



The impact of adverse childhood experiences on depression: the role of insecure attachment styles and emotion dysregulation strategies

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Abstract

Objectives: The previous studies have reported that adverse childhood experiences (ACEs) can have detrimental effects on victims' attachment styles, emotion regulation strategies and depression. How the insecure attachment styles and emotion dysregulation strategies play a role in the relationship between ACEs and depression among Chinese university students remains unclear. **Methods:** The research was made known to students studying at universities in China. Five hundred and eighty-nine college students completed questionnaires measuring ACEs, insecure attachment styles, emotion dysregulation strategies and depression. Sequential chain mediation model was built by Mplus. **Results:** The model showed that insecure attachment styles and emotion dysregulation strategies mediated the relationship between ACEs and depression respectively. Moreover, the sequential chain mediation showed an indirect path (ACEs - insecure attachment styles - emotion dysregulation strategies - depression). **Conclusion:** Following childhood adversities, students can experience elevated depression which is influenced by attachment styles and emotion regulation strategies.

Keywords Adverse childhood experiences · Insecure attachment Styles · Emotion dysregulation strategies · Depression

Introduction

Adverse childhood experiences (ACEs) are characterized as various forms of physical and emotional abuse, neglect, and dysfunctional family relationships that occur during childhood (e.g., Kuhlman et al., 2018; Santoro et al., 2018). The World Health Organization 2022 reported the data on major childhood adversities that nearly 3 in 4 children aged 2–4 years regularly suffer physical punishment or psychological abuse; and one in five females and 1 in 13

males have been sexually abused aged 0–17 years (WHO, 2022). There was a high prevalence of multiple childhood adversities among respondents with any childhood adversity (55.3–66.2%; Kessler et al., 2010). Based on these statistics, childhood adversities are also common among university students. McGuire and London (2020) reported that about 24% of university students have experienced at least one type of child abuse. Consistent with the previous finding that domestic violence and maltreatment predicted poorer academic performance (Coohy et al., 2011; Ye & Chung, 2022) reported even higher rates of childhood physical abuse, emotional abuse, and sexual abuse (i.e., 28.5%, 35.5%, and 31.5%, respectively) and physical neglect and emotional neglect (i.e., 46.4% and 64.2%) among the young adults in associate's college, the majority of whom scored lower in the National College Entrance Examination on the national norm.

Individuals with these adversity experiences, such as abuse and neglect, were especially prone to depressive symptoms (Infurna et al., 2016; Roxburgh & Rhea MacArthur, 2018). For example, Gould et al. (2021) reported that 56.9% of participants with childhood trauma were diagnosed with depression. Individuals in response to exposure to long-term external stress (ACEs in this case), become

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increasingly sensitized to stress and then produce many distressing emotions so that even minor stresses generate increasingly negative emotions (i.e., depression) with each subsequent exposure (e.g., Harkness et al., 2015). Thus, it is important for individuals to regulate their present negative emotions adequately. When individuals cannot adequately modulate distress leading to moodiness and emotional hypersensitivity as well as overreacting to stressful events (Briere, 1992), the increasing depth of these distressing emotions results in depressive symptoms. According to the self-trauma model (Briere, 1992), when children experience childhood adversities (such as abuse, neglect, and household dysfunction), they may experience overwhelming and ongoing negative emotions, which induce the development of emotion dysregulation (Bacon & Charlesford, 2018; Ruocco et al., 2018; Ye et al., 2021).

Compared to emotion regulation which is the ability to modulate emotions and use adaptive strategies to deal with emotions, emotion dysregulation means individuals have a difficult time modulating emotion to deal with their emotions (i.e., blaming, suppression) (Gross, 2014). Emotion dysregulation is typically considered a childhood developmental problem. People build and develop their emotion regulation skills as they grow. More specifically, the development of emotion regulation is a process of trial and error. When people encounter difficulties (e.g., a fall) that result in negative emotions, they will try to seek support from someone close to them (e.g., caregivers) to reduce negative emotions. These acts of seeking are an inborn affect regulation device designed to protect an individual from physical and psychological threats and to alleviate distress (Mikulincer et al., 2003a). However, children in adversity (i.e., abuse, household dysfunction, or neglect) can have a poor or unsupportive family relationships. Because these relationships are difficult to provide enough supportive responses, children cannot reduce distress via support and may learn from others' negative reactions to deal with their emotions (Burns et al., 2012). Therefore, living in adversities and lacking support can hinder the acquisition of appropriate emotion regulation skills (e.g., Burns et al., 2010). Consequently, individuals may become accustomed to suppressing or avoiding negative emotions. However, such strategies belong to dysregulation, and relying on them only offers short-term relief rather than long-term benefits (Szepeswol & Simpson, 2019).

