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Esther C. McGowan MD, MS , Suzette O. Oyeku MD, MPH, FAAP ,
Sylvia W. Lim MD, FAAP

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Esther C. McGowan MD, MS

Assistant Clinical Professor, Health Sciences

Department of Pediatrics

University of California, Riverside

School of Medicine | UCR Health

Suzette O. Oyeku MD, MPH, FAAP

Chief, Division of Academic General Pediatrics

Professor of Pediatrics

Director, Academic General Pediatrics Fellowship

The Children's Hospital at Montefiore

The Pediatric Hospital for Albert Einstein College of Medicine

Sylvia W. Lim, MD, FAAP

Associate Professor of Pediatrics

Associate Director, Academic General Pediatrics Fellowship

The Children's Hospital at Montefiore

The Pediatric Hospital for Albert Einstein College of Medicine

Division of Academic General Pediatrics

Corresponding Author:

Esther C. McGowan MD, MS

Assistant Clinical Professor, Health Sciences

Department of Pediatrics

University of California, Riverside

School of Medicine | UCR Health

79430 Highway 111|Suite 102|La Quinta, CA 92253

emcgowan@medsch.ucr.edu

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Abstract

Objective: To examine the association of 1) extrinsic resilience factors and 2) adverse Childhood experiences (ACEs) with a caregiver reported diagnosis of depression in a nationally representative sample of adolescents.

Methods: A cross sectional analysis of the 2016-2017 National Survey of Children's Health, restricted to adolescents 12 to 17 years old was conducted. The dependent variable was caregiver reported depression: no current diagnosis vs. current diagnosis of depression. Independent variables were reported ACEs dichotomized as lower (0-3) or higher (4 or more), and specific resilience factors: family resilience, neighborhood cohesion and caregiver emotional support. Resilience factors were analyzed as a composite score dichotomized as lower (0-3) or higher (4 or more) and individually. Purposeful selection multivariable logistic regression model building was used to estimate the associations between reported diagnosis of depression, ACEs and resilience factors adjusting for demographic covariates.

Results: Study sample consisted of 29,617 (weighted N=24,834,232) adolescents, 6% with current reported diagnosis of depression, 8% with higher ACEs and 91% with higher resilience. Family resilience, neighborhood cohesion and caregiver emotional supports were each independently associated with lower odds of reported diagnosis of depression. However, with all resilience factors in the model, only family resilience and neighborhood cohesion (specifically school safety) remained significantly associated with lower odds of reported diagnosis of depression.

Conclusion(s): In this nationally representative sample, family resilience and neighborhood cohesion were associated with lower odds of a reported diagnosis of depression even with confounding ACEs exposure. These factors may be important targets for future intervention.

INTRODUCTION

Adverse childhood experiences (ACEs) include traumatic events of childhood such as suffering childhood abuse, neglect and household dysfunction.¹ ACEs also include environmental stressors such as exposure to unsafe neighborhoods, racism/discrimination, and bullying.²⁻⁴ Mounting evidence shows that ACEs impact childhood developmental trajectory, and

physical and mental health outcomes.²⁻⁸ Approximately 50% of United States' (US) children have experienced at least one ACE.^{7, 9} Eight percent of US children have experienced ≥ 4 ACEs.^{7,9,10} Four or more reported ACEs have been shown to be associated with a higher probability of ever being diagnosed with depression as compared with no ACEs.^{1,8} Such childhood experiences have been suggested as "psychiatry's greatest public health challenge."¹¹

Childhood mental health disorders are a public health emergency with increasing prevalence, financial burden, and negative impact on children, families, and communities.¹² National surveys indicate 21% of adolescents have one or more reported mental health disorders.¹³⁻¹⁵ Adolescence is a unique developmental stage of rapid growth during which physiologic, cognitive, social, and emotional changes occur simultaneously with increased vulnerability to the effects of ACEs.^{6,15} Adolescent ACEs have been associated with increased risk of anxiety, depression, substance abuse, behavioral problems, and suicide.^{7,13-18}

