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BASIC RESEARCH ARTICLE

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Perceived parental depression and PTSD in adolescents: mediating roles of attachment insecurity and coping style

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ABSTRACT

Background: Earthquakes can cause negative psychological states in adolescents and their parents, such as post-traumatic stress disorder (PTSD) and depression. Previous cross-sectional studies have shown that adolescents who perceive parental depression after an earthquake are more likely to experience PTSD. However, the mechanism underlying this process remains unclear and previous studies have not examined the association between these factors.

Objective: The current study explored the mediating roles of attachment insecurity and coping style in the association between perceived parental depression and PTSD in adolescents after the Jiuzhaigou earthquake.

Method: In total, 391 participants completed follow-up questionnaires at 12, 21, and 27 months (T1–T3, respectively) after the Jiuzhaigou earthquake.

Results: T1 perceived parental depression was not a direct predictor of T3 PTSD in adolescents. In the full mediation model, T1 perceived parental depression predicted T3 PTSD in adolescents indirectly via T2 attachment insecurities through T2 emotion-focused coping.

Conclusion: The findings highlight that attachment insecurity and emotion-focused coping mediated the relationship between perceived parental depression and PTSD in adolescents following an earthquake. To alleviate PTSD in adolescents, efforts should be directed toward reducing perceived parental depressive symptoms and emotion-focused coping, and promoting the formation of secure attachment styles.

Percepción de Depresión Parental y Trastorno de Estrés Postraumático en Adolescentes: Roles Mediadores de la Inseguridad en el apego y el Estilo de Afrontamiento

Antecedentes: Los terremotos pueden causar estados psicológicos negativos en los adolescentes y sus padres, como el trastorno de estrés postraumático (TEPT) y la depresión. Estudios transversales previos han demostrado que los adolescentes que perciben la depresión de los padres después de un terremoto tienen más probabilidades de experimentar TEPT. Sin embargo, el mecanismo subyacente a este proceso sigue sin estar claro y estudios anteriores no han determinado la asociación entre estos factores.

Objetivo: El presente estudio exploró los roles mediadores de la inseguridad en el apego y el estilo de afrontamiento en la asociación entre la percepción de la depresión parental y el TEPT en adolescentes después del terremoto de Jiuzhaigou.

Método: En total, 391 participantes completaron cuestionarios de seguimiento a los 12, 21 y 27 meses (T1–T3, respectivamente) después del terremoto de Jiuzhaigou.

Resultados: La depresión parental percibida en T1 no fue un predictor directo del TEPT en T3 en los adolescentes. En el modelo de mediación completo, la depresión parental percibida en T1 predijo el TEPT en T3 en los adolescentes de manera indirecta a través de las inseguridades en el apego en T2 mediante el afrontamiento centrado en las emociones en T2.

Conclusión: Los hallazgos resaltan que la inseguridad en el apego y el afrontamiento centrado en las emociones mediaron en la relación entre la percepción de la depresión parental y el TEPT en adolescentes después de un terremoto. Para mitigar el TEPT en los adolescentes, los esfuerzos deben dirigirse a reducir los síntomas de depresión parental percibidos y el afrontamiento centrado en las emociones, y promover la formación de estilos de apego seguros.

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Perceived parental depression; attachment insecurity; coping style; post-traumatic stress disorder; adolescents

PALABRAS CLAVE
Depresión parental percibida; Apego inseguro; Estilo de afrontamiento; Trastorno de estrés postraumático; Adolescentes

关键词
感知父母抑郁; 依恋不安全感; 应对方式; 创伤后应激障碍; 青少年

HIGHLIGHTS

- Perceived parental depression after an earthquake is associated with subsequent PTSD symptoms in adolescents indirectly.
- Attachment insecurity and coping styles mediate the relationship between perceived parental depression and PTSD in adolescents.
- Therapy should focus on adolescents' emotional processing after an earthquake to help them cope without resorting to emotion-focused coping.