As more emotional pains accumulate, the threshold for reactivity to stressful events decreases; therefore, depressive reactions occur even to mild stressors (Cheong et al., 2017; Klumpp et al., 2019). Some studies reported that ACEs elevate emotion dysregulation resulting in mental health problems, such as more depressive and anxious symptoms (Cloitre et al., 2019; McLafferty et al., 2020). For example,

Cloitre et al. (2019) found from 290 female participants that emotion regulation significantly mediated the path of ACEs to physical/ mental health. McLafferty et al. (2020)'s study based on 739 university students also supported the mediated role of emotion regulation in the link from ACEs to psychopathology and suicidality.

Caregivers' unsupportive behaviors in ACEs families also affect the development of secure attachment (Cooke et al., 2019). According to Bowlby's attachment theory (Bretherton, 1992), people are born to seek support and maintain proximity with caregivers to satisfy their needs. The interaction between children and caregivers creates a close attachment bond, and then children internalize this bond, which affects their attachment styles (Sherman et al., 2015; Sroufe et al., 2005). For example, children attract their caregivers' attention for requiring care through some signals, such as crying. When children signal to seek help, if their caregivers provide timely positive feedback and emotional communication, children who receive reliable and consistent care can develop secure attachment (Bretherton, 1992; Cassidy, 1994). In contrast, those who experience insensitive, inconsistent caregiving or maltreatment, subsequently develop insecure attachment (such as avoidance, anxiety, or disorganization), due to the perception of others as unreliable and untrustworthy (Corcoran & McNulty, 2018; Cyr et al., 2010; Howe, 2005; Widom et al., 2018; Zietlow et al., 2017). Attachment bonds formed during childhood can have lasting effects on adult relationships. Research has shown that individuals tend to prioritize romantic partnerships from adolescence onward (Fraleigh, 2019; Freeman & Simons, 2018; Theisen et al., 2018; Umemura et al., 2018). Those who feel insecure about their parental bonds may struggle with trust and close relationships as adults. These insecure attachment styles have been found to predict higher rates of depression (Dagnino Robles et al., 2017). A previous study (Corcoran & McNulty, 2018) among 190 university students displayed the mediated role of insecure attachment in the impact of ACEs on depression.

Therefore, both insecure attachment and emotion dysregulation could play an important role in the link between ACEs and depression. Research has shown that attachment and emotion regulation are closely intertwined, yet the nature of this relationship remains complex and requires further examination. Previous studies indicate that attachment persists throughout the life cycle and is inseparable from emotion regulation (Hazan & Selcuk, 2015). The attachment system can be viewed as a type of emotion-regulating system (Gillath et al., 2016), in which regulation strategies are seen as extensions of internal models that guide behavior in relationships (Gardner et al., 2020; Malik et al., 2015). These findings suggest that individuals' patterns of emotion regulation when developing and

building romantic attachments may be influenced by their primary emotional connections with their parents, as well as the continued influence of later relationships (Fávero et al., 2021). These patterns may have significant repercussions on the formation and success of new relationships as individuals continue to construct new attachments throughout their lives.

For example, children with secure attachment actively seek caregivers' help, given that they know their caregivers can support them. The emotional communication process helps children learn to accept, positively reappraise or put their distress into perspective (Cassidy, 1994), while children with insecure attachment show the opposite (Howe, 2005). Children who have experienced rejection from their caregivers, such as a lack of response, or intrusiveness, such as discouragement of negative emotions, may develop an avoidant attachment style that leads them to minimize displays of negative emotion when dealing with distress (Movahed Abtahi & Kerns, 2017; Van Ijzendoorn et al., 1999). This can have lasting effects on their ability to regulate emotions and form healthy attachments later in life. Children who have experienced inconsistent and unpredictable responses from their caregivers, such as punishment, may develop an anxious-ambivalent attachment style that leads them to maximize or hyperactivate the expression of negative emotion to draw the attention of their inconsistent caregiver (Brenning & Braet, 2013; Movahed Abtahi & Kerns, 2017; Van Ijzendoorn et al., 1999). They may be highly attuned to signs of rejection from their partner, and catastrophize their emotions. Those with avoidant attachment styles may display hypoactivation of emotions, aiming to suppress negative emotions elicited by the fear of rejection (Mikulincer & Shaver, 2019; Simpson & Rholes, 2017; Umemura et al., 2018). This can lead them to appear cold and distant, and they may avoid emotional closeness and