To address this public health concern, there is growing interest in resilience factors and how they can provide protection in individuals that experience ACEs.^{5,12} Despite exposure to ACEs, most children and adolescents do not develop poor health outcomes. This is based on the premise that various resilience factors may mitigate the impact of ACEs on lifelong health course.¹² Resilience refers to the ability to adapt successfully to disturbances that threaten development of a positive life course or the ability to resume one following periods of adversity.¹² A key requirement of resilience is the presence of both risks, such as ACEs, and promotive factors that either help bring about a positive outcome, reduce or avoid a negative outcome.¹⁹ There are multiple domains of resilience. The focus of this study is centered on extrinsic factors. These include family resilience, neighborhood cohesion, and caregiver emotional support.²⁰ Extrinsic resilience utilizes the socio-ecological framework to emphasize

the dynamic interaction of individuals and their environment.²⁰ It moves away from conceptualizations of resilience as a static, intrinsic trait.¹⁹

The objective of this study was to examine the association of specific extrinsic resilience factors, ACEs, and a diagnosis of depression among a nationally representative sample of adolescents. The specific aims included examining the relationships between 1) exposure to higher ACEs, 2) presence of lower vs higher extrinsic resilience factors, and 3) the individual resilience factors of family resilience, neighborhood cohesion, and caregiver emotional support on reported diagnosis of depression in a nationally representative adolescent population. Limited studies exist that address the potential effect modification of individual extrinsic resilience factors on ACEs and depression in adolescents. We hypothesized that resilience moderates the effect of ACEs on the reported diagnosis of depression. We assessed the potential effect modification of resilience on ACEs and the reported diagnosis of depression in adolescents.

METHODS

We conducted a cross-sectional analysis using the combined 2016-2017 National Survey of Children's Health (NSCH)²¹ to assess the effect of resilience factors on the odds of reported depression in a nationally representative adolescent population.

Data Source and Study Sample

The 2016-2017 NSCH is a publicly available, population based, and nationally representative mail and online survey that assess children's health, well-being, family and community characteristics of U.S. households based on parent/caregiver report.²¹ We will subsequently refer to parent/caregiver as caregiver in this manuscript. The NSCH is sponsored by the Maternal and Child Health Bureau (MCHB) of the Health Resources and Services

Administration, an agency in the U.S. Department of Health and Human Services. The National Maternal and Child Health Data Resource Center, led by the Child and Adolescent Health Measurement Initiative (CAHMI), is a national initiative based in the Johns Hopkins Bloomberg School of Public Health, that combined the 2016-2017 data files and constructed variables in collaboration with the MCHB and the National Center for Health Statistics. Complex survey weights provided by the NSCH adjust for nonresponse and unequal selection bias. Results are representative of national and state specific, noninstitutionalized children 0-17 years old. All analyses were performed using established survey weights to account for the complex sampling design per the NSCH guidelines presented in the dataset codebook.²² Details of the design and implementation of this survey are available through the Data Resource Center website.²¹ A total of 71,811 surveys were completed for 2016-2017. We limited our sample to adolescents 12-17 years of age, N=29,617. The study was approved by the Albert Einstein College of Medicine Institutional Review Board.

Measures:

Independent Variables:

Adverse Childhood experiences:

In the 2016-2017 NSCH, caregivers were asked whether their child had experienced any of nine adverse experiences in childhood (Table1). All questions were derived from a modified version of the Centers for Disease Control (CDC) and Kaiser Permanente Adverse Childhood Experiences Study.¹ ACEs totals were tabulated for responses of having experienced an ACE, and then collapsed into a dichotomous ACEs score of lower "0-3" or higher "≥4". Four or more ACEs have been associated with poor physical and mental health outcomes in both adults and children.^{1,10,23}

Resilience Factors:

Questions used to assess family resilience, neighborhood cohesion, and caregiver emotional supports are noted in Table 2. Family resilience was measured by a 4-item index established by the NSCH (Table 2).²⁴ For our analysis, we dichotomized family resilience factors as “higher” family resilience for “most” or “all of the time” responses to all 4 questions and “lower” family resilience for “most” or “all of the time” responses to 0-3 questions as defined in the codebook.

Neighborhood cohesion was measured using 3 questions. Question 1 was derived from responses to three sub-questions (see Table 2). In the NSCH scoring algorithm, parent responses to question 1 were transformed into a dichotomous variable: living in a supportive neighborhood vs. not living in a supportive neighborhood. Questions 2 and 3 specifically addressed neighborhood and school safety. Caregivers responded on a 4-point Likert scale: never, sometimes, usually, or always. Responses of never, sometimes, or usually/always were analyzed as dummy variables in regression models. Previously published papers have assessed these individual safety variables, highlighting important distinctions and relationships.²⁵⁻²⁷ We subsequently analyzed each variable individually.