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青少年中感知父母抑郁和PTSD：依恋不安全感和应对方式的中介作用

背景：地震会导致青少年及其父母出现负性心理状态，例如创伤后应激障碍（PTSD）和抑郁。此前的横断面研究表明，在地震后感受到父母抑郁的青少年更有可能经历创伤后应激障碍（PTSD）。然而，这一过程的机制仍不清楚，之前的研究也没有考查这些因素之间的关联。
目的：本研究在九寨沟地震后青少年中探讨依恋不安全感和应对方式与感知父母抑郁和创伤后应激障碍（PTSD）关联中的中介作用。
方法：共有 391 名参与者在九寨沟地震后 12、21 和 27 个月（分别为 T1-T3）完成了随访问卷。
结果：T1 感知到父母抑郁并不是青少年T3 PTSD 的直接预测因素。在完全中介模型中，T1 感知父母抑郁通过 T2 依恋不安全感和 T2 以情绪为中心的应对间接预测青少年的 T3 PTSD。
结论：研究结果强调，依恋不安全感和以情绪为中心的应对方式中介了地震后青少年感知父母抑郁与 PTSD 之间的关系。为了减轻青少年的PTSD，应努力减少感知父母抑郁症状和以情绪为中心的应对方式，并促进安全依恋风格的形成。

1. Introduction

As major life-threatening traumatic events, natural disasters can cause many psychological problems in adolescents (Baryshnikova & Pham, 2019), such as post-traumatic stress disorder (PTSD; Zhou et al., 2021), which may require intervention. The parents may also be traumatized by natural disasters (Cobham et al., 2016; Juth et al., 2015) and are prone to depression, which is one of the most common mental disorders after an earthquake (Chan et al., 2012). Studies indicated that parents with depression may engage in dysfunctional parenting, which can trigger PTSD in their children (e.g. Eltanamly et al., 2019; Williamson et al., 2017) over the long term. One potential assumption underlying these studies is that children are passively affected by their parents. However, this overlooks the role of children's initiative in the parent–child relationship. In family systems, children have agency and play an active role (Minuchin, 1974). Therefore, whether parents' depression can affect children's likelihood of experiencing PTSD depends on one key factor, which is children's perception and understanding of their parents' depressive symptoms. Children's perceptions of their parents' reactions have a greater likelihood of impacting their mental health than the adverse reactions of the parents themselves (Gaylord et al., 2003; Spitz et al., 2021). Against this background, investigating the impact of children's perception of parental depression on their PTSD is both meaningful and necessary.

This study extends that of Zhou et al. (2021), who found that both types of attachment insecurity could predict adolescent PTSD through perceived parental depression, highlighting the key predictive role of perceived parental depression in adolescent PTSD and suggesting that perceived parental depression played a mediating role in this process. However, some limitations of that study need to be addressed: first, it used a cross-sectional design, and the association among perceived parental depression, attachment insecurity, and PTSD needs to be further examined using prospective data collected across several time points. Second, considering the initiative of adolescents and the findings of Zhou et al. (2021), the question of how perceived parental depression affects adolescent PTSD, which has not been addressed in previous studies, is of greater concern. Third, Zhou et al. (2021) and other previous studies emphasized the independent roles of attachment insecurity and coping style in PTSD, overlooking their combined mediating effects; this limits our understanding of the specific mechanism through which perceived parental depression influences PTSD. To address these issues, this study is the first to adopt a longitudinal design to investigate the effect of perceived parental depression on subsequent adolescent PTSD and the potential underlying psychological mechanisms.

1.1. Effect of perceived parental depression on adolescent PTSD

According to Minuchin (1974), family members affect each other at the individual level, such that the psychological problems of adolescents may be influenced by the perceived negativity of their parents (e.g. perceived parental depression). More severe perceived parental depression was associated with more obvious emotional and behavioural problems in parents during parent–child interactions (e.g. Mun & Lee, 2023; Stearns & McKinney, 2020). Adolescents may perceive parental depression with excessive sensitivity and internalize their parents' negative emotions and behaviours (Zhou et al., 2021), ultimately leading to more severe PTSD symptoms. Thus, we hypothesize that perceived parental depression may exacerbate PTSD symptoms in adolescents.