intimacy as a way of protecting themselves from potential rejection.

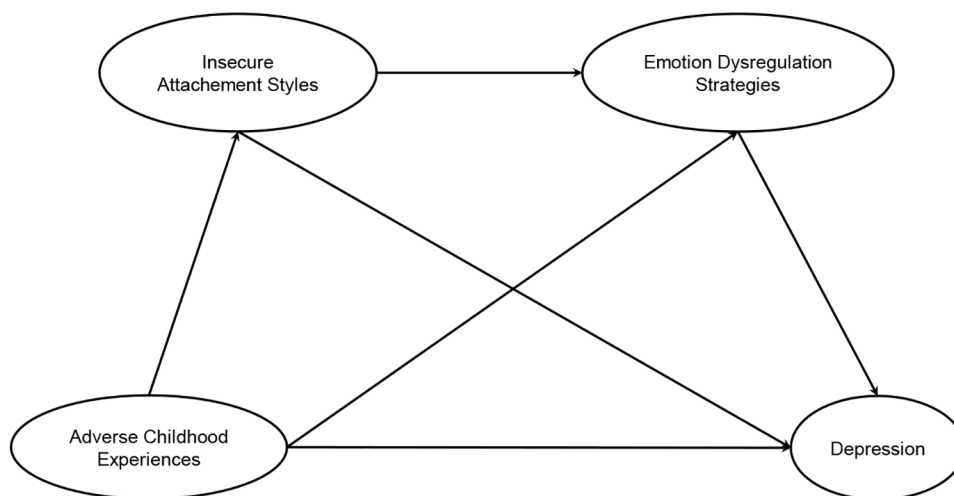
Based on the studies mentioned above, it is clear that childhood attachment styles can predict adulthood attachment patterns, which can have a significant impact on people's emotional experiences and the strategies they use to regulate their emotions. As such, the current study hypothesizes that insecure attachment styles can lead to the development of dysregulation strategies for managing emotions. The aims of the current study are to examine the relationship between insecure attachment styles and emotion dysregulation strategies, and examine the mediated role of insecure attachment styles and emotional dysregulation strategies in the link between ACEs and depression. Specifically, the chain-mediation role (insecure attachment - emotion dysregulation strategies) would be tested first, and then the major mediated role of insecure attachment and emotion dysregulation strategies in this link should be explored (see Fig. 1).

Method

Participants and procedure

The convenience sampling method was used to recruit participants from 85 Chinese universities from September 2020 to January 2021 through online advertisements that explained the study's purpose, procedure, and reward to participants. Written informed consent was obtained from all participants before completing the online questionnaires, and each participant received RMB 125 as remuneration if they had completed all questionnaires. This study was approved by the Ethics Committee of the College of Psychology, Shenzhen University.

Fig. 1 Hypothesized Structure Equation Model



Questionnaires were conducted at three-time points (T1 ~ T3). In September 2020 (T1), 631 participants reported their ACEs history demographic information (i.e., age, gender, and social status). Two months later (T2), 35 participants dropped out, and 596 participants completed questionnaires about insecure attachment styles and emotion dysregulation strategies. In January 2021 (T3), 592 participants reported depression symptoms. Three items tested whether the participants responded carefully to the questionnaires. Namely, participants were asked to choose a specific option in these items (e.g., “please choose 1 in this item”, and were considered as wrongly responding to the item if they chose other options. Participants were only included if they responded correctly to one of the three items. After excluding the three participants for careless responding, the final sample consisted of 589 college students who had completed all items of the questionnaires across the three-time points. Therefore, 589 participants were included in the statistical analysis ($M_{\text{age}} = 20.42$ years, $SD = 1.58$; 26.7% males).