Caregiver emotional support was provided as a single dichotomized variable: “having” vs “not having emotional support”. Children whose parents had someone to turn to for day-to-day emotional support with parenting or raising children, either a spouse, family member, close friend, health care provider, places of worship/religious leader, support/advocacy group related to special health care condition, peer support, counselor/other mental health professional or other people, were reported as having emotional support (Table 2).

Scoring of the resilience factor variables was accomplished using algorithms provided within the NSCH codebook and showed relatively high internal consistency and reliability.^{9,25,27,28}

Dependent Variable

Current Depression

Caregivers were asked whether a doctor or other health care providers had ever told them that their child had depression. Caregivers who answered “yes” were further asked whether the child currently had the condition, and this assessed prevalence of depression. Only children with a reported current diagnosis of depression were considered as a positive diagnosis consistent with previous published literature using the NSCH dataset.^{10,27,29}

A panel of experts was consulted for measure development. Assessments of these measures showed relatively high internal consistency and reliability.^{9,25,27,28} These measures have subsequently been used in other published articles and in the development of other measures.

29-31

Study Covariates:

Sociodemographic characteristics of one adolescent and caregiver per household were collected in the NSCH. For adolescents, these characteristics reported by the caregiver included: age (in years), sex, race/ethnicity (non-Hispanic white, Hispanic, non-Hispanic black, and multi-racial/other) and insurance type (public only, private only, combination of public and private, uninsured, and other). The characteristics of caregivers included: education (less than high school, high school or GED, some college or technical school, and college degree or higher), caregiver marital status/family structure (2 parents married, 2 parents unmarried, single mother, other), income level of household as percentage of Federal Poverty Level (FPL) (0-99% FPL, 100-199% FPL, 200-399% FPL, 400% FPL or more) and parent nativity (2 US born parents, only one parent born in the US, 2 non-US born parents but child born in the US).

Statistical analysis

We used descriptive statistics to calculate proportions of the characteristics of our study population. We used χ^2 tests for categorical variables to examine bivariate relationships between “no reported diagnosis” and “current reported diagnosis” of depression, ACEs, each resilience factor, and study covariates. Resilience score was tabulated from the 4 family resilience questions, 3 neighborhood cohesion questions, and 1 caregiver emotional support question, which resulted in a score ranging from 0-8. Histograms of the total resilience factor variable stratified by 1) lower vs higher ACEs and 2) current diagnoses of depression, were visually assessed. These graphs had similar distributions with steepest slope at approximately 4 resilience factors before plateauing. Therefore, resilience was dichotomized to lower (0-3) vs higher (≥ 4) resilience factors. Sensitivity analysis was conducted with logistic regression models at different levels of dichotomized resilience and with resilience score as an ordinal variable (Appendix table 8).

As we cannot determine which exposure came first, ACEs or resilience factors, we decided a priori and based on the literature, to test the effect modification of resilience on ACEs and the reported diagnosis of depression in adolescents.³⁰ The moderator (i.e. resilience factor) would affect the direction and/or strength of the relation between the independent variable (ACEs) and the dependent variable (reported diagnosis of depression).³⁰

Covariates were chosen based on literature search and clinical importance. We initially included all the demographic covariates with statistically significant association at the 0.05 level with depression in each model. We used purposeful selection multivariable logistic regression model building to assess the associations between the dependent variable, independent variables, and study covariates. Significant variables at alpha 0.05 level in the logistic regression models remained in the final main effect models. The model results are presented as adjusted odds ratio (aOR) with 95% confidence interval. Unweighted likelihood ratio test was used to assess

model fit for a model with and without resilience factors. The statistical software could not use weighted models to test likelihood ratio.

These are the models:

Model 1: assessed the association of a reported diagnosis of depression and ACEs. (See Table 5)

Model 2A and 2B: assessed the association of a reported diagnosis of depression, ACEs, lower (0-3) vs higher (≥ 4) resilience factors and related interaction term (See Table 4 and 5)

We ran tests to see if the data met the assumption of collinearity for variables in the regression models. Model fit was adequate for each model, assessed using Hosmer-Lemeshow goodness-of-fit. Significance was assessed at a 2-tailed α of 0.05. Statistical analyses were performed using Stata/IC (v 16.1, College Station, TX).³¹

Additional statistical analysis was conducted and are presented in the Appendix. We assessed the association of a reported diagnosis of depression, ACEs and all the individual resilience factors, which were included together in one model (See Appendix Table 6). Effect modification was assessed by the inclusion of these interaction terms into the regression models (Appendix Table 7). A statistically significant interaction at $\alpha < 0.05$ was considered positive interaction. We also assessed a model of a reported diagnosis of depression with only the statistically significant resilience factors (Appendix Table 9).