1.2. Mediating roles of attachment insecurity and coping style

To understand how perceived parental depression relates to PTSD in children, attachment theory

(Bowlby, 1969, 1973, 1990) may provide a useful theoretical framework. Stable and positive parental emotional reactions provide children with a sense of security and promote secure attachment (Ahmetoglu et al., 2018). However, when children perceive their parents to be depressed, it may undermine their security base and increase the risk for attachment insecurity to their parents (Bowlby, 1990). Within the realm of social and personality psychology, attachment insecurity can be categorized into two dimensions: avoidant and anxious attachment (Cassidy & Shaver, 2016). On the one hand, if children perceive parental depression as severe, they might be sensitive and careful, and exhibit a reluctance to mention traumatic events that might 'trigger' their parents. As such, they might be inclined to suppress and avoid negative emotions and behaviours, which correlated to avoidant attachment (Shaver & Mikulincer, 2002). On the other hand, depression and negative emotions perceived in parents might exacerbate those of the children themselves (Larson & Richards, 1994), and associated with anxious attachment (Shaver & Mikulincer, 2002). Anxiously attached individuals worry that others will not be available in times of need and search for love and support, whereas individuals with avoidant attachment distrust others' intentions and show compulsive self-reliance (Bowlby, 1969). These behaviours and beliefs impair social information processing (Sharp et al., 2012) and emotional regulation (Ogle et al., 2016), which increases the likelihood of PTSD (Ogle et al., 2015). Therefore, we hypothesized that perceived parental depression may increase the likelihood of PTSD via its effects on avoidant and anxious attachment.

Furthermore, Attachment theory postulates that, through interactions with parents, adolescents' internal working models are updated and revised over time, which influence their emotion regulation and emotional responses to stress (Bowlby, 1980; Cassidy & Shaver, 2016). Mikulincer and Shaver (2019) reviewed numerous studies and concluded that people with avoidant attachment use inhibitory activation strategies, making them more likely to cope with threatening events through cognitive distancing and emotional disengagement (e.g. Holmberg et al., 2011; Pascuzzo et al., 2013), while those with anxious attachment use hyperactivation activation strategies and exhibit greater engagement to distress-exacerbating ruminations, i.e. anxious, 'gloomy' thoughts about threatening events (e.g. Caldwell & Shaver, 2012; Garrison et al., 2014). It appears that individuals with attachment insecurity tend to exhibit emotion-focused coping (aimed at reducing distressing emotions; Lazarus & Folkman, 1984); the associated amplification or avoidance of negative emotions may increase intrusive thoughts and thus PTSD (e.g. Bryant & Harvey, 1995). Individuals with attachment insecurities are less likely to exhibit problem-focused coping (aimed at resolving problems that cause stress; Lazarus & Folkman, 1984), such that their problems will continue to have a negative impact and may trigger PTSD (Mikulincer & Solomon, 1989). From this perspective, we hypothesized that perceived parental depression may indirectly contribute to adolescent PTSD through multiple pathways, including an increased risk of attachment insecurities and coping styles.

Nevertheless, coping styles may play a mediating role in the relation of perceived parental depression with adolescents' PTSD. The transactional theory of coping (Lazarus & Folkman, 1987) posits that a lack of environmental resources (e.g. a small social support network) influences the types of coping strategies that individuals will adopt; moreover, negative emotions may evolve into persistent mental health problems (e.g. PTSD). Children rely on their parents as the primary source of social, psychological, and financial support (Fields & Prinz, 1997; LeBlanc et al., 2011), but when they perceive depressive symptoms in their parents, they may feel powerless and believe that their parents cannot fully support them. Thus, they may feel they have to cope with difficulties alone. However, because many traumatic events are beyond their control, adolescents may prefer emotion-focused over problem-focused coping strategies (Mikulincer & Solomon, 1989), and thus exhibit negative emotional responses (Folkman & Lazarus, 1988a) and experience intrusive thoughts (e.g. Bryant & Harvey, 1995), which can ultimately increase the severity of PTSD (e.g. Mikulincer & Solomon, 1989; Pineles et al., 2011). Based on these findings, we hypothesize that perceived parental depression may affect PTSD indirectly via emotion- and problem-focused coping.

1.3. Current study

Adolescents are more vulnerable to trauma because of their underdeveloped cognitive and emotional faculties (Ying et al., 2012), which gives rise to a need for appropriate post-disaster mental health interventions. Therefore, adolescent survivors after the Jiuzhaigou earthquake were selected as participants in this longitudinal study exploring the relationships among perceived parental depression, attachment insecurity, coping style, and PTSD. The current study integrates attachment theory (Bowlby, 1969, 1973, 1990) and the transactional theory of coping (Lazarus & Folkman, 1987), and hypothesizes that perceived parental depression could contribute to adolescent PTSD directly, as well as indirectly through mediators such as attachment insecurity and coping style (see Figure 1).