Measures

Adverse childhood experiences

Individuals’ adverse childhood experiences (ACEs) were measured at T1 using the Adverse Childhood Experiences Questionnaire (Felitti et al., 1998), which measures the prevalence of childhood adversities experienced by participants before the age of 18. The 29-item questionnaire assesses exposure to ten categories of ACEs, including 8 items related to abuse (emotional abuse, physical abuse, and sexual abuse), 10 items related to neglect (emotional neglect and physical neglect), and 11 items related to family dysfunction (i.e., domestic violence, living with household members who were substance abusers, mentally abnormal or criminal, parental separation, or divorce). Each item related to abuse (emotional and physical), domestic violence, and neglect (emotional and physical) was rated on a scale of *never* = 1, *once or twice* = 2, *sometimes* = 3, *often* = 4, and *very often* = 5, while items related to sexual abuse and other household incidents were rated as either *yes* = 1, or *no* = 0. Based on the criteria established by Dong et al. (2004), each item was then coded as 1 for those who had experienced the ACE, and 0 for those who had not. Ten binary indicators were then generated by averaging scores within dimensions. At last, based on previous studies, the participant was considered to have experienced at least one type of childhood adversity if their total score on the Adverse Childhood Experiences Questionnaire was higher than zero (e.g., Bieles et al., 2016; Chapman et al., 2004).

The scoring criteria for each dimension as below. Participants were classified as experiencing physical abuse (coded

as 1) if they reported being pushed, grabbed, slapped, or threw something “often, or very often”, or hit so hard that they had marks or injured “sometimes, often, or very often”. Emotional abuse was defined as having occurred “often” or “very often” (coded as 1). And the experience of domestic violence was defined as any circumstance where a father pushed, grabbed, slapped, threw something, kicked, bit, or hit their mother with fists or hard objects “sometimes, often, or very often” or continued to hit her for a long time or threatened or hurt her with a knife or gun “once or twice, sometimes, often, or very often” (coded as 1). As for the neglect subscale, emotional or physical neglect experiences were coded as 1 when their total scores exceeded 15 and 10, respectively. Experiences of sexual abuse and other household issues were coded as 1 when participants responded “yes” to these experiences. In the present study, internal consistency for the mean score was high ($\alpha = 0.87$).

Insecure attachment styles

Insecure attachment styles were measured at T2, using the Insecure Attachment subscale from the Attachment Style Questionnaire (ASQ; Chinese version), developed for adults (Zhang & Chen, 2020). The subscale is a 32-item 6-point Likert scale from 1 (strongly disagree) to 6 (strongly agree) reported rating the probability of adopting such attachment styles. Insecure attachment styles contain four dimensions (discomfort with closeness, relationships as secondary, need for approval, and preoccupation with relationships). They demonstrated good reliability in the previous study (Cronbach’s $\alpha = 0.68 \sim 0.83$). Cronbach’s α was 0.90 for the subscale in the present sample.

Emotion dysregulation strategies

Emotion dysregulation strategies were assessed at T2, using The Dysregulation Strategies subscale from the Chinese version of the Cognitive Emotion Regulation Questionnaire (CERQ; Zhu, 2007). The subscale is a 16-item rated on a 5-point Likert scale from 1 (never) to 5 (always). It has demonstrated good reliability (Cronbach’s $\alpha = 0.83$). This subscale includes four negative strategies (self-blame, rumination, catastrophizing, and other-blame) that were averaged, with higher mean scores suggesting a more probability of adopting dysregulation strategies. Cronbach’s α was 0.88 for the sub-scale in the present sample.

Depression

Depression symptoms were assessed at T3 by the Chinese version of the Beck Depression Inventory-II (BDI-II; Yang et al., 2014). The scale consists of 21 items ranging from 0

to 3 for each, indicating the severity of individual depressive symptoms in the past two weeks. Cronbach's α was 0.89 for the scale in our sample.

Demographics

Participants provided demographic information at T1, including sex (i.e., sex assigned at birth; 0 = male, 1 = female), age, and social status. Social status was assessed by one item. Participants were asked to imagine a ladder representing ten social status grades and then to report their subjective feelings about it. The higher scores indicate higher social status levels regarding their salary, education, and vocation.