RESULTS

Study Sample

Our study sample consisted of 29,617 adolescents between 12-17 years of age, representing an estimated 24,837,790 U.S. adolescents. Table 3 shows reported sample

characteristics and the bivariate associations of adolescents with or without a reported diagnosis of depression. There was a statistically significant difference in the association of a reported diagnosis of depression and adolescent sex, race/ethnicity, parent nativity, spoken home language, family structure, highest education of adult in family, insurance status, federal poverty level, ACEs and resilience (Table 3). The analysis showed high Cronbach Alphas (0.91-0.94) and that multicollinearity was not a concern (VIFs=1.24-4.67).

Associations Between Caregiver Report of Current Diagnosis of Depression, Lower vs Higher ACEs and Lower vs Higher Resilience among Adolescents (Table 4)

All models were adjusted for adolescent sex, race, insurance status, parent nativity and marital status. Higher ACEs were associated with higher odds of a current reported diagnosis of depression (adjusted odds ratio [aOR]: 2.65; 95% confidence interval [CI]: 2.01-3.48), while higher resilience lowered odds of a reported diagnosis of depression (aOR: 0.34; 95% CI: 0.27-0.45) in adolescents. Sensitivity analysis with resilience dichotomized at 0-2 vs ≥ 3 , 0-3 vs ≥ 4 and 0-4 vs ≥ 5 , and resilience as an ordinal variable showed similar results (Appendix Table 8). Having no parent born in the US compared with 2 US-born parents (aOR: 2.04; 95% CI 1.19-3.51), living in a single mother household compared to a married 2 parent household (aOR: 1.47; 95% CI: 1.16-1.88), having public insurance or mixed public and private insurance compared to private insurance (aOR: 1.82; 95% CI 1.44-2.30 and aOR: 1.88; 95% CI 1.20-2.96 respectively), were associated with higher odds of having a current reported diagnosis of depression. Being Hispanic or non-Hispanic, Black adolescent compared to being non-Hispanic, White was associated with lower odds of reported current diagnosis of depression (aOR: 0.64; 95% CI: 0.47-0.87 and OR: 0.55; 95% CI: 0.38-0.78). Being an adolescent male was also associated with lower odds of having a reported diagnosis of depression (OR: 0.73; 95% CI: 0.60-0.89).

Association Between Caregiver Report of Current Diagnosis of Depression, ACEs, Resilience and the Interaction Between ACEs and Resilience Category (Table 5)

Next, we examined the role of resilience in the relationship between ACEs exposure and depression. When adjusting for demographic covariates, adolescents with higher ACEs had threefold higher odds of having a reported diagnosis of depression (aOR 3.08; 95% CI 2.36-4.01) Further adjustment for resilience lowers the odds by 14% (aOR: 2.65; 95% CI 2.01-3.48)

After adjustment for covariates and individual resilience factors, adolescents with higher ACEs had increased odds of having a reported diagnosis of depression (aOR 2.49 95% CI: 1.90-3.26) (Appendix Table 6). Higher family resilience was associated with lower odds of having a reported diagnosis of depression (aOR: 0.49, 95%CI: 0.40-0.61), adjusting for other covariates (Appendix Table 6). Caregivers who somewhat agreed their adolescent was safe at school (aOR: 1.62; 95% CI: 1.29-2.05) or somewhat/definitely disagreed (aOR: 4.49; 95%CI: 2.92-6.92) had increased odds of reported diagnosis of depression compared to caregivers who definitely agreed, when adjusting for other covariates (Appendix Table 6).

Each resilience factor when added one at a time, lowered the odds of an adolescents' reported diagnosis of depression and lowered the odds of adolescents with higher ACEs having a reported diagnosis of depression in the logistic regression model (Appendix Table 7). Neighborhood cohesion, specifically school safety had the largest decrease of 15.26% in the effect of higher ACEs on reported diagnosis of depression in adolescents: (OR: 3.08; 95%CI 2.36-4.01 compared to OR: 2.61; 95%CI: 1.99-3.42) (Appendix Table 7). Interaction terms of resilience factors and ACEs added to logistic regression models were not statistically significant (Appendix Table 7).

