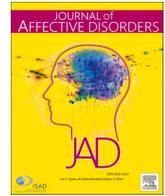




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Research paper

Parental psychosocial factors predicting adolescents' psychological adjustment during the surging and remission periods of COVID-19 in China: A longitudinal study

Yuting Li, Xinxin Huang, Jianyin Qiu, Chunbo Li, Zhuoying Zhu^{*}, Yifeng Xu^{*}

Shanghai Mental Health Center, Shanghai Jiao Tong University School of Medicine, Shanghai, China

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ABSTRACT

Background: Parents play a critical role in adolescents' psychological adjustment, especially in stress response. Few studies have investigated parental impact on adolescents' psychological adjustment in the pandemic. The longitudinal study examined how parental psychosocial factors at the surging period of the pandemic (T1) in China predicted adolescents' anxiety and depression concurrently and at the remission periods three (T2) and six months (T3) later.

Methods: Middle and high school students and their parents from three schools in Shanghai, China, completed online surveys on March 10, 2020 (T1), June 16, 2020 (T2), and Sep 25, 2020 (T3). Adolescents' anxiety/depression levels were assessed by matching self- and parent-reports at T1, T2, T3, and parents reported their psychological state (emotion and psychopathology), pandemic response (appraisal and coping), and perceived social support (PSS) at T1.

Results: Parental positive/negative emotions, anxiety, depression, control-appraisal, forward- and trauma-focus coping style and PSS were all significantly related to their children's anxiety/depression at T1. All factors, except coping style, predicted adolescents' anxiety/depression at T2 and T3, even after controlling for T1 adjustment levels. Parental positive emotion and depression had the strongest impact on adolescents' adjustment.

Limitations: Some participants didn't complete the surveys at later time points, and the participants were only recruited in Shanghai.

Conclusions: The study found that parents' psychosocial factors played a pivotal role on adolescents' psychological adjustment during COVID-19, highlighting the need to provide help to parents who were suffering from potential psychological distress.

1. Introduction

By September 2022, the COVID-19 pandemic has reached >605 million confirmed cases and resulted in more than six million deaths around the world (World Health Organization, 2022). Although the swift development of vaccines has slowed down the spread of the virus, the impact of the pandemic, however, persists—fear of contagion, uncertainties in employment and economy, travel restrictions, social distancing, and disruption in routines, continue to impose physical and psychological threats to the public. Research on the general population worldwide reported increased occurrences of depression, anxiety, insomnia, post-traumatic stress disorder and other psychological distress

during the pandemic (Xiong et al., 2020).

Adolescents, compared to adults, are more susceptible to stress both at behavioral and neurobiological levels (Rahdar and Galván, 2014; Wu et al., 2021). Large-scale studies of adolescents' mental health during the pandemic have been conducted in several countries, and all reported a drop in psychological well-being in this population, albeit of varying degrees. Cross-sectional studies showed that between 34.0 % and 49.1 % American adolescents reported having experienced more negative effects than before during the initial surging of the COVID-19 (Rogers et al., 2021). Icelandic adolescents reported more depressive symptoms and lower well-being, when compared to those of their same-aged peers pre-pandemic (Thorisdottir et al., 2021). An online survey in China

^{*} Corresponding authors.

E-mail addresses: zhuzhuoying@smhc.org.cn (Z. Zhu), xuyifeng@smhc.org.cn (Y. Xu).

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found that occurrence of clinically significant depression and anxiety among adolescents were as high as 43.7 % and 37.4 %, respectively, which were much higher than pre-COVID levels (Zhou et al., 2020). Several longitudinal studies also found increased rates of emotional or behavioral problems (Schmidt et al., 2021), suicide (Isumi et al., 2020), hyperactivity and conduct problems (Raw et al., 2021) among children and adolescents in the first six months after the COVID-19 outbreak.

These studies identified several factors related to worsening mental health of adolescents during the pandemic, including the female gender (Duan et al., 2020; Wang et al., 2021), negative cognitive appraisals (Schmidt et al., 2021), negative coping (Zhang et al., 2020), and lower levels of physical activity (Wright et al., 2021).