Data analysis

Bivariate correlations between variables were examined using SPSS 24.0. The structural equation model (SEM) was employed with maximum likelihood estimation by Mplus 7.0 to examine the path of ACEs on depression with insecure attachment styles and emotion dysregulation strategies as sequential mediators. In order to reduce the model complexity, two kinds of parceling approaches were applied to form the parcels. First, for multidimensional variables (i.e., ACEs, insecure attachment styles, and emotion dysregulation strategies), parcels were created using a domain representative approach by combining items within the same facets into the specific item sets. Second, for unidimensional variables (i.e., depression), parcels were created by combining items based on the order of factor loadings in the unidimensional confirmatory factor analysis. The model simultaneously included gender, age, and social status as the covariates. The bias-corrected bootstrap method (1000 times) was used to compute the 95% confidence interval to test the indirect effects. The indirect effects were considered significant if the 95% confidence interval did not contain zero (Wen & Ye, 2014). The goodness of model fit was determined by the Comparative Fit Index (Macfie et al., 2005) value > 0.90 , Tucker-Lewis Fit Index (TLI) > 0.90 , Standardized Root Mean Square Residual (SRMR) < 0.05 , and Root

Mean Square Error of Approximation (RMSEA) < 0.08 (Browne & Cudeck, 1993; Hu & Bentler, 1999).

Result

Descriptive statistics and correlation analysis

The descriptive statistics and bivariate correlations for the investigated variables were shown in Table 1. There were significantly positive correlations among ACEs, insecure attachment styles, emotion dysregulation strategies, and depression. Social status was significantly negatively correlated with ACEs, insecure attachment styles, emotion dysregulation strategies, and depression, and age had a significantly positive correlation with ACEs.

Mediation analysis

The structural equation model with standardized path coefficients provided a good fit ($\chi^2 = 466.35$, $df = 66$, CFI = 0.92, TLI = 0.91, SRMR = 0.05, RMSEA = 0.06). As detailed in Fig. 2; Table 2, insecure attachment styles ($\beta = 0.02$, BC 95% CI [0.00, 0.06]) and emotion dysregulation strategies ($\beta = 0.11$, BC 95% CI [0.06, 0.18]) mediated the ACEs-depression link. In addition, the sequential chain mediation analysis showed an indirect path from ACEs to insecure attachment styles to emotion dysregulation strategies to depression ($\beta = 0.04$, BC 95% CI [0.01, 0.09]), and ACEs had no significant direct effect on depression ($\beta = 0.04$, $SE = 0.07$, $p = .54$). Next, the regression analysis further examined the relationship between specific insecure attachment styles and emotional regulation strategies. The result indicated that among all insecure attachment styles, preoccupation with relationships ($\beta = 0.21$, $p < .01$) and need for approval ($\beta = 0.21$, $p < .01$), showed relatively higher effect sizes when predicted emotion dysregulation strategies than discomfort with closeness ($\beta = 0.11$, $p = .01$) and relationships as secondary ($\beta = 0.07$, $p = .10$). In sum, after controlling covariates, we found the full mediation effects for depression via insecure attachment and emotion

Table 1 Means, SDs, and bivariate correlations among study variables

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Sex	0.73	0.44	—						
2. Age	20.42	1.58	−0.08	—					
3. Social status	4.76	1.47	−0.03	0.01	—				
4. ACEs	0.13	0.17	0.02	0.09*	−0.21**	—			
5. Insecure attachment styles	3.63	0.52	0.04	−0.03	−0.12**	0.17**	—		
6. Emotion dysregulation strategies	2.60	0.55	0.08	−0.03	−0.18**	0.23**	0.48**	—	
7. Depression	0.48	0.39	0.04	−0.05	−0.13**	0.16**	0.37**	0.46**	—

Note. Significant coefficients are highlighted in bold. ACEs = Adverse Childhood Experiences.

* $p < .05$. ** $p < .01$.

