



# Relationship Between Adverse Childhood Experiences and Resilience in College Students in China

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## Abstract

A great body of literature has documented that adverse childhood experiences (ACEs) are related to individuals' psychological functioning and mental health. However, the majority of ACE studies focus on psychological dysfunction and less is known about how ACEs are associated with other positive psychological outcomes, including resilience. The current study assessed the relationship between ACEs and resilience, using a sample of college students in China. We hypothesized that college students who had ACEs would have lower levels of resilience. Data came from 1,871 college students from twelve colleges in China through an anonymous online survey between late September and early October 2020. Linear regression analyses were conducted. Aligned with our hypotheses, ACEs had a negative association with individuals' resilience. Despite several limitations, this study found a negative association between ACEs and college students' resilience. Preventive services and interventions are in need to protect individuals from ACEs.

**Keywords** Adverse childhood experiences · Resilience · College students · China

## Introduction

Adverse childhood experiences (ACEs) are events that are potentially traumatic and occur in childhood (0–17 years old), including child abuse, neglect, and various household challenges, such as domestic violence and mental illness in the household (Felitti et al., 1998; Hughes et al., 2017). ACEs are a prevalent social issue in the U.S. In the original ACEs study, Felitti and colleagues (Felitti et al., 1998) surveyed 8,056 adults who had completed a standardized

medical evaluation at a large HMO about their adverse experiences in childhood. The results suggested that more than half of respondents (52%) reported at least one type of ACEs, and about one-fourth of respondents reported having multiple types of ACEs. More recently, Merrick and colleagues (Merrick et al., 2018) used the data from the Behavioral Risk Factor Surveillance System (BRFSS) survey to estimate the prevalence of ACEs across 23 states in the U.S. and found that among the 214,157 participants, roughly 62% had at least one type of ACEs, and about 38% reported having more than one type of ACEs. In recent decades, the research interest toward ACEs has been greatly grown in China. So far, several studies have estimated the prevalence of ACEs using different samples in China. For instance, Xiao et al. (2008) surveyed a sample of 2,073 medical students in Anhui province and found that 68.9% of respondents had at least one type of ACEs. Ding et al. (2014) collected data from 189 adults in a drug rehabilitation center in China and found that slightly over half of them (50.5%) had at least one type of ACEs. In another study, Zhang, Mersky, and colleagues (2020a) analyzed the data from 1,019 rural high school graduates from three provinces of China and described that 75.0% of participants reported at least one ACE.

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A large body of literature has documented that individuals with ACEs are prone to have maladaptation and impaired physical and psychological well-being (e.g., Bayarri et al., 2011; Felitti et al., 1998; Herrenkohl et al., 2013; Karatekin & Ahluwalia, 2020; Kim & Cicchetti, 2010; Lanier et al., 2018). For instance, using a group of college students in the U.S., Karatekin and Ahluwalia (2020) assessed the effect of ACEs, perceived stress, and perceived social support on individuals' physical and mental health. Results indicated that ACEs were associated with poorer mental health. However, the majority of ACEs studies focus on psychological dysfunction (Dube et al., 2001; Forster et al., 2020; Greeson et al., 2014; Lanier et al., 2018), and less is known about how ACEs are associated with other positive psychological outcomes, including resilience.

Resilience is a two-dimensional concept encompassing both the occurrence of challenging events and individuals' positive adaptation when experiencing the challenges (Luthar et al., 2000; Rutter, 2006). When individuals face various risks and challenges throughout their lifetime, resilience can help them adaptively cope with the corresponding stress and promote positive development (Bajaj & Pande, 2016; Rutter, 2006). Researchers have different insights concerning the nature of resilience (Fletcher & Sarkar, 2013; Herrman et al., 2011). Some define resilience as the absence of psychopathological symptoms and other negative outcomes during adversity (e.g., Graham-Bermann et al., 2009; Howell et al., 2010; Martinez-Torteya et al., 2009); while others define resilience as a trait, a personal characteristic that enables individuals to adapt to adverse circumstances (Bajaj & Pande, 2016; Connor & Davidson, 2003). The current study is in favor of the latter definition and conceptualizes resilience as an inherent trait-like ability to cope with adversity. Resilience is an important indicator of positive psychological functioning, which stresses human capacities to cope with adversity (Ryff & Singer, 1996).