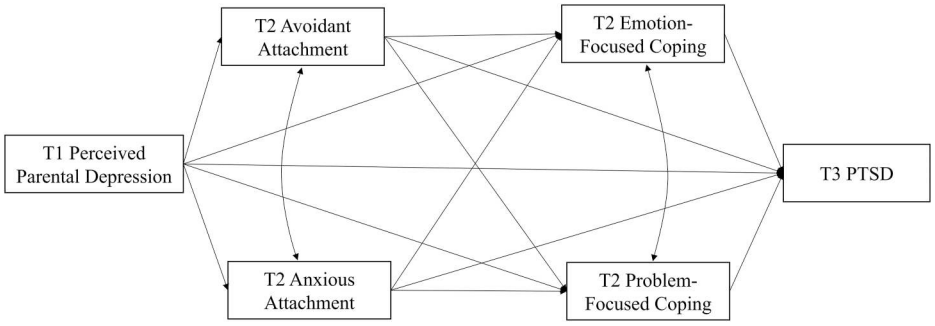

Figure 1. Hypothesized multiple mediation model.
Note. PTSD = post-traumatic stress disorder. Controlling for gender, age, trauma exposure and PTSD at T1.

2. Methods

2.1. Participants and procedures

We conducted a three-wave survey of adolescents from several middle schools in areas severely affected by the Jiuzhaigou earthquake (7.0 on the Richter scale), which resulted in 25 deaths, 525 injuries, and 73,671 damaged buildings (Zhou et al., 2021). The first survey started 12 months after the earthquake (time [T] 1), and a total of 620 adolescents participated in the T1 survey. After each follow-up survey, some students dropped out, graduated, or transferred to other schools; these participants were excluded from the analysis (see Figure 2). The second survey was conducted 21 months after the earthquake (T2); of the participants in the original sample, 492(79.35%) participated in the T2 survey, and 391 (63.06%) took part in the T3 survey (27 months after the earthquake). Finally, a total of 391 adolescent earthquake survivors completed self-report questionnaires in all three waves. Among these adolescents, there were 138 males and 253 females. The mean age of the participants in the T1 survey was 15.27 years (SD = 1.63; range: 12–18 years). Results of an attrition analysis showed significant differences between participants who dropped out and those who were retained in the analysis for gender ($\chi^2_{(1)} = 4.80$, $p = .028$), age ($t_{(531)} = -6.43$, $p < .001$), and trauma exposure at T1 ($t_{(606)} = -2.99$, $p = .003$). There were no significant differences for perceived parental depression at T1 ($t_{(612)} = -0.74$, $p = .460$) or PTSD at T1 ($t_{(559)} = -0.36$, $p = .717$).

The project was approved by the Research Ethics Committee of Zhejiang University, local education departments, and the principals of participating schools. The participants signed the informed consent forms and were free to withdraw from the survey at any time. The instructions were identical among the three waves; all questionnaires were submitted on the spot after the questionnaires were completed, and the process was carried out by trained psychology graduate students.

2.2. Measures

Trauma exposure. To assess participants' exposure to the Jiuzhaigou earthquake at T1, a trauma exposure questionnaire was used (Zhou et al., 2019). This scale consists of seven items scored as 0 (*No*) or 1 (*Yes*). Higher total scores indicate more severe traumatic experiences. In the present study, the Cronbach's α for this scale was 0.63.

Perceived parental depressive symptoms. Zhou et al. (2021) developed the perceived parental depression questionnaire to assess adolescents' perceptions of parental depressive symptoms at T1. During the development of the questionnaire, Zhou et al. (2021) first used the Chinese version of the Center for Epidemiologic Studies Depression Scale (CES-D; Wang, 1999) to interview 15 adolescents in the area most severely affected by the Jiuzhaigou earthquake. The adolescents were asked to indicate whether their parents had the symptoms included in the CES-D following the earthquake. Subsequently, Zhou et al. (2021) excluded items that appeared to elicit confusion and integrated items that corresponded to the same symptoms perceived by the adolescents to derive the final questionnaire. The questionnaire includes seven items