Ample evidence suggests that parental characteristics, including psychiatric disorders and parenting behaviors, are associated with offspring's mental health and other socioemotional outcomes (Jami et al., 2021). For example, adolescents whose parents had two or more episodes of depression are much more likely to be depressed than adolescents with never-depressed parents (Jaffee et al., 2021). Furthermore, parental psychological and behavioral response are proposed to have an even more profound impact on their children's adjustment under stressful situations, including parent's general emotional states, psychopathology, appraisal, coping and support (e.g., Cobham et al., 2016). For example, during the swine flu outbreak, parental fear was found closely related to their children's fear of the disease (Remmerswaal and Muris, 2011). Other research revealed significant associations between caregivers' psychopathology and adolescents' adjustment across a range of different stressful contexts, including terrorist attacks (Kerns et al., 2014), conflict settings (Betancourt et al., 2012; Meyer et al., 2017), and natural disasters (Chen et al., 2020; Polusny et al., 2011).

Parental cognitive appraisal and behavioral coping in response to an adverse event also predict how well their children fare in the situation. In a study of children who experienced interpersonal trauma, parental dysfunctional cognition was found to predict child's post-traumatic stress and depression symptoms (De Haan et al., 2019). Similarly, parental avoidant coping was found significantly related to their children's worsened mental health after children's exposure to acute trauma or injuries (Hiller et al., 2018; January et al., 2019). Finally, the amount of support parents receive in crisis has been shown to reduce stress-related parent-adolescent conflicts (Lewandowski and Drotar, 2007), and in turn alleviate the negative impact of maternal depression on children's behavioral problems (Lee et al., 2006).

During COVID-19, frequent school closures and social restrictions drastically increased parent-child interaction time, making the role of parents particularly relevant for children's adaptation under this highly stressful time. Several studies have investigated the relationship between parental factors and children and adolescents' psychological adjustment in the pandemic. In a small sample of Turkish students, parental anxiety and compulsion were found to be positively associated with adolescents' anxiety (Akgül and Atalan Ergin, 2021). Using a cross-lagged longitudinal model, Lorenzo et al. (2021) found that parental internalizing symptoms significantly predicted adolescents' internalizing symptoms one month after the COVID outbreak in the United States. Maternal mental health symptoms were also found to mediate the effects of pandemic-related stressors on American adolescents' internalizing/externalizing problems (Lengua et al., 2022). Similarly, studies conducted during the surging period of COVID-19 in Italy showed that parental active coping was positively associated with young children's adaptive behaviors (Petrocchi et al., 2020), and poorer quality of parent-child relationship was associated with higher levels of psychopathological symptoms among adolescents (Cimino and Cerniglia, 2021). A recent study from China provided comparable results that adolescents' negative affect, PTSD symptoms, anxiety, and depression during the initial outbreak of the pandemic were related to maternal anxiety (Zhou et al., 2022).

To further understand how parent's psychosocial factors impacted adolescents' adjustment during the COVID pandemic, especially

whether parental psychological state, stress response and social support uniquely predict changes in adolescents' adjustment after controlling for their initial distress levels, adolescents and their parents at three middle/high schools in Shanghai, China, were surveyed at three time points following the initial COVID-19 outbreak. The first survey (T1) was conducted during the initial surging of the pandemic (March 10, 2020), where the whole country was experiencing a prolonged and strict national lockdown—all schools were closed, social activities were limited, and non-essential travels were banned. Adolescents and parents were invited to answer questions regarding their general emotions, anxiety and depression levels, appraisal of the pandemic, coping strategies, as well as the level of social support they perceived during the time. Three months later in June 2020, when the pandemic lapsed into a period of remission and businesses and schools were reopen (T2), adolescents' anxiety and depression were reassessed; the third assessment of adjustment was conducted at the beginning of the next semester where the remission of the pandemic prevailed (T3). Fig. 1 illustrates the COVID situation in China during the study period by number of daily confirmed cases.

Most research on adolescents' adjustment used self-reports (Duan et al., 2020; Rogers et al., 2021; Schmidt et al., 2021). Because there is a general consensus of incorporating informants' data in assessing children and adolescents' psychological status (Comer and Kendall, 2004; Kendall and Flannery-Schroeder, 1998), and considering that adolescents spent much more time at home during the study period, both youth self-report and parent-report of adolescents' anxiety and depression were collected.