Examining the relationship between ACEs and resilience amongst college students is needed. First of all, college students are one population that is at risk of having ACEs. Individuals may be exposed to ACEs up to age 17, which corresponds to the age that individuals attend college. Shouldering such adversity, students' college life may be compromised. Second, college students are at a critical life stage in which they try to explore and identify their life roles, educational aspiration, and occupational interest (Hutchison, 2015). Resilience is an important factor to facilitate individuals to achieve these goals and to accomplish ideal outcomes. Therefore, the current student aims to assess the relationship between ACEs and resilience, using a college sample from China.

## ACEs and Resilience

Researchers have put great effort into investigating the relationship between ACEs and resilience. Several studies considered resilience as a personal trait and examined the relationship between ACEs and resilience (Campbell-Sills et al., 2009; Yu et al., 2020). For instance, Yu and colleagues (Yu et al., 2020) examined the relationship between childhood abuse and neglect on resilience using 237 American and 347 Chinese individuals. The results suggested that childhood abuse and neglect had distinct relationships with resilience between two cultural groups. Specifically, for the American sample, childhood neglect, but not abuse, was associated with impaired resilience; while for the Chinese sample, only childhood abuse had significant and negative associations with individuals' resilience. In other words, the Chinese subjects were more sensitive to childhood abuse while the American counterparts were more sensitive to childhood neglect (Yu et al., 2020). Additionally, based on a community sample in the U.S., Campbell-Sills and colleagues (Campbell-Sills et al., 2009) found that heightened levels of child maltreatment were associated with diminished levels of resilience in adulthood. Some other studies (e.g., Graham-Bermann et al., 2009; Howell et al., 2010; Martinez-Torteya et al., 2009; McGloin & Widom, 2001; Spaccarelli & Kim, 1995; Wright et al., 2005) assessed the relationship between subtypes of ACEs and resilience, considering resilience as the absence of psychopathological symptoms, termed as relative resilience (Domhardt et al., 2015; Luthar et al., 2000). For example, Howell and colleagues (Howell et al., 2010) conceptualized resilience as strengths in emotion regulation and prosocial skills and investigated the relationship between preschoolers' exposure to intimate partner violence (IPV) and resilience. This study found that less severe IPV exposure was related to higher resilience. Moreover, Wright and colleagues (Wright et al., 2005) assessed resilience by four domains: absence of depressive symptoms, physical health status, perceived parental competence, and marital satisfaction. This study found that mothers who had a history of child sexual abuse were more likely to have higher levels of depressive symptoms.

Among the established evidence, however, very few of them concentrate on college samples. As discussed beforehand, college is a critical stage for individuals, and resilience is an important quality that facilitates accomplishing goals. Therefore, the current study will examine the relationship between ACEs and resilience using a college sample from China. Herrman et al. (2011) argue that multiple factors can influence resilience, including personal factors, biological factors, environmental-systemic factors, and the interaction

between personal, biological, and environmental factors. Personal factors refer to various personality traits and characteristics, such as openness, internal locus of control, self-esteem, and optimism that can contribute to resilience. Biological factors include the influence of physical changes in the brain, such as the sensitivity of receptors and neural networks, on resilience. Environmental-systemic factors represent the factors that exist in both microenvironmental and macro-systemic levels. Some microenvironmental factors include relationships with family and peers, parent–child attachment, family stability, and absence of mental illness in parents (Herrman et al., 2011). ACEs may influence resilience through some microenvironmental factors, such as parent–child relationship/attachment and family stability. However, instead of promoting resilience, ACEs may impede individuals' resilience by dampening the parent–child relationship/attachment through child abuse and neglect, threatening family stability due to parental separation or divorce, and increasing individuals' exposure to mental illness in the household. Thus, individuals with ACEs experiences may have reduced resilience.

## Method

### Data and Sample

The data were collected from junior and senior students at twelve colleges in China through an online anonymous survey. The participating colleges were from the north, south, east, west, and middle regions of China, ensuring a regionally diverse sample. We contacted the department of social science at each college and invited junior and senior students to participate in this study. A total of 2,229 students received the initial invitation for the survey in late September 2020 and two reminders about survey participation on the fourth and eighth following days, respectively. We provided an informed consent form to every student before the survey, which indicated their voluntary-based participation and their rights to not participate or terminate participation at any time. Data collection lasted until early October 2020. After excluding ten responses with incomplete answers, the final analytic sample was 1,781, resulting in a response rate of 80%. The research protocol was reviewed and approved by the review committee at one co-author's institution in China.