Fig. 2 The Structure Equation Model of Association between ACEs and Depression

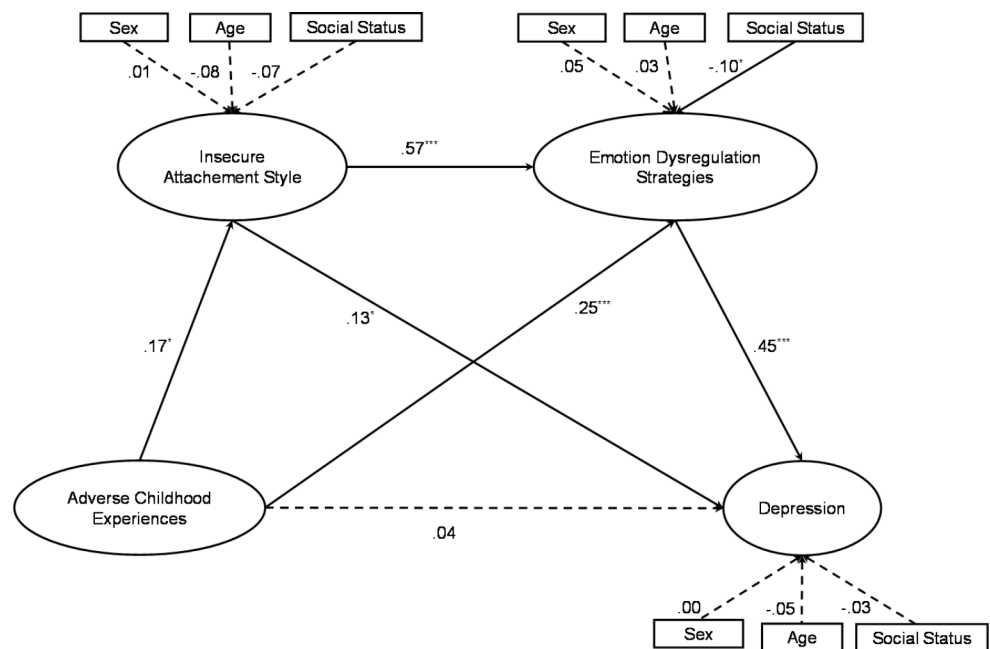


Table 2 Chain mediation effects of ACEs on depression via insecure attachment styles and emotion dysregulation strategies

Effects	β	SE	p	BC 95% CI	
				Lower	Upper
Direct effects					
ACEs → Depression	0.04	0.07	0.54	—	—
ACEs → Insecure Attachment styles	0.17	0.07	0.02	—	—
Insecure Attachment Styles → Depression	0.13	0.06	0.04	—	—
ACEs → Emotion dysregulation strategies	0.25	0.06	<0.001	—	—
Emotion dysregulation strategies → Depression	0.45	0.07	<0.001	—	—
Insecure Attachment styles → Emotion dysregulation strategies	0.57	0.07	<0.001	—	—
Indirect effects					
ACEs → Insecure Attachment Styles → Depression	0.02	0.01	—	<0.001	0.06
ACEs → Emotion dysregulation strategies → Depression	0.11	0.03	—	0.06	0.18
ACEs → Insecure Attachment Styles → Emotion dysregulation strategies → Depression	0.04	0.02	—	0.01	0.09

Note. ACEs = Adverse Childhood Experiences, BC = Bias-Corrected, CI = confidence interval.

dysregulation strategies. Participants with higher ACEs reported higher levels of insecure attachment styles and emotion dysregulation strategies, thus increasing the severity of depression symptoms. Specifically, the mediation via emotion dysregulation strategies accounts for the major effect of ACE on depression (64.70%), and the chain mediation via insecure attachment and then emotion dysregulation accounts for 23.53% in the ACE-depression link, while the mediation of insecure attachment accounts for 11.76%. The supplementary analysis also indicated the serial effect from ACE to emotion dysregulation, insecure attachment, and then depression ($\beta=0.03$), with a relatively smaller effect size (see Supplementary Material).

Discussion

The present study investigated the relationship between adverse childhood experiences (ACEs), insecure attachment, emotion dysregulation and depression among Chinese university students. The results showed that first, ACEs predict depression fully via parallel and sequential chain mediation of insecure attachment and then emotion dysregulation. Second, the mediation via emotion dysregulation played a major important role in the ACE-depression link.