2. Method

2.1. Participants

The study was conducted at the request of one junior middle school (Grade 6 to Grade 9) and two middle schools (Grade 6 to Grade 12) in Shanghai, China, to assess their students' mental health status during the initial outbreak of COVID-19. Students received the invitation via school email to participate a three-time online survey related to their mental health during the pandemic, and were asked to invite one parent to complete a separate survey. It was emphasized in the email that no personal information would be identified and participation was completely voluntary. Students and parents answered questions regarding the impact of the pandemic¹, appraisal and coping of the pandemic, social support, general emotion, and anxiety and depression at T1 (March 10, 2020; for adolescents, only self-reported anxiety/depression was used in the study). Students and parents again reported adolescents' anxiety/depression at T2 (June 16, 2020) and T3 (September 25, 2020). The study was approved by the Institutional Review Board at Shanghai Mental Health Center, China (Ethics Approval Number: 2020-13).

At T1, a total of 1468 adolescents (response rate 74.2 %) and 1155 parents (response rate 58.4 %) completed the surveys, among which 862 adolescents participated with their parents (twenty-nine students with two parents; mean scores of the two parents were used). Out of these adolescents, a total of 542 (missing rate: 37.1 %) and 367 (missing rate: 57.4 %) remained at T2 and T3, respectively.

According to pretest results, minimum completion times were set at 240 s for T1, and 60s for T2 and T3. Participants who completed the survey faster than the minimum time or whose completion time was >3 standard deviations from the mean ($M = 534$ s, $SD = 373$ s at T1; $M = 222$ s, $SD = 394$ s at T2; $M = 177$ s, $SD = 119$ s at T3) were excluded ($N = 42$ at T1; $N = 2$ at T2; $N = 3$ at T3). The data screening process resulted in a final sample of 820 adolescents (Age: $M = 15.26$, $SD = 2.06$) at T1, a total of 540 adolescents (Age: $M = 14.54$, $SD = 1.99$) at T2, and 364 adolescents (Age: $M = 14.28$, $SD = 1.86$) at T3.

The demographic information of the participants is presented in Table 1. There were slightly more girls (59.1–60.6 %) than boys. Most of

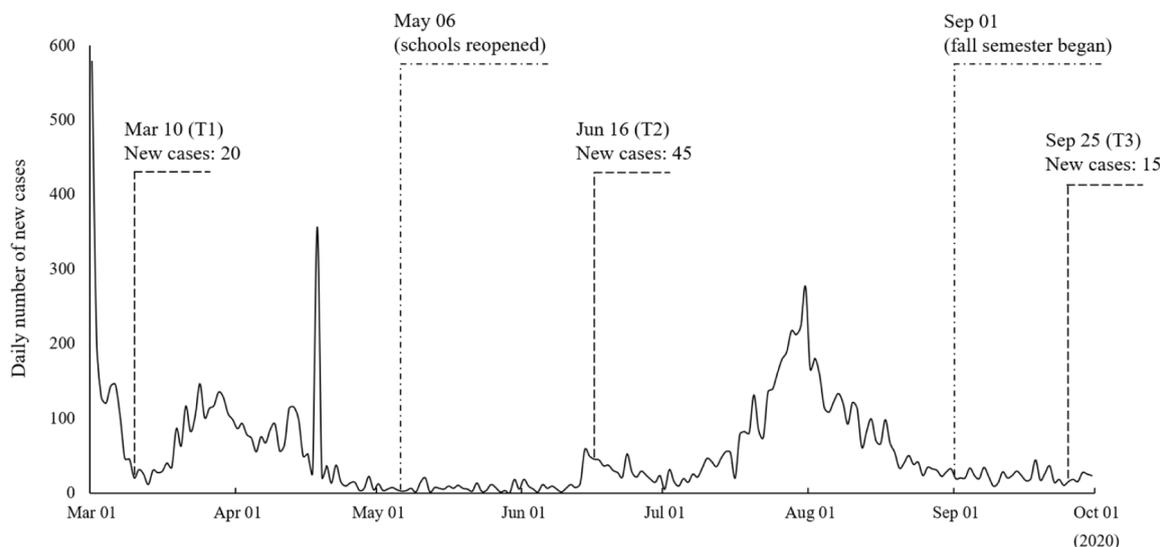


Fig. 1. Daily number of new cases of COVID-19 in China during the study period (based on World Health Organization reports).

Table 1
Demographic characteristics of samples at T1, T2 and T3.