Table 1 displays the descriptive statistics of the controlled characteristics. The average age of the sample was 20.62 years old ( $SD=0.96$ ), and about two-thirds (66.97%) of the sample were female. More than half of the participants had city household registration (52.37%), followed by rural household registration (38.70%) and city but prior rural household registration (8.93%). Over 60% (60.72%) of the

**Table 1** Descriptive statistics of covariates

	Mean (S.D.)
Gender [%]	
Female	66.97
Male	33.03
Age	20.62 (0.96)
Household registration [%]	
Rural	38.70
City	52.37
City but prior rural	8.93
Grade [%]	
Junior	60.72
Senior	39.28
Ethnicity [%]	
Han	89.36
Others	10.64
Parent marital status [%]	
Married	89.04
Separated	0.80
Divorced	6.89
Widowed	2.35
Others	0.91
Parent highest education achievement [%]	
Elementary school or below	6.90
Junior high school	28.11
High school	25.17
College or above	39.82
Family income	90,990 (122,030)
Receiving social welfare [%]	
No	74.72
Yes	25.28
Number of family members	3.87 (1.16)
COVID-19 infection in family and friends [%]	
No	99.14
Infected	0.48
Dead	0.37
College [%]	
College 1	7.11
College 2	9.57
College 3	6.25
College 4	10.85
College 5	10.15
College 6	7.06
College 7	6.41
College 8	11.54
College 9	11.12
College 10	2.46
College 11	6.89
College 12	10.58

Note:  $N=1871$

participants were in their junior year, compared to 39.28% in their senior year. The majority of the sample (89.36%) self-identified as Han ethnicity. Close to 90% (89.04%) of the students reported their parents' marital status was married, while 6.89% reported their parents were divorced. The percentages of separated and widowed parents were lower than 3%. Most parents (39.82%) were reported as receiving a college-level education or above, followed by junior high school (28.11%), high school (25.17%), and elementary school of below (6.90%). The annual family income in the past year was 90,990 RMB (about 13,580 USD) in the past year, with an SD of 122,030 RMB (about 18,170 USD). One-fourth of the participants (25.28%) reported a family history of receiving social welfare last year. The number of family members was 3.87 on average ( $SD = 1.16$ ). The sample had a diverse college composition, as each college occupied at least 2.46% of the final sample, while no college occupied more than 12%.

## Measures

### Dependent Variable

Resilience was measured using Wagnild's (2016) 14-item Resilience Scale instrument (RS-14), a concise format of the Resilience Scale (Wagnild & Young, 1993). RS-14 evaluates five characteristics of individual resilience, including a meaningful and purposeful life, perseverance, equanimity, self-reliance, and existential aloneness, that can alleviate the detrimental effects of adverse life conditions on psychological adjustment (Wagnild, 2016; Wagnild & Young, 1993). A meaningful and purposeful life refers to individuals having clear goals and values about life; perseverance represents the persistence to face difficulties in the midst of adversity; equanimity indicates individuals' ability to endure life stress, remain composed and optimistic in difficult situations, and endeavor for opportunities; self-reliance occurs when individuals learn problem-solving skills from challenges; and existential aloneness means individuals feel comfortable to manage things on their own (Aiena et al., 2015). Examples of items of the RS-14 include: "When I'm in a difficult situation, I can usually find my way out of it;" "I feel proud that I have accomplished things in life;" "I feel that I can handle many things at a time;" and "My life has meaning." The RS-14 has shown satisfactory validity and reliability across racially and ethnically diverse samples (Aiena et al., 2015; Damásio et al., 2011; Pritzker & Minter, 2014). Moreover, the RS-14 has demonstrated adequate reliability among Chinese samples (Shi et al., 2015; Tian & Hong, 2013). Participants were asked to rate how strongly they identified themselves with each item in the past four weeks on a 7-point Likert scale (1 = strongly disagree and 7 = strongly

agree). The resilience variable was constructed by summing up the scores of all items, yielding a possible score ranging from 14 to 98. Higher scores indicate higher perceived resilience. The Cronbach's alpha of these items was 0.92 in this study.

