCH as there is no longitudinal population-based dataset in the United States with information on adverse childhood experiences, and thus no causal inferences on why ACEs are associated with poor school success can be made from this study.

There are several strengths to this study including the use of a large, nationally representative dataset which is weighted to be representative of the children in the United States. To our knowledge, this study is the first using 2016 NSCH data to examine the association between ACEs, by type and count, and challenges to school success. The use of examination by both types and counts may demonstrate the cumulative effect of ACE exposure, with the examination by type providing additional information to aid in the development of prevention and intervention efforts. Also a strength is the use of interviews with the parents of children, rather than interviews of adults on their childhood. These interviews can provide more timely information that can help shape current policy efforts. This study's findings may contribute to the development of prevention and interventions efforts to reduce the prevalence of ACEs and mitigate their potential negative impact on school age children in the United States.

CONCLUSIONS

School absenteeism, repeated grades, and nonengagement in school are all challenges to a child's school success, potentially affecting long-term health outcomes.[39,40] The findings from this nationally representative study confirm prior findings that counts of 4 or more ACEs, as well as particular types of ACEs, such as economic hardship, exposure to life in a disrupted household, and exposure to violence, are associated with challenges to school success. By examining and understanding these issues within the context of ACEs, rather than the factors themselves, we can begin to better understand how they affect individuals long term and how best to counteract their effects.

Educators, pediatricians, and social service providers are all well-suited to engage with individuals, families, and the community in conversations about childhood trauma and school performance. Such conversations can result in guidance for families on mitigating ACE exposure and impact, and thus potentially improving the child's school performance and long-term well-being. The continued support of policies and programs that work to reduce the effects of childhood trauma are critical to the well-being of our children. Future research should examine frameworks that effectively support collaboration between educators, social service providers, and pediatricians as they seek to prevent or reduce the impact of ACEs and other childhood trauma.

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