Variables	Time 1 (N = 820)		P	Time 2 (N = 540) ^a		P	Time 3 (N = 364) ^b	
	M (SD)	N (%)		M (SD)	N (%)		M (SD)	N (%)
Adolescent								
Age ^c	15.26 (2.06)		<.001	14.54 (1.99)		<.001	14.28 (1.86)	
Gender			.803			.793		
Male		329 (40.1)			213 (39.4)			149 (40.9)
Female		491 (59.9)			327 (60.6)			215 (59.1)
Living arrangement ^c			<.001			.004		
With both parents		608 (74.1)			431 (79.8)			291 (79.9)
With one parent		92 (11.2)			65 (12.0)			43 (11.8)
At school		96 (11.7)			25 (4.6)			18 (4.9)
Other		24 (2.9)			19 (3.5)			12 (3.3)
Anx/Dep_SelfR	5.78 (4.97)			6.01 (5.14)			5.83 (5.59)	
Anx/Dep_ParentR	3.12 (3.61)			4.28 (4.78)			3.21 (4.08)	
Parent								
Family income (¥)			.067			.249		
<50,000		315 (38.4)			155 (32.1)			128 (33.7)
50,000–99,999		474 (57.8)			304 (63.1)			234 (61.6)
100,000–199,999		31 (3.8)			23 (4.8)			18 (4.7)
Education level			.106			.509		
≤Middle school		346 (42.2)			176 (36.5)			147 (38.7)
High/technical school		451 (55.0)			288 (59.8)			221 (58.2)
≥College		23 (2.8)			18 (3.7)			12 (3.2)

Note.

Anx/Dep_SelfR = Anxiety/depression score by self-report; Anx/Dep_ParentR = Anxiety/depression score by parent-report.

^a Among 540 adolescents, a total of 376 participated with parents, and 106 parents participated alone. Parents: N = 482.

^b Among 364 adolescents, a total of 302 participated with parents, and 78 parents participated alone. Parents: N = 380.

^c Variables differed from T1.

the adolescents lived with both parents (74.1–79.9 %). Noticeably, participants were mostly from lower socio-economic families, with an annual income below 100,000 RMB (approximately \$16,000, 95.2–96.2 %) and parent’s education level at high/technical school or lower (96.3–97.2 %). Students who remained at the follow-ups were younger ($ps < .001$), and with a higher percentage of living with parents (T1 = 85.4 %, T2 = 91.9 %, $\chi^2 = 20.25, p < .001$; T3 = 91.8 %, $\chi^2 = 13.28, p < .01$). No other differences in the samples were found across time.

2.2. Measures

2.2.1. Parent’s psychological state

2.2.1.1. Emotion. The Positive and Negative Affect Schedule (PANAS) (Watson et al., 1988) was used to measure general emotions. The PA and NA subscales each includes ten adjectives of emotions, and parents were asked to report the extent to which they experienced each emotion in the past week on a 5-point Likert scale (1 = *very slightly or not at all*, 5 = *extremely*). Mean scores on the PA ($\alpha = 0.84$) and NA ($\alpha = 0.91$) scales were 29.95 ($SD = 6.32$) and 19.16 ($SD = 6.53$), respectively.

2.2.1.2. Depression and anxiety psychopathology. The 11-item

Epidemiologic Studies-Depression Scale (CES-D) (Kohout et al., 1993) was used to assess depression in the past week. Each item was rated on a 4-point Likert scale, from 0 (*rarely or none of the time, < 1 day*) to 3 (*Most or all of the time, 5–7 days*). The mean score was 7.50 ($SD = 6.33$, $\alpha = 0.84$).

The 7-item Generalized Anxiety Disorder scale (GAD-7) (Spitzer et al., 2006) was used to measure anxiety in the past two weeks. Items were rated on a 4-point Likert scale, from 0 (*not at all*) to 3 (*nearly every day*). The mean score was 2.45 ($SD = 3.22$, $\alpha = 0.92$).

2.2.2. Parent's stress response

2.2.2.1. Cognitive appraisal. Parental cognitive appraisal towards the pandemic was measured by the Stress Appraisal Measure (SAM) (Peacock and Wong, 1990) subscales related to perceived control of the situation, including the controllable-by-self, controllable-by-others and uncontrollable subscales, each being comprised by four items. Each item was rated on a 5-point Likert scale, from 1 (*not at all*) to 5 (*extremely*). The mean scores were 15.05 ($SD = 3.33$), 13.60 ($SD = 2.91$), and 8.21 ($SD = 3.47$) on the controllable-by-self ($\alpha = 0.91$), controllable-by-others ($\alpha = 0.74$) and uncontrollable ($\alpha = 0.83$) subscales, respectively.