### Independent Variable

Adverse childhood experiences (ACEs) were measured by the CDC-Kaiser ACE scale (Center for Disease Control and Prevention [CDC], 2021). The ACE scale includes 10 items, which assess three dimensions of ACEs during individuals' first 18 years of life, including abuse, neglect, and household challenges. Specifically, the abuse dimension contains questions about emotional abuse ("Did a parent or other adult in the household often: Swear at you, insult you, put you down, or humiliate you? Or Act in a way that made you afraid that you might be physically hurt?"), physical abuse ("Did a parent or other adult in the household often: Push, grab, slap, or throw something at you? Or Ever hit you so hard that you had marks or were injured?"), and sexual abuse ("Did an adult or person at least 5 years older than you ever: Touch or fondle you or have you touch their body in a sexual way? Or Try to or actually have oral, anal, or vaginal sex with you?"). The neglect dimension evaluates emotional neglect ("Did you often feel that: No one in your family loved you or thought you were important or special? Or Your family didn't look out for each other, feel close to each other, or support each other?") and physical neglect ("Did you often feel that: You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you? Or Your parents were too drunk or high to take care of you or take you to the doctor if you needed it?"). Household challenges include questions about parental separation or divorce ("Were your parents ever separated or divorced?"), battered mother ("Was your mother or stepmother: Often pushed, grabbed, slapped, or had something thrown at her? Or Sometimes or often kicked, bitten, hit with a fist, or hit with something hard? Or Ever repeatedly hit over at least a few minutes or threatened with a gun or knife?"), household substance abuse ("Did you live with anyone who was a problem drinker or alcoholic or who used street drugs?"), mental illness in the household ("Was a household member depressed or mentally ill or did a household member attempt suicide?"), and an incarcerated household member ("Did a household member go to prison?"). Participants answered each item in a "yes-or-no" format. A "yes" response to any of the questions identified the participant as having at least one type of ACE. We further constructed ACEs as a continuous variable by assigning one point to each affirmative answer and summing all items. The continuous ACE score ranged between 0 to 10, with higher scores suggesting the occurrence of more types of ACEs.

## Covariates

We controlled for individual and family characteristics that might confound the relationship between ACEs and resilience based on previous literature (Chen et al., 2021; Campbell-Sills et al., 2009; Hu et al., 2015; Wasonga et al., 2003). Individual characteristics include participants' age, gender (male vs. female), ethnicity (Han ethnicity vs. other), and the type of household registration (rural, city, and city but prior rural). Family characteristics include parents' marital status (married vs. separated vs. divorced vs. widowed), parents' highest level of education (elementary school or below vs. junior high school vs. high school vs. college or above), number of family members, annual family income in the past year, and receiving social welfare in last year (yes vs. no). Since the data collection was conducted during the COVID-19 pandemic, we also controlled the COVID-19 infection among family members and friends, guided by the growing evidence of the effect of COVID-19 on individuals' psychological well-being (Ye et al., 2020; Zhang et al., 2020a, b). This study also includes a college-fixed effect to control for college characteristics on individual resilience. The college-fixed effect, in consideration of the possibility that college characteristics, such as college culture, may influence individuals' mental health and well-being (Fletcher, 2010).

## Analytical Strategies

We first undertook descriptive analyses to examine the distribution of main variables. Then, linear regression analyses were conducted to evaluate the net effect of ACEs on individual resilience when all covariates were controlled for. We hypothesized that ACEs were negatively associated with resilience, above and beyond individual and family characteristics and college. STATA software 16.0 was used for all analyses.