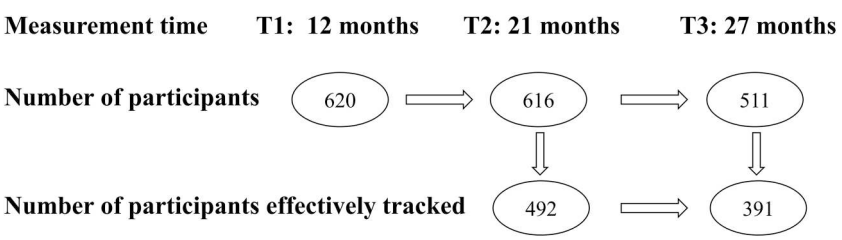

Figure 2. Flow chart of participant tracking.

pertaining to negative mood, physical discomfort, nervousness, distress, sleep difficulties, loss of interest, and pessimistic tendencies (e.g. 'I notice that my parents have been in a negative mood since the earthquake'). Items are rated on a 5-point Likert scale (0 = *Never*, 4 = *Always*) and showed good internal consistency (Cronbach's α = 0.89) in this study. The validity of the scale is also good ($\chi^2/df = 3.16$, comparative fit index (CFI) = 0.99, Tucker–Lewis index (TLI) = 0.98, root mean square error of approximation (RMSEA) = 0.06, standardized root mean square residual (SRMR) = 0.02; Zhou et al., 2021).

Attachment insecurity. To assess attachment insecurity of adolescents to their parents at T2, we utilized the Chinese version of the Experiences in Close Relationships Inventory (ECRI; Zhou et al., 2021), originally developed by Brennan et al. (1998). Zhou et al. (2021) revised the Chinese ECRI by changing the focus of each item from 'partner' to 'parents' (e.g. substituting 'I am nervous when partners get too close to me' with 'I am nervous when my parents get too close to me'). A preliminary interview of 15 adolescents was conducted after the Jiuzhaigou earthquake to confirm the comprehensibility of the items, some of which were reworded on the basis of the feedback. The final scale includes avoidant and anxious attachment subscales. The 36 items were rated on a 7-point Likert scale ranging from 1 (*Completely disagree*) to 7 (*Completely agree*); both subscales showed good internal reliability in this study (Cronbach's α = 0.87 and 0.88, respectively). Moreover, the scale has shown good validity ($\chi^2/df = 2.24$, CFI = 0.92, TLI = 0.90, RMSEA = 0.05, SRMR = 0.06; Zhou et al., 2021).

Coping style. The Coping Style Questionnaire developed by Chen et al. (2000), which was based on the Ways of Coping Questionnaire (Folkman & Lazarus, 1988b), was used to assess coping styles at T2. This questionnaire includes problem- and emotion-focused coping subscales, with 19 and 17 items respectively. The items in both subscales are rated on a 4-point Likert scale ranging from 1 (*Not at all*) to 4 (*Often*). The problem- and emotion-focused coping subscales showed good reliability in this study (Cronbach'α = 0.85 and 0.80, respectively).

PTSD symptoms. Zhou et al. (2017) revised the 20-item PTSD Checklist of the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (PCL-5; Weathers et al., 2013). We used the revised version to measure adolescent PTSD symptoms at T1 and T3. On the basis of frequency within the last 2 weeks, responses are made using a 5-point Likert scale ranging from 0 (*Not at all/only once*) to 4 (*Almost every day*). The PCL-5 has four dimensions: intrusions, negative cognition and emotion alteration, avoidance, and hyperarousal. In this study, the scale showed high reliability at T1 (Cronbach's $\alpha = 0.90$) and T3 (Cronbach's $\alpha = 0.96$).