2.2.2.2. Coping style. The Perceived Ability to Cope with Trauma Scale (PACT) was used to measure parental coping style (Bonanno et al., 2011). The scale is comprised of 20 items measuring two types of coping styles: forward-focus coping (12 items) and trauma-focus coping (8 items). Parents were asked to rate the extent to which they utilized each strategy since the beginning of COVID on a 7-point Likert scale from 1 (*not at all*) to 7 (*most of the time*). The mean scores were 63.55 ($SD = 10.91$) and 32.54 ($SD = 6.51$) on the forward-focus ($\alpha = 0.86$) and trauma-focus ($\alpha = 0.61$) subscales, respectively.

2.2.3. Parent's social support

The Perceived Social Support Scale (PSSS) (Zimet et al., 1988) was used to measure the degree of support parents received since the beginning of the COVID-19. The scale consists of 6 items rated on a 7-point Likert scale, from 1 (*strongly disagree*) to 7 (*strongly agree*). The mean score was 32.76 ($SD = 6.24$, $\alpha = 0.91$).

2.2.4. Adolescents' anxiety/depression

2.2.4.1. Self-report. Adolescents completed the Achenbach Youth Self Report (YSR) (Achenbach and Rescorla, 2001) anxiety/depressive symptom subscale ($\alpha = 0.87$ at T1; $\alpha = 0.89$ at T2, $\alpha = 0.88$ at T3). Sixteen items typical to youth depression and anxiety were rated on a 3-point Likert scale, from 0 (*not at all*) to 2 (*often*). Mean scores were 5.78 ($SD = 4.97$), 6.01 ($SD = 5.14$), and 5.83 ($SD = 5.59$) at T1, T2, and T3, respectively.

2.2.4.2. Parent-report. The Achenbach Child Behavior Checklist (CBCL) (Achenbach and Rescorla, 2001) is the matching parent-version of the YSR, asking parents to rate their children's emotional and behavioral problems. The anxiety/depressive symptom subscale ($\alpha = 0.84$ at T1; $\alpha = 0.92$ at T2, $\alpha = 0.87$ at T3) was used for the study. Mean scores were 3.12 ($SD = 3.61$), 4.28 ($SD = 4.78$), and 3.21 ($SD = 4.08$) at T1, T2, and T3, respectively.

3. Results

Preliminary analyses revealed that adolescents' anxiety and depression were significantly different by gender (self-report: $r = 0.138$, $p < .001$), age (self-report: $r = 0.147$, $p < .001$), parental income (parent-report: $r = -0.068$, $p < .05$) and education (self-report: $r = -0.101$, $p < .01$). These variables were controlled in all subsequent analyses.

The missing rates across the three time points were high (37.1 % at

T2, 57.4 % at T3). Because it has been suggested that when there were >30–50 % of missing data, the inherent errors in the imputation procedures could be amplified (White et al., 2011), we opted to sacrifice statistical power for precision by using the pair-wise deletion method for missing cases in the analyses. The remaining sample differed with the original sample in age and living situation (see Table 1), we controlled for the two variables in all subsequent analyses as well, as an effort to minimize the effect of the difference between the samples.

Repeated measures ANOVA was performed to investigate changes of adolescents' anxiety/depression levels over time. Neither self-report nor parent-report scores differed across time (self-report: $M = 5.35$, $SD = 5.12$ at T1; $M = 5.79$, $SD = 5.08$ at T2; $M = 5.75$, $SD = 5.71$ at T3; $F(2, 291) = 2.55$, $p > .05$; parent-report: $M = 3.11$, $SD = 3.51$ at T1; $M = 4.29$, $SD = 4.93$ at T2; $M = 3.00$, $SD = 3.96$ at T3; $F(2, 277) = 2.08$, $p > .05$). It is noted that adolescents' anxiety/depression scores at the three time points were higher than that found in the pre-COVID studies using youth self-reports (pre-COVID score: $M = 4.92$, $SD = 3.91$; $t = 3.51$, $p < .001$ at T1; $t = 4.05$, $p < .001$ at T2; $t = 2.96$, $p < .01$ at T3) (Wang et al., 2005) or parent-reports (pre-COVID score: $M = 2.11$, $SD = 2.77$; $t = 5.06$, $p < .001$ at T1; $t = 8.22$, $p < .001$ at T2; $t = 4.52$, $p < .001$ at T3) (Guo et al., 2000) among school samples in mainland China, indicating that the pandemic indeed impacted adolescents' mental health.