The first finding was that insecure attachment styles predicted emotion dysregulation and chain-mediated ACEs' impact on depression. It has been proposed that attachment theory is often cited as an explanatory framework for understanding emotion regulation processes (Mikulincer et al., 2003b; Schore & Schore, 2008). The relationship between attachment and emotion regulation is complex and dynamic,

with each influencing the other in a reciprocal manner. However, some previous studies have treated attachment styles as a predictor of emotion regulation (Brumariu, 2015; Parrigon et al., 2015; Zimmer-Gembeck et al., 2016), and their relationship has a significant history dating back to childhood. When children do not receive consistent and reliable protection and support from their primary caregivers, such as adverse childhood experiences, they may develop insecure attachment styles (Simons et al., 2014; Smith et al., 2016). These experiences can have a lasting impact on children's internal working models, which begin by seeking out connections for survival, forming close attachment bonds, and then internalizing these bonds to form the foundation of their adult attachment style (Sherman et al., 2015; Sroufe et al., 2005). Specifically, due to adverse experiences (such as being ignored, abused, or disorganized parenting), individuals develop over-anxious, emotional, and/or disorganized attachment bonds that mirror the behaviors of their caregivers. As individuals grow and develop, they accumulate a mental record of their experiences with obtaining proximity/comfort or experiencing neglect/discomfort from their caregivers, which they then use to form internal working models of attachment (Sherman et al., 2015). These internal working models can have lasting effects on individuals' ability to form healthy relationships in adulthood, as they transfer these models to their close friends and romantic partners later in life.

For example, people with an avoidant attachment style often hold negative views of others and their environments, which can make them feel uncomfortable when they experience emotional closeness (Pietromonaco & Barrett, 2000). Conversely, people with an anxious attachment style often hold negative self-views and may feel less self-efficient, leading them to over-pursue attention within their relationships (Pietromonaco & Barrett, 2000). Disorganized attachment is a type of fearful-avoidant attachment characterized by high levels of both avoidance and anxiety, leading individuals to exhibit confusing and erratic behaviors in their relationships (Mosquera et al., 2014). Then, individuals' regulatory mechanisms play an important role in helping them navigate difficulties in interpersonal relationships, and they may develop either a hyperactivation or deactivation model to achieve their attachment-directed goals (i.e., hyperactivation to attract care and attention or deactivation to avoid hurt) (Liu & Ma, 2019; Mikulincer et al., 2003b).

The current study further analyzed that among all insecure attachment styles, anxious attachment styles (including preoccupation with relationships and need for approval) more predicted emotion dysregulation strategies. Individuals with anxious attachment are usually over-worried about being neglected and over-expect to be cared for; therefore, they are sensitive to moods and actions, are highly emotional and

lack impulse control (Collins et al., 2006). Thus, they tend to use hyper-activating strategies (Mikulincer et al., 2003a), like ruminative, blaming others, or catastrophizing, to elicit care and attention, given that it is difficult for anxious people to suppress their emotional experiences (Gillath et al., 2005). In contrast to anxious individuals, avoidant individuals tend to fear emotional expression and closeness, which they associate with being hurt. As a result, they are most concerned with protecting themselves from potential harm, and they do so by employing deactivating emotion regulation strategies such as denial and suppression (Mikulincer et al., 2004). Therefore, anxious individuals and avoidant individuals tend to use different dysregulation strategies (i.e., the former uses hyper-activated strategies, and the latter uses deactivated strategies). The current study only examines the hyper-activated strategies (i.e., rumination, catastrophizing, self-blame, and blaming others). Thus, the current study supported the hypothesized link, and the supplemental analysis also found the chain mediation effect with the reverse order between attachment and emotion regulation. Meanwhile, it implies the need to verifying further the causal link between attachment and emotion regulation in the chain mediation effect by cross-lagged design.