2.3. Statistical analysis

Participants who completed all three waves were included in the analysis. First, we utilized the Harman single-factor method to test for potential common method bias (Podsakoff et al., 2003) and found that the variation in the first factor without rotation was 18.21%, which was less than the critical value of 40%; therefore, there was no evidence of significant common method bias. Then, we used SPSS software (version 26.0) to generate descriptive statistics and perform partial correlation analysis. For structural equation modelling (Figure 1), we used Mplus (version 8.3; Muthén & Muthén, 1998–2017) to examine the mediating roles of T2 avoidant attachment, T2 anxious attachment, T2 problem-focused coping, and T2 emotion-focused coping in the relationship between T1 perceived parental depression and T3 PTSD in adolescents. We performed bias-corrected bootstrapping tests and calculated 95% confidence intervals (CIs) to evaluate the significance of the indirect effects. To ensure that all available information was included, we used the full information maximum likelihood (FIML) estimation to handle missing data, which is known to produce less biased and more reliable results than traditional methods (Widaman, 2006). Model fit was evaluated using χ^2, CFI, TLI, RMSEA, and SRMR values. Accepted cutoffs for good model fit were used, i.e. ≥ 0.90 for the CFI and TLI, and < 0.08 for the SRMR and RMSEA (Wen et al., 2004). Note that our main analysis controlled for gender, age, trauma exposure and PTSD at T1. The Mplus code used for the data analysis can be found in the supplementary material.

3. Results

3.1. Descriptive statistics and partial correlations among main variables

Table 1 shows the descriptive statistics and partial correlations among the main variables after controlling for gender, age, trauma exposure and PTSD at T1. According to Weathers et al. (2013), the cutoff score on the DSM-5 checklist for probable PTSD is 31. In our study, 161 (41.18%) participants had probable PTSD at T1 and 136 (34.78%) had probable PTSD at T3. The correlations among all variables were significant, except for the non-significant relationships of T2 problem-focused coping with T1 perceived parental depression, T2 emotion-focused coping, and T3 PTSD.

3.2. Examination of the multiple mediation effect

On the basis of the hypothesis of the multi-mediating model, we examined the relationship between T1 perceived parental depression and T3 PTSD in

Table 1. Descriptive statistics and partial correlations among the main variables ($N = 391$).

Variable	*M* (SD)	1	2	3	4	5	6
1. T1 perceived parental depression	4.35 (4.55)	–					
2. T2 avoidant attachment	64.16 (17.36)	0.14*	–				
3. T2 anxious attachment	59.84 (17.59)	0.26***	0.44***	–			
4. T2 problem-focused coping	50.48 (8.29)	−0.06	−0.33***	−0.21**	–		
5. T2 emotion-focused coping	37.65 (7.37)	0.20**	0.32***	0.40***	0.05	–	
6. T3 PTSD	24.00 (16.08)	0.17*	0.20**	0.29***	0.003	0.33***	–

Notes: *$p < .05$, **$p < .01$, ***$p < .001$. *M* = mean; SD = standard deviation; PTSD = post-traumatic stress disorder. Controlling for gender, age, trauma exposure and PTSD at T1.

adolescents, and the mediating role of T2 attachment insecurity and T2 coping style in this process. Gender, age, trauma exposure and PTSD at T1 were controlled for as covariates in the following analyses. First, we examined the direct effect of T1 perceived parental depression on T3 PTSD in adolescents, and the results showed that the model was completely saturated ($\chi^2 = 0.00$, CFI = 1.00, TLI = 1.00, RMSEA = 0.00, SRMR = 0.00). This is because the variables have been fully modelled, resulting in no degrees of freedom in the structure of the model. The path analysis revealed that T1 perceived parental depression did not significantly predict T3 PTSD in adolescents ($\beta = 0.09$, $p = .109$).

Next, we constructed a multiple indirect effect model by incorporating T2 attachment insecurity and T2 coping style into the direct effect model of T1 perceived parental depression predicting T3 PTSD in adolescents (Figure 3). The model had good fit indices ($\chi^2 = 0.00$, CFI = 1.00, TLI = 1.00, RMSEA = 0.00, SRMR = 0.00) and was completely saturated. The result suggested that T1 perceived parental depression was positively associated with T2 avoidant attachment and T2 anxious attachment, but did not significantly correlate to T2 coping style or T3 PTSD. Both types of attachment insecurity at T2 were significantly associated with emotion-focused coping at T2. Anxious attachment at T2 was not significantly associated with problem-focused coping at T2, while T2 avoidant attachment was significantly negatively related to T2 problem-focused coping. Neither type of T2 attachment insecurity significantly predicted T3 PTSD. Regarding coping styles, while T2 problem-focused coping did not significantly predict T3 PTSD, T2 emotion-focused coping was a significant positive predictor of T3 PTSD.