Paired-sample *t*-test showed that adolescents' self-report levels of anxiety/depression were significantly higher than that of parent-report at all three time points ($t = 14.16$, $p < .001$ at T1; $t = 3.49$, $p < .01$ at T2; $t = 7.73$, $p < .001$ at T3). Discrepancy between self-report and parent-report scores was larger in older adolescents at T1, T2, and T3 ($r = 0.123$, $p < .01$ at T1; $r = 0.207$, $p < .01$ at T2; $r = 0.123$, $p < .01$ at T3), and in girls at T1 and T2 ($t = -3.01$, $p < .01$ at T1; $t = -2.14$, $p < .05$ at T2).

3.1. Parental factors and adolescents' adjustment

Correlations among all variables are shown in Table 2. As predicted, parental general psychological state, pandemic response and social support were all significantly associated with their children's anxiety and depression at T1. Specifically, parental negative emotion (self-report: $r = 0.111$, $p < .01$; parent-report: $r = 0.355$, $p < .01$), uncontrollable-appraisal (self-report: $r = 0.099$, $p < .01$; parent-report: $r = 0.186$, $p < .01$), trauma-focused coping (parent-report: $r = 0.159$, $p < .01$), depression (self-report: $r = 0.147$, $p < .01$; parent-report: $r = 0.474$, $p < .01$) and anxiety (self-report: $r = 0.130$, $p < .01$; parent-report: $r = 0.485$, $p < .01$) were positively related to adolescents' anxiety/depression; whereas parental positive emotion (self-report: $r = -0.100$, $p < .01$; parent-report: $r = -0.092$, $p < .01$), self-control-appraisal (self-report: $r = -0.072$, $p < .05$; parent-report: $r = -0.200$, $p < .01$), other-control-appraisal (self-report: $r = -0.072$, $p < .05$; parent-report: $r = -0.095$, $p < .01$), forward-focused coping (self-report: $r = -0.089$, $p < .05$), and perceived social support (parent-report: $r = -0.148$, $p < .01$) were negatively correlated with adolescents' anxiety/depression.

Partial correlations were conducted to investigate whether parents impacted their children's mental health above and beyond adolescents' initial stress level, that is, after controlling for adolescents T1 anxiety/depression, whether parental variables were still related to their children's anxiety/depression at T2 and T3. As presented in bold letters in Table 2, at T2, parental negative emotion (parent-report: $r = 0.108$, $p < .05$), depression (self-report: $r = 0.096$, $p < .05$; parent-report: $r = 0.143$, $p < .01$), and anxiety (parent-report: $r = 0.131$, $p < .01$) predicted higher levels of adolescents' anxiety/depression, and parental positive emotion (self-report: $r = -0.156$, $p < .001$), other-control appraisal (self-report: $r = -0.088$, $p < .05$), and perceived social support (self-report: $r = -0.107$, $p < .05$; parent-report: $r = -0.092$, $p < .05$) predicted less anxiety/depression in adolescents.

The impact of parental factors continued to T3. Parental depression (parent-report: $r = 0.214$, $p < .001$) and anxiety (self-report: $r = 0.118$, $p < .05$; parent-report: $r = 0.151$, $p < .01$) predicted elevated levels of

Table 2
Correlations (partial correlations) between parental variables and adolescents' anxiety and depression at T1, T2, and T3.

	1	2	3	4	5	6	7	8	9	10
1. PA	–									
2. NA	0.036	–								
3. Self_control	0.299**	–0.288**	–							
4. Uncontrol	–0.210**	0.385**	–0.490**	–						
5. Other_control	0.267**	–0.100**	0.294**	–0.137**	–					
6. Forw_cop	0.444**	–0.082*	0.322**	–0.214**	0.258**	–				
7. Trau_cop	0.178**	0.259**	0.059	0.095**	0.078*	0.516**	–			
8. PSS	0.354**	–0.267**	0.477**	–0.380**	0.408**	0.525**	0.165**	–		
9. Dep	–0.143**	0.559**	–0.301**	0.328**	–0.169**	–0.085*	0.282**	–0.345**	–	
10. Anx	–0.067	0.593**	–0.233**	0.293**	–0.149**	–0.086*	0.258**	–0.260**	0.697**	–
11. Anx/Dep_SelfR_T1	–0.100**	0.111**	–0.072*	0.099**	–0.072*	–0.089*	0.033	–0.068	0.147**	0.130**
12. Anx/Dep_ParentR_T1	–0.092**	0.355**	–0.200**	0.186**	–0.095**	–0.026	0.159**	–0.148**	0.474**	0.485**
13. Anx/Dep_SelfR_T2	–0.156***	0.046	–0.074	0.065	–0.088*	–0.031	0.010	–0.107*	0.096*	0.060
14. Anx/Dep_ParentR_T2	0.024	0.108*	–0.017	0.002	–0.025	–0.016	0.022	–0.092*	0.143**	0.131**
15. Anx/Dep_SelfR_T3	–0.116*	0.094	–0.046	0.028	–0.154**	–0.101	0.030	–0.106*	0.100	0.118*
16. Anx/Dep_ParentR_T3	–0.119*	0.039	–0.004	0.078	–0.028	–0.094	0.046	–0.162**	0.214***	0.151**