DISCUSSION

In this analysis of a nationally representative adolescent population, we found that higher extrinsic resilience (≥ 4 resilience factors) was associated with lower odds of a reported current diagnosis of depression. This finding is consistent with other studies that have shown the mitigating effect of resilience on negative health outcomes.^{12,17,32} Unique to this study was the focus on the extrinsic resilience factors of family resilience, neighborhood cohesion, and caregiver emotional support in relation to reported diagnosis of depression among adolescents. We found that even for adolescents with higher ACEs exposure, adjusting for extrinsic resilience factors lowered the odds of a reported current diagnosis of depression by 14%. We found that each specific resilience factor, independently and significantly lowered the odds of a reported diagnosis of depression even when adjusting for ACE exposure. Notably, there was no effect modification between extrinsic factors and ACEs on the reported diagnosis of depression. This suggests an alternate relationship of ACEs and resilience. Komro *et al.* suggest that prevention of ACEs is the most effective when started early in life.³³ They suggest improving resilience throughout childhood and adolescence could provide additional protection.³³ More studies are needed to assess the temporal relationship of ACEs and resilience on negative health outcomes such as depression. Future studies conducting mediation analyses to further assess this relationship should be considered.

When identifying resilience factors to address mental health issues, prior studies focused on intrinsic factors such as an individual's ability to cope with stress and adversity.³⁴ Our study highlights the importance of family and community based resilience. Whiteker *et al.* also found that family connection in childhood may influence flourishing decades later, even with early adversity.³⁵ When we adjusted for all resilience factors concurrently in one model, only family resilience and neighborhood cohesion, specifically school safety, maintained statistical significance. Our study suggests that these two resilience factors could be key players in mitigating the diagnosis of depression in adolescents. An interesting question for future studies

is if there is any additional benefit to increasing resilience beyond a specific threshold, such as in individuals with high family resilience and neighborhood cohesion? These are important considerations especially in resource limited areas where targeted interventions may be designed to promote specific, high yield resilience factors. Also, which resilience factor predominates may be sample dependent.

Another interesting finding of our study was the protective role school safety played relative to the other resilience factors. Adolescents in the US spend nearly half of their waking time at school.³⁶ Sadly, some adolescents report being victimized or engaging in or being exposed to violence in school which increases concerns about school safety.³⁷ This study adds to the growing literatures that advocate for school safety initiatives, which could utilize the social-ecological framework to promote resilience.^{20 38} For example, focusing on interactions between families and schools working together to mutually support a young person's positive development.^{20 38}

We also found interesting associations between demographic characteristics and a reported diagnosis of depression in adolescents. Notably, living with a single mother and having public insurance, which are proxy indicators of socio-economic status (SES), were associated with higher odds of a reported current diagnosis of depression. We also found that having no parent born in the US versus 2 US-born parents was associated with higher odds of a reported current diagnosis of depression. This was consistent with growing social determinants of health literature highlighting children of lower SES and racial and ethnic minorities are at increased risk of deleterious health outcomes.³³ We found that being Hispanic or non-Hispanic, Black compared to being non-Hispanic, White or having only one parent born in the US compared to 2 US-born parents was associated with lower odds of reported current diagnosis of depression. A possible hypothesis is that minority populations may have limited access to care thus reducing opportunities for diagnosis. Another hypothesis is that individuals from minority backgrounds

might be less willing to disclose mental health symptoms due to stigmatization concerns.³⁹ After adjusting for these demographic covariates, higher family resilience and neighborhood cohesion still lowered the odds of an adolescent's reported diagnosis of depression. This reinforces how well-functioning family support systems could help protect minority children from the negative behavioral and health-related consequences of stress.⁴⁰

Finally, caregiver emotional support is significantly associated with lower odds of reported current diagnosis of depression when considered individually without other resilience factors. The social-ecological framework highlights how different distal social interaction has the potential to influence child development indirectly.²⁰ Communities that facilitate social networks provide supportive caregiver relationships, which promote quality child rearing.²⁰

Currently, many adolescents and their caregivers are facing an unprecedented global pandemic with numerous idiosyncratic factors (e.g. financial hardships, virtual schooling) that are affecting their physical, psychological and emotional well-being.⁴¹ Promoting extrinsic resilience could be one of many solutions. As Brown *et al.* highlighted in *Let's Not Settle for Getting Back to "Normal" – Addressing ACEs and Health Behaviors in the Wake of the COVID-19 Pandemic*, health providers have the unique opportunity to redefine a new "normal" by taking this opportunity to advance policy and clinical care to address ACEs and improve health outcomes.⁴²

Limitations

Our findings should be viewed in the context of several limitations. Although, our analysis was weighted, we cannot make assumptions that our results can be applied to all adolescents. The sample demographics were skewed towards US-born, non-Hispanic, White, college educated,

upper socioeconomic populations and therefore associations may not account for nuanced relationships present in differing subpopulations.