We used bias-corrected bootstrap CIs (5,000 bootstraps) to determine the significance of these pathways. A pathway was considered significant if the 95% CIs of the pathway coefficient did not contain zero. According to this criterion, we found that the total indirect effect from T1 perceived parental depression to T3 PTSD was significant. Moreover, the bootstrap results showed that the indirect path did not include zero, indicating a full mediation model (Table 2). Furthermore, we found that T2 attachment insecurity (either avoidant or anxious) significantly mediated the relationship between T1 perceived parental depression and T3 PTSD via T2 emotion-focused coping, as the indirect pathways did not include zero. This suggests that attachment insecurity and emotion-focused coping at T2 mediated the association between T1 perceived parental depression and T3 PTSD in adolescents.

4. Discussion

To our knowledge, this is the first longitudinal study to investigate the underlying mechanisms through which perceived parental depression contributes to PTSD. The findings showed that avoidant attachment, anxious attachment, and emotion-focused coping played significant mediating roles in the relationship between perceived parental depression and PTSD, which partially supports our hypothesis. Specifically, perceived parental depression can promote emotion-focused coping by increasing two types of attachment insecurity, thereby increasing the likelihood of PTSD in adolescents.

In this study, the direct effect was not significant and perceived parental depression did not significantly affect PTSD in adolescents through either attachment

Table 2. Results of bias-corrected bootstrapping analysis of mediating effects.

Indirect Path	Standardized estimates	95% CI
Paths from T1 perceived parental depression to T3 PTSD	**0.051**	**[0.011,0.098]**
Indirect via T2 avoidant attachment	0.012	[−0.003,0.044]
Indirect via T2 anxious attachment	0.014	[−0.007,0.049]
Indirect via T2 problem-focused coping	0.000	[−0.013,0.005]
Indirect via T2 emotion-focused coping	0.009	[−0.016,0.040]
Indirect via T2 avoidant attachment, T2 problem-focused coping	0.001	[−0.003,0.008]
Indirect via T2 anxious attachment, T2 problem-focused coping	0.000	[−0.001,0.003]
Indirect via T2 avoidant attachment, T2 emotion-focused coping	**0.005**	**[0.001,0.015]**
Indirect via T2 anxious attachment, T2 emotion-focused coping	**0.011**	**[0.003,0.028]**

Notes: A 95% confidence interval (CI) of an indirect path coefficient that does not include 0 suggests that the indirect path is significant. Significant paths in bold. PTSD = post-traumatic stress disorder. Controlling for gender, age, trauma exposure and PTSD at T1.

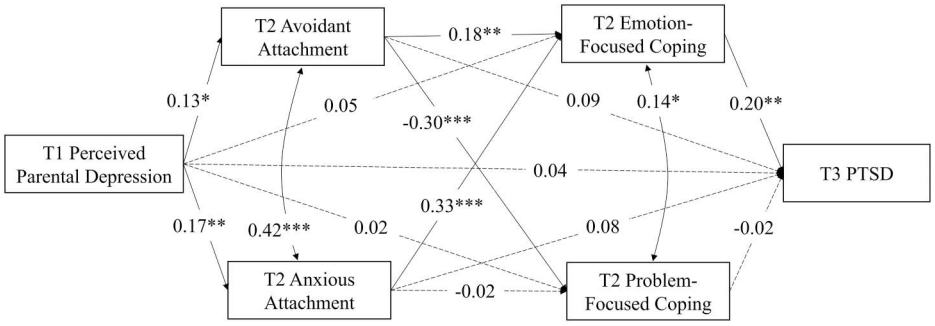

Figure 3. Final mediation model.

Notes: *$p < .05$, **$p < .01$, ***$p < .001$. Dotted lines represent non-significant paths; solid lines represent significant paths. PTSD = post-traumatic stress disorder. Controlling for gender, age, trauma exposure and PTSD at T1.

insecurities or coping styles. This may be because a multiple mediation path of attachment insecurity via emotion-focused coping fully mediated the relationship between perceived parental depression and PTSD in adolescents. Our findings indicated that perceived parental depression associated with the risk for attachment insecurity, which in turn increased the short-term emotion-focused coping that ultimately exacerbated adolescent PTSD symptoms. This is partially consistent with our hypothesis.