## Results

Table 2 presents the distributions of the main dependent and independent variables. The average score of resilience was 68.64, with a range of 14–98 and a standard deviation (SD) of 13.42. More than one-third (35.16%) of the sample reported the occurrence of at least one type of ACE in the first 18 years of their lifetime. The ACE score was 0.69 on average ( $SD = 1.28$ ), ranging from 0 to 10. The analytic sample reported a mean score of 0.28 on the abuse dimension ( $SD = 0.63$ ), 0.15 on the neglect dimension ( $SD = 0.41$ ), and 0.26 ( $SD = 0.61$ ) on household challenges. Among the ten ACE items, 14% of the sample reported parental separation or divorce, followed by emotional neglect (12%), emotional

**Table 2** Descriptive statistics of resilience and adverse childhood experience

	Mean (S.D.)
Resilience [14–98]	68.64 (13.42)
Adverse childhood experience [%]	35.16
Adverse childhood experience [0–10]	0.69 (1.28)
Abuse [0–3]	0.28 (0.63)
Emotional abuse [%]	0.11
Physical abuse [%]	0.06
Sexual abuse [%]	0.11
Neglect [0–2]	0.15 (0.41)
Emotional neglect [%]	0.12
Physical neglect [%]	0.03
Household challenges [0–5]	0.26 (0.61)
Parental separation or divorce [%]	0.14
Battered mother [%]	0.02
Substance abuse in the household [%]	0.02
Mental illness in the household [%]	0.05
Incarcerated household member [%]	0.03

$N = 1871$

abuse (11%), sexual abuse (11%), physical abuse (6%), and mental illness in the household (5%). The reported percentages of physical neglect, an incarcerated household member, battered mother, and substance abuse in the household were all at 3% or below.

The regression results of resilience are shown in Table 3. Model 1 presents the standardized estimates of the occurrence of ACEs (i.e., having at least one type of ACEs vs. none) and other variables on the resilience score. Supporting our hypotheses, the occurrence of any ACE was negatively associated with resilience. Participants who had ACEs reported lower resilience compared to those who never had ACEs ( $\beta = -0.10$ ,  $p < 0.001$ ). Several covariates had significant associations with resilience as well. Participants' resilience increased as they were older ( $\beta = 0.07$ ,  $p < 0.05$ ) and as the annual family income increased ( $\beta = 0.05$ ,  $p < 0.05$ ). When participants had more family members, their resilience decreased ( $\beta = -0.06$ ,  $p < 0.05$ ). The adjusted R-square of Model 1 was 0.05. Following the same method to produce Model 1, we regressed the resilience score on the main independent variables and covariates in Model 2, except replacing the occurrence of ACEs with the ACE score. Model 2 indicates that the ACE score had a negative association with resilience ( $\beta = -0.15$ ,  $p < 0.001$ ).

We further investigated the associations between ACEs and resilience by dimensions and items. We followed the same analyses in Model 2 of Table 3 as it has a higher adjusted R-square than Model 1. Specifically, the ACEs score was replaced by one of ACEs dimensions or individual items in each regression while controlling for other

**Table 3** Regression analysis of resilience

	Model 1			Model 2		
	$\beta$	S. E	<i>P</i>	$\beta$	S. E	<i>P</i>
Adverse childhood experiences [%]	-0.10	0.68	***	–	–	
Adverse childhood experience [Score]	–	–		-0.15	0.25	***
Female	0.00	0.71		0.00	0.70	
Age	0.07	0.39	*	0.06	0.39	*
Household registration						
Rural (reference category)	–	–		–	–	
City	-0.01	0.85		-0.02	0.85	
City but prior rural	-0.04	1.14		-0.03	1.14	
Junior year	0.01	0.76		0.01	0.76	
Han ethnicity	0.01	1.02		0.01	1.02	
Married parents	-0.03	1.04		-0.03	1.02	
Parents' level of education						
Elementary school or below (reference category)	–	–		–	–	
Junior high school	-0.01	1.32		-0.02	1.32	
High school	0.03	1.39		0.02	1.38	
College or above	0.09	1.48		0.07	1.47	
Family income	0.05	0.30	*	0.05	0.30	*
Welfare status	0.02	0.79		0.01	0.78	
Number of family members	-0.06	0.29	*	-0.06	0.29	*
COVID-19 infection in family and friends	-0.10	3.33	***	-0.09	3.34	***
College fixed effects	Yes			Yes		
Adjusted R-square	0.05			0.06		