Given the cross-sectional design, the results could only be interpreted as associations with no inferences made about causal relationships. As this was a nationally distributed survey, questions were already predetermined, and measures of resilience were not based on validated screening tools although a panel of experts was consulted for measure development. The survey relies on a caregiver's report of a diagnosis of depression, the validity or method of diagnosis cannot be verified. Notably ACEs and resilience factors were also parent reported and limited in number based on the survey questions. Other potential confounding factors could not be completely eliminated. The potential effect of timing of ACEs experiences could not be examined because information of the specific age of childhood ACEs was not collected. Finally, potential for recall bias or even normal but inaccurate responses to socially desirable worded questions may have yielded unreliable responses and might explain surprisingly high rates of resilience in the population.

Conclusion

In this nationally representative sample, family resilience, neighborhood cohesion, and caregiver emotional support were associated with lower odds of reported diagnosis of depression even when adjusting for ACEs. The results of our study are encouraging and should guide further research for systemic interventions to boost extrinsic resilience factors. Future directions include verifying these relationships in more diverse populations, tailoring targeted resilience interventions to communities and adolescents with complex psycho-social circumstances utilizing the social-ecological framework. Building multi-level, targeted resilience interventions could be our beacon of hope and may lead to better outcomes.

Table 1: Adverse Childhood Experiences Questions

Parents were asked whether or not their child had experienced any of the following:

- 1 Hard to get by on family's income*
 - 2 Parent or guardian divorced or separated
 - 3 Parent or guardian died
 - 4 Parent or guardian served time in jail
 - 5 Saw or heard parents or adults slap, hit, kick punch one another in the home
 - 6 Was a victim of violence or witnessed violence in neighborhood
 - 7 Lived with anyone who was mentally ill, suicidal, or severely depressed
 - 8 Lived with anyone who had a problem with alcohol or drugs
 - 9 Treated or judged unfairly due to races/ethnicity
-

*Response options of "somewhat often" or "very often" were coded as having this ACE, a response of "rarely" or "never" was coded as not having this ACE.

Questions 2-9 were coded as having or not having experienced the ACE

Table 2: Specific Resilience Factors Questions**Cronbach
Alpha**

Family Resilience: When your family faces problems, how likely were you to do each of the following:

	All of the time	Most of the time	Some of the time	None of the time	
1 Talk together about what to do					0.905
2 Work together to solve our problems					0.907
3 Know we have strength to draw on					0.907
4 Stay hopeful even in difficult times					0.903

Neighborhood Cohesion: To what extent do you agree with these statements about your neighborhood or community:

	Definitely agree	Somewhat agree	Somewhat disagree	Definitely disagree	
1 Child lives in a supportive neighborhood if*:					
a) people in my neighborhood help each other out					0.905
b) we watch out for each other's children in this neighborhood					
c) when we encounter difficulties, we know where to go for help in our					0.905

community					
		Definitely agree	Somewhat agree	Somewhat/definitely disagree	
					0.906
2	Child lives in a safe neighborhood				0.905
3	Child is safe at school				0.938
Caregiver emotional support:				Yes	No
1	During the last 12 months, was there someone that you could turn to for day-to-day emotional support with parenting or raising children?				0.917
					0.918
*children were considered to live in supportive neighborhoods if their parents reported “definitely agree” to at least one of the items and “somewhat agree” or “definitely agree” to the other two items					

Table 3: Caregiver Report of Adolescent Demographic Characteristics, Stratified By Reported Current Diagnosis Of Depression