Note.
PA = Positive emotion; NA = Negative emotion; Self_control = Controllable-by-self appraisal; Uncontrol = Uncontrollable appraisal; Other_control = Controllable-by-others appraisal; Forw_cop = Forward focused coping; Trau_cop = Trauma focused coping; PSS = Perceived social support; Dep = Depression; Anx = Anxiety.
Rows in bold represents partial correlations after controlling for adolescents' Anx/Dep levels at T1.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

anxiety/depression in their children at T3, whereas parental positive emotion (self-report: $r = -0.116, p < .05$; parent-report: $r = -0.119, p < .05$), other-control-appraisal (self-report: $r = -0.154, p < .01$), and perceived social support (self-report: $r = -0.106, p < .05$; parent-report: $r = -0.162, p < .01$) predicted lower levels of adolescents' anxiety/depression.

3.2. Hierarchical regressions

A series of regression models were run to further determine which parental variables were the strongest factors on adolescents' adjustment during the pandemic (see Table 3).

As can be seen, parental depression (self-report: $\beta = 0.102, p < .05$; parent-report: $\beta = 0.247, p < .001$) and anxiety (parent-report: $\beta = 0.284, p < .001$) were the most important factors for adolescents' adjustment at the beginning of the pandemic (T1). The more depressed or anxious the parents, the more depressed and anxious their children. As the pandemic started to ease, parental positive emotion (self-report: $\beta = -0.085, p < .05$) emerged to serve as a strong protector for adolescents' adjustment (T2), and parental depression (parent-report: $\beta = 0.162, p < .05$) continued to lead to more adolescents' anxiety/depression (T3).

4. Discussion

The study investigated the relationship between parental psychosocial factors and adolescents' psychological adjustment from the initial surging period to the remission periods of COVID-19 in China. The results showed that the pandemic resulted in worsening mental health in adolescents with elevated anxiety and depression levels, and the effect lasted for a relatively long time (six months), despite the fact that the general situation was largely under control since the initial assessment. To obtain more comprehensive assessment of adolescents' adjustment levels, both self-report and parent-report were used to measure anxiety and depression. Similar to previous research (Kim et al., 2020; Makol and Polo, 2018; Tepper et al., 2008), the results showed that adolescents' self-reported anxiety and depression levels were significantly higher than those reported by their parents, and this discrepancy was larger for older students and girls. This is probably because parents tended to underestimate the severity of their children's psychological problems, resulting from either disinterest or inability (Ferdinand et al.,

2004), and this disinterest or inability might be more prevalent for parents of older children and girls. There might also be culturally relevant parenting at play. Chinese parents, to some extent, tend to pay more attention to their children's academic performance than mental well-being (Chen, 2001; Huntsinger and Jose, 2009), therefore failed to notice their children's mental health problems. Typical adolescent withdrawal from family and tendency to focus on emotional distress might be another source for the discrepancy (Ferdinand et al., 2004). Nevertheless, despite the difference in the reports, self-ratings and parent-ratings yield comparable results in their association with parental psychosocial variables, and the dual-reports strengthened the validity and reliability of the assessment.

More importantly, the present results provided strong evidence of the importance of parent's role in adolescents' mental health, especially their stress response. Parental emotion, their own depression and anxiety, cognitive appraisal, coping style, and social support were all directly linked to children's anxiety/depression levels. Among them, parental emotion, psychopathology levels, appraisal and perceived support had a more profound influence on adolescents' adjustment in response to COVID-19. That is, these parental factors were found to predict adolescents' anxiety/depression three and six months later even after controlling for initial distress level.