*N* = 1871. *p* < .05, \*\* *p* < .01, \*\*\* *p* < .001

covariates in the model. The Bonferroni test was employed to adjust multiple comparisons. The adjusted critical *p*-value was the significant level of the critical *p*-value divided by the number of tests performed ( $0.05/14 = 0.0035$ ). Table 4 only displays the estimates of ACE dimensions and individual items for simplicity. The results of other variables were comparable to those in Table 3. Consistent with the results of Model 2 in Table 3, all three dimensions of the ACE scale had negative associations with resilience after employing the Bonferroni adjustment. The neglect dimension had the strongest association with resilience ( $\beta = 0.13$ ), followed by the abuse dimension ( $\beta = -0.12$ ) and household challenges ( $\beta = -0.10$ ). Several ACE items also had significant and negative associations with resilience, among which emotional abuse had the most negative association with resilience ( $\beta = -0.12$ ), followed by emotional neglect ( $\beta = -0.11$ ), substance abuse in the household ( $\beta = -0.11$ ), physical neglect ( $\beta = -0.09$ ), and physical abuse ( $\beta = -0.08$ ).

## Discussion

This study examined the relationship between ACEs and college students' resilience in China. This study found a dose–response association between ACEs and resilience.

Particularly, as the number of the types of ACEs increased, individuals' resilience decreased. Further analysis also showed that three ACE subscales and the majority of ACE items were significantly associated with resilience, after controlling for multiple comparisons. Consistent with the referred conceptual framework, the findings demonstrate that ACEs can dampen individuals' resilience. Existing studies primarily assessed the protective effect of resilience on the detrimental outcomes of ACEs (e.g., Clements-Nolle & Waddington, 2019; Poole et al., 2017; Young-Wolff et al., 2019; Zetino et al., 2020), but relatively few studies examined the net effect of ACEs on resilience. This study contributes to the literature by demonstrating the impeded resilience among college students who had ACEs. Furthermore, this study implies a future research direction of investigating the mechanisms between ACEs and resilience. According to Herrman et al.'s (2011) factors of resilience, research can explore how different personal factors (e.g., internal locus of control), biological factors (e.g., the neural networks), and microenvironmental factors (e.g., parent–child attachment) explain the relationship between ACEs and resilience. Along a similar vein, Grych and colleagues' (Grych et al., 2015) resilience portfolio model also suggests potential mechanisms by which the distress is avoided, such as supportive relationships, interpersonal strengths, and coping strategies.

**Table 4** Regression analysis of ACE on resilience

	Resilience			Adjusted <i>P</i>
	$\beta$	S. E	<i>P</i>	
Whole ACE scale				
Adverse childhood experience	-0.15	0.25	***	***
Three dimensions				
Abuse	-0.12	0.49	***	***
Neglect	-0.13	0.74	***	***
Household challenges	-0.10	0.55	***	***
Individual items				
Emotional abuse [0–1]	-0.12	0.99	***	***
Physical abuse [0–1]	-0.08	1.28	***	***
Sexual abuse [0–1]	-0.06	0.98	*	
Emotional neglect [0–1]	-0.11	0.93	***	***
Physical neglect [0–1]	-0.09	1.91	***	***
Parental separation or divorce [0–1]	-0.04	1.08		
Battered mother [0–1]	-0.05	2.09	*	
Substance abuse in the household [0–1]	-0.11	2.24	***	***
Mental illness in the household [0–1]	-0.06	1.45	**	
Incarcerated household member [0–1]	-0.04	1.89		

*N* = 1871. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Adjusted *P* was the significant level of the critical *p*-value divided by the number of tests performed, 14

Hamby and colleagues (Hamby et al., 2018) describe the range of strengths that helps individuals recover from adversity as poly-strengths and indicate that the total number of strengths in an individual's portfolio may be more important for avoiding stress and advancing healthy functioning than one particular strength. Thus, future studies should consider the mechanisms between adversity and subsequent resilience from a poly-strength perspective. At the same time, resilience can be a mediator between ACEs and various outcomes, given the significant role of resilience on individual well-being (Hartley, 2011; Hu et al., 2015). Some evidence has been established. For instance, Tranter et al. (2020) examined whether resilience could explain the relationship between ACEs and posttraumatic growth, individuals' positive changes after the psychological struggle with stressful life events (Tedeschi & Calhoun, 2004), and found that ACEs had an indirect and negative effect on individuals' posttraumatic growth through reduced resilience. Future studies should extend this knowledge by exploring whether resilience explains the effect of ACEs on other outcomes.