Characteristic	Weighted Percentage of Adolescents With or Without Reported Diagnosis of Depression (N =24,688,075**)		
	Without Depression (weighted N=23,246,461)	With Depression (weighted N=1,441,783)	P value*
Total Adolescents (N=24,837,790)	94.2	5.8	-
Sex			<0.001
Female	48.5	56.2	
Male	51.5	43.8	
Race/Ethnicity			0.006
Non-Hispanic, White	51.2	58.8	
Other	9.7	9.3	
Hispanic	24.2	17.0	
Non-Hispanic, Black	14.8	14.8	
Parent Nativity**			<0.001
All parents born in the US	66.1	72.7	
Only one parent born outside the US	26.8	13.4	
2 non-US born parents (child born in the US)	7.1	13.9	
Home Language**			0.002
English	85.9	93.7	
Other than English	14.3	6.3	
Family Structure**			<0.001
Two parents, currently married	66.7	48.1	

Single mother	16.9	27.1	
Other family structure	9.3	17.1	
Two parents, not currently married	7.1	7.7	
Highest Education of Adult in Family**			0.039
College degree or higher	46.0	38.0	
Some college or technical school	22.9	27.7	
High school or GED	20.9	23.1	
Less than high school	10.2	11.2	
Insurance Status**			<0.001
Private only	60.8	43.7	
Public only (govt assistance)	27.4	43.1	
Uninsured	7.1	5.0	
Public and private	4.8	8.2	
Federal Poverty Level			0.001
400% FPL or greater	31.9	27.4	
200-399% FPL	27.1	23.2	
100-199% FPL	21.5	23.1	
0-99% FPL	19.5	26.3	
ACEs Category**			<0.001
None to lower (0-3)	92.8	73.6	
Higher (4 or more)	7.2	26.4	
Resilience Score			<0.001
Higher Resilience (4 or more)	91.8	77.3	
Lower resilience (0-3)			

8.2

22.7

All proportions were weighted to represent the US population ages 12-17.

*Reported p value of chi-square tests comparing the proportion of children with or without parent reported diagnosis of current depression.

**missing data resulting in lower N

Table 4: Association Between Caregiver Report of Current Diagnosis of Depression, ACEs (Lower vs Higher) And Resilience (Lower vs Higher)

Model 2A

	aOR (95% CI)	P value
Sex		
Male	0.73 (0.60-0.89)	0.002
Race/Ethnicity		
Non-Hispanic, Black	0.55 (0.38-0.78)	0.001
Hispanic	0.64 (0.47-0.87)	0.004
Other/Multi-racial (ref. white)	0.87 (0.60-1.24)	0.43
Parent Nativity		
Only one parent born outside US	0.52 (0.36-0.75)	<0.001
2 non-US born parents (ref. both parents born in the US)	2.04 (1.19-3.51)	0.01

Family Structure		
2 parents, unmarried	1.14 (0.78-1.67)	0.69
Single mother	1.47 (1.16-1.88)	0.002
Other (ref 2 married parents)	0.80 (0.54-1.17)	0.25
Insurance status		
Public only	1.82 (1.44-2.30)	<0.001
Mixed public and private	1.88 (1.20-2.96)	0.006
Uninsured (ref Private insurance)	1.03 (0.67-1.58)	0.91
ACEs Category		
Higher ACEs (4 or more)	2.65 (2.01-3.48)	<0.001
Resilience Category		
Higher Resilience (4 or more)	0.34 (0.27-0.45)	<0.001
Adjusted odds ratios for all variables in the table: demographic covariates + ACEs + Resilience Category		
CI = confidence interval		

Table 5: Association Between Caregiver Report of Current Diagnosis of Depression,

ACEs, Resilience and the Interaction Between ACEs And Resilience Category

Models 1, 2A and 2B		
Variables	aOR (95% CI)	P value
Model 1		
ACEs Category		
Higher ACEs (4 or more)	3.08 (2.36-4.01)	<0.001
Model 2A (as shown in Table 4)		
ACEs Category		
Higher ACEs (4 or more)	2.65 (2.01-3.48)	<0.001
Resilience Category		
Higher resilience (4 or more)	0.34 (0.27-0.45)	<0.001
Model 2B		
ACEs Category		
Higher ACEs (4 or more)	2.41 (1.84-3.15)	<0.001
Resilience Category		
Higher resilience (4 or more)	0.306 (0.22-3.49)	<0.001
ACEs*Resilience	1.40 (0.78-2.49)	0.26

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Conflicts of Interest

The authors have no financial relationships to disclose and no conflicts of interest to resolve.

What's New

The novel application of socioecological framework to examine the potential effect modification of multiple extrinsic resilience factors on youth exposed to ACEs. This analysis found extrinsic resilience lowers the odds of a reported diagnosis of depression in adolescents.

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