According to attachment theory (Bowlby, 1969, 1973, 1990), negative interactions with parents can exacerbate adolescents' negative self and other models, such as negative self-evaluations and distrust of others. On the one hand, children who perceive their parents to be depressed may internalize guilt, have intrusive thoughts, and experience anger from their parents (Burbach & Borduin, 1986). These experiences may contribute to negative self-evaluations, worrying, an inability to procure support when needed, and a yearning for parental attention and assistance, which can exacerbate the level of anxious attachment (Cassidy & Shaver, 2016). Individuals with anxious attachment often deploy emotion-focused coping strategies (Shaver & Mikulincer, 2002), which tend to increase the perceived severity of threats (such as earthquakes) and lead to feelings of helplessness and vulnerability (Mikulincer & Shaver, 2019); in turn, this may increase the severity of PTSD (e.g. Ogle et al., 2015; Ogle et al., 2016).

On the other hand, adolescents who perceive parental depression may experience negative parenting behaviours, such as rejection (Spitz et al., 2021). As a result, they may develop negative views of others, including distrust of their parents, and may desire behavioural and emotional independence, which can increase the level of avoidant attachment (Cassidy & Shaver, 2016). Individuals with avoidant attachment tend to use emotion-focused coping strategies (Shaver & Mikulincer, 2002) to suppress fear, anxiety, anger, sadness, guilt, and pain in the face of trauma (such as an earthquake), where these emotional states are associated with a sense of threat and vulnerability (Mikulincer & Shaver, 2019). Adolescents using emotion-focused coping strategies may deny or suppress certain emotions and thoughts, memories, and behaviours (Mikulincer & Shaver, 2003, 2019; Shaver & Mikulincer, 2002). Although this provides a temporary buffer against negative emotions (Dempsey et al., 2012), PTSD symptoms such as intrusive thoughts (e.g. Bryant & Harvey, 1995) and avoidant behaviours may occur in the long term. Finally, compared with adolescents exhibiting anxious attachment, those with avoidant attachment caused by perceived parental depression may have more difficulty in developing problem-focused coping.

This study had several limitations. First, it relied on self-report data, which increased the risk of common method bias. Future research could address this limitation by collecting data on attachment, coping style, and PTSD from various sources, such as teachers, peers, and caregivers. In particular, parent-reported depressive symptom data would provide further insight into this issue. Second, given the longitudinal follow-up design, uncontrolled factors at previous time points may have affected the relationships among the main variables. Future studies should control for these potential confounders, such as attachment insecurity prior to the earthquake and PTSD at T2. Third, our study only considered individual-level differences and did not assess possible family clustering. Future research should consider collecting data allowing family clustering to be assessed to improve the accuracy of the results. Finally, the participants were all affected by the Jiuzhaigou earthquake, so caution must be exercised when generalizing the findings to other populations.

Despite its limitations, this study has important theoretical and practical implications. It builds upon the work of Zhou et al. (2021) and addresses some of the limitations of that study. The primary strength of this study was the analysis of prospective data across multiple time points, which revealed the underlying

psychological mechanisms by which perceived parental depression affects adolescent PTSD and elucidated the associations between the variables. Moreover, the relationships between avoidant/anxious and PTSD were both mediated by emotion-focused coping. However, individuals with anxious or avoidant attachment may differ in their use of specific emotion-focused coping strategies to cope with distress and trauma, with hyperactivated and inhibitory activation strategies being used, respectively, to deal with these difficulties. This study integrated attachment theory (Bowlby, 1969) and the transactional theory of coping (Lazarus & Folkman, 1987) to validate a multiple mediation model of adolescent PTSD across multiple time points, and provides a basis for further research. In terms of clinical implications, it is important to focus on and actively engage with adolescents regarding their perceptions and concerns about their parents' psychological state. It is crucial to clarify the sources and objectivity of these perceptions and encourage positive communication between adolescents and their parents, while also provide a secure and supportive environment for adolescents. This can help reduce the likelihood of avoidance and anxious attachment, as well as the use of emotion-focused coping strategies in adolescents. This could also improve adolescents' ability to cope with trauma and ultimately relieve PTSD. Therapy should focus on adolescents' emotional processing after a traumatic event to help them cope without resorting to emotion-focused coping.

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Data availability statement

The data that support the findings of this study are openly available in [osf.io] at https://osf.io/kwyzh/?view_only=df197cd25f8e4d9c90d647f570af3223.

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