Based on the results, the second finding was that emotion dysregulation accounts for the major effect of ACE on depression. This indicates that emotion dysregulation plays an important role in the relationship between ACEs and depression, echoed in previous studies (e.g., Bacon & Charlesford, 2018; Ruocco et al., 2018; Ye et al., 2021). Based on the emotion dysregulation strategies (including catastrophizing, self-blame, and blaming others) used in the current study, people using dysregulation strategies, are more likely to catastrophically think about problems repeatedly and blame others or themselves, which causes more depressive symptoms. The previous studies have examples that when catastrophizing thoughts occur repeatedly, people will delve into many irrational thoughts that consider something much worse than reality (Petrini & Arendt-Nielsen, 2020; Quartana et al., 2009). They treat actual or anticipated negative events as intolerable catastrophes, even for relatively minor problems. Thus, this thinking pattern will expand the negative emotions, resulting in the increasing probability of depressive symptoms (e.g., Gregory et al., 2010; Moore et al., 2018; Noël et al., 2012). When people use blaming strategies, especially blaming others, they defend themselves against being disowned and highly negative parts of the self by attributing their responsibility to others (Malancharu, 2004). This process seems like an act of psychological projection, indicating that they have so much internal distress that they misinterpret inside distress as coming from outside (McWilliams, 2011) to reduce internal distress. However, the more frequently they blame

others for what they have experienced, project their responsibilities and criticize other people for their own drawbacks and weaknesses, the more depressed they become (Oftadehal et al., 2012). Taken together with the finding of chain mediation effect, it is possible that, emotion regulation strategies play the major mediated role in the ACE-depression link for its closer relationship with or more direct effect on depression.

Limitations and Implications

There were still some limitations in the present study, beginning with the sample. This could have been biased in that some might have participated in the research with the hope of alleviating distress through the research. On the other hand, as part of their posttraumatic stress avoidance symptoms, some might have completely avoided participation. This sample bias would have an impact on the generalizability of the findings. Secondly, for matching participants in the longitudinal study, participants also needed to use the same ID to match their identities. Therefore, their answers might have been affected by social approval and so they selected a more positive answer. Thirdly, given that the sample is university students, the sample size's heterogeneity is insufficient to generalize to other groups, such as minorities or youth with low educational levels. At the same time, under the influence of COVID-19, students' mental health might have been influenced. Thus, the results could not be generalized or comparable with the other population under different pandemic situations. Fourthly, two mediators (i.e., insecure attachment styles and emotion dysregulation strategies) were both measured at T2. Thus, the causal relationship between them cannot be adequately demonstrated. However, some previous research has supported the current finding that insecure attachment styles precede the formation of individual emotion dysregulation strategies (e.g., Peng et al., 2021; Cloitre et al., 2008).

Despite these limitations, our findings provided primary evidence of the chain relationship between insecure attachment styles and emotion dysregulation strategies, and provided evidence that dysregulation plays a major mediating role in the relationship between ACEs and depression. These results also have clinical meanings. First, mental health practitioners and counsellors could further understand psychological constructs following ACEs among university students based on the present results and should be aware of the relationship of the present study's variables to elaborate efficient treatment plans. Second, for individuals with ACEs, the core beliefs of treatment should focus on reducing their negative views of the self and the world, reducing over-rumination about their traumatic memories (Danese & Widom,

2020), and guiding them to form positive emotion regulation strategies.

To conclude, the current findings have increased our understanding of how Chinese university students with ACEs develop depressive symptoms. Such depressive symptoms are prone to the influence of avoidance or anxiety attachment styles and dysregulated emotion strategies, such as blaming, catastrophizing, and ruminating. Future studies will benefit from investigating (1) the specific sub-categories of ACE experiences and their associations with different attachment styles; (2) exploring the relationship between specific emotion dysregulation strategies and depression can provide insight into the underlying mechanisms of depression. It can help to better understand the relationship between childhood adversity, attachment styles, and emotion regulation by conducting such research and developing more effective strategies for supporting individuals who have experienced childhood adversity.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s12144-023-04613-1>.

Author Contribution Zilan Ye: Conceptualization, Methodology, Writing - Original Draft, Revision, Supervision.

Xiaoqi Wei: Data curation, Validation, Writing - Original Draft, Revision.

Jieting Zhang: Conceptualization, Writing - Review and Editing, Supervision.

Huilin Li: Data curation, Formal Analysis.

Jiageng Cao: Data collection, Formal Analysis.

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Data Availability Due to the sensitive nature of participants, the data cannot be available to access in public.

Code Availability Not applicable.

Declarations

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Consent to participate All participants were informed consent which explicitly stated the purpose of the study, participation incentives, and the voluntary nature of their participation as well as their rights during the study and the confidentiality of their personal information used in the study.

Consent to publish Informed consent was obtained from participants prior to the study.

Conflict of interest All the authors declare that there is no conflict of interest.

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