Compared to previous studies, our sample reported a lower prevalence of ACEs. For instance, by analyzing 1,019 young adults from three Chinese provinces, Zhang, Mersky, and associates (2020a) found that about 75% of participants

reported the occurrence of ACEs in their lifetime, while the prevalence of ACEs in the current study was 35.16%. Fu et al.'s (2018) systematic review also suggests a higher rate of child maltreatment among Chinese college students, ranging between 52.3% and 75.6%. The divergent findings may be explained by the different sociodemographic characteristics of the samples. Particularly, Zhang et al. (2020a, b) findings were drawn from a group of young adults in rural China, whereas the majority of our sample (61.3%) lived in urban cities. Studies have argued that rural populations may at greater risk of child maltreatment and domestic violence than the urban population in China (Ji et al., 2013; Lin et al., 2011; Song et al., 2020; Zhang Mersky, & Topitzes, 2020; Zhang et al., 2020b). Therefore, the relatively advanced socioeconomic status of our sample is likely to reduce the representativeness of our findings. Meanwhile, the estimates of ACEs may differ by measurement tools, as indicated by Fu et al.'s (2018) systematic review. Particularly, Yu et al. (2020) utilized Childhood Trauma Questionnaire (Bernstein et al., 2003), while we used the CDC-Kaiser ACE scale. Due to the lack of national surveillance data on ACEs in China, estimates of the prevalence are from various individual studies and varied greatly (Fu et al., 2018). Thus, we call for a national epidemiological survey on ACEs to better tap the prevalence and significance of ACEs in China.

Several other limitations should be aware of when interpreting the findings. First of all, information gathered on key variables was from participants' self-reports, which may be subject to intentional or unintentional reporting errors. Future studies could triangulate data sources, such as from family members and peers, to reduce report errors. Second, the cross-sectional data could only establish associative relationships, and a temporal sequence between variables cannot be established. In future studies, longitudinal data will enable researchers to examine the variables in time order and track the change of resilience over time. Third, other unobserved variables could influence resilience but were omitted in the study, such as ongoing adverse experiences and peer relationships. One evidence to notice is that while the examined relationships are significant, the magnitude is quite small, ranging between -0.05 to -0.15. This indicates that many other unobserved variables affect resilience while are omitted in the study. Fourth, the generalizability of the findings is limited to the college population in China. Future studies should consider employing random sampling to obtain more representative results.

Furthermore, the relationship between ACEs and resilience could differ by culture. Personal characteristics, such as resilience, are sensitive to cultural context. For instance, members of individualistic countries focus more on themselves and their immediate families, while members of collectivist countries concentrate more on immediate and extended families as well as larger ingroups (Hofstede,

1984). Satterwhite and Luchner (2016) argued that cultural differences between collectivism and individualism might influence individuals' resilience. Moreover, as indicated by Yu et al. (2020), American and Chinese individuals' resilience was sensitive to different types of child maltreatment, such that Chinese individuals' resilience may be more sensitive to child abuse relative to American individuals. Thus, the relationships between ACE dimensions and resilience may differ by students' cultural backgrounds. A multi-culture comparison study may be warranted to further explore the relation between ACEs and resilience.

Despite the limitations, the current study adds to the literature the relationship between ACEs and individuals' resilience during the pandemic. Childhood adversity is detrimental to children's normal developmental trajectories and can result in maladaptation (Cicchetti, 2010). Thus, to protect individuals from ACEs and to promote children's positive development, preventive services are needed in China. For instance, school social workers can implement more comprehensive assessment tools to screen school-aged children's ACE history. Home-based interventions may be considered as a tool to prevent inappropriate parenting behaviors and child abuse and/or neglect (DuMont et al., 2008; Eckenrode et al., 2000).

## Conclusion

This study investigated the relationship between ACEs and college students' resilience in China. The findings reveal that ACEs had a negative association with individuals' resilience. Considering the vital role of resilience on individuals' mental health and well-being, it is recommended to conduct studies to examine the mechanism between ACEs and resilience as well as the mediational effects of resilience that explain the detrimental consequences of ACEs on individuals. Innovative services are expected to protect individuals from ACEs.

## Declarations

**Conflict of Interest** The authors declare that they have no conflict of interest.

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