Parents who viewed the pandemic more controllable (either by themselves or by others), had less anxious or depressed children both concurrently and in the long run. This is probably because parent's sense of control provided their children a sense of safety in time of uncertainty and threats and helped them focused more on problem-solving (Taha et al., 2014). The result is consistent with that in the cancer care literature, where caregivers reporting higher control appraisal of the disease not only showed better adjustment themselves (Fitzell and Pakenham, 2010), but also have children better adaptation to cancer-related stress (Monti et al., 2017). Related, the current study found that parent's forward-focus coping strategies, that is, maintaining a normal routine and moving forward in face of difficulties, was associated with lower adolescent anxiety/depression. During the pandemic, forward-focus coping has demonstrated its effectiveness to psychological adjustment across a wide age range, from adolescents (Jordan et al., 2022) to elders (Rudenstine et al., 2022). However, parent's trauma-focus coping, an emotional coping style typically equally beneficial for the individual during adverse circumstances in the Western culture (Bonanno and Burton, 2013), led to more distress in their children at the

Table 3
Simultaneous regression analyses of parental factors on adolescents' anxiety and depression (both youth self-report and parent-report) at T1, T2 and T3.

	β	ΔF	ΔR^2
Self-report			
T1		(8, 806) 3.259**	0.021**
PA	-0.027		
NA	0.023		
Self_control	0.032		
Uncontrol	0.037		
Other_control	-0.030		
Forw_cop	-0.048		
Dep	0.102*		
Anx	0.029		
T2		(4, 529) 3.279*	0.013*
Anx/Dep_SelfR_T1	0.434***		
PA	-0.085*		
Other_control	-0.037		
PSS	-0.015		
Dep	0.065		
T3		(4, 353) 2.538*	0.013*
Anx/Dep_SelfR_T1	0.424***		
PA	-0.064		
Other_control	-0.093		
PSS	0.029		
Anx	0.081		
Parent-report			
T1		(9, 805) 34.508***	0.270***
PA	-0.052		
NA	0.055		
Self_control	-0.073		
Uncontrol	-0.020		
Other_control	-0.004		
Trau_cop	0.041		
PSS	0.056		
Dep	0.247***		
Anx	0.284***		
T2		(4, 471) 3.197*	0.013*
Anx/Dep_ParentR_T1	0.409***		
NA	0.031		
PSS	-0.046		
Dep	0.066		
Anx	0.062		
T3		(4, 369) 5.276***	0.034***
Anx/Dep_ParentR_T1	0.348***		
PA	-0.055		
PSS	-0.070		
Dep	0.162*		
Anx	0.016		

Note.

The Table shows results after controlling for demographic variables that were significantly related to adolescents' anxiety/depression or differed between baseline and the follow-up samples, including adolescents' age, gender, living arrangement, parental income and education.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

beginning of COVID-19 in China. Although some studies suggest that focusing on traumatic experience might not be adaptive in the Eastern culture due to less cultural focus on emotion in general (e.g., [Zhu and Zhao, 2021](#)), and parent's maladaptive coping might in turn take its toll on their children, the effects of emotional coping, including how parental coping impacts children's adjustment, however, awaits more culturally specific research. .

It is worth noting that the protective effects of parental controllability appraisal remained as time passed by, but the effects of parental coping did not last past the initial stage of the pandemic. It was plausible that as COVID-19 was no longer an emergency in China, stress coping was thus not as important to adjustment; but since the threats of COVID were still lurking, the appraisal of the situation, on the contrary, played a more essential role for adaptation.

The more straight-forward finding was that parent's own perceived social support reduced the adverse impact of the pandemic on their children, results that were consistent with a similar study conducted in China ([Wu et al., 2020](#)). The stress-buffering effects of social support on individuals have been extensively reported (e.g., [Rueger et al., 2016](#)). Parents who perceive more social support tend to be more supportive of their children ([Lippold et al., 2018](#)), and supportive parenting would greatly facilitate children's adaptation under stress, as in the COVID pandemic ([Neubauer et al., 2021](#)).

Among all parental factors, parent's emotion and psychopathology served as the strongest predictors for adolescents' psychological adjustment in the pandemic. Positive emotion is known to facilitate cognitive flexibility and social interactions, in other words, those who experience more positive emotions may have or be able to obtain more psychological and social resources ([Fredrickson, 2001](#); [Janssen et al., 2020](#); [Rueger et al., 2011](#)) to deal with challenges of the pandemic. On the other hand, parental depression and anxiety could lead to rejection, neglect and behavioral control towards their children ([Epkins and Harper, 2016](#)), and this type of caregiver-child interaction could put adolescents at high risk of maladjustment during their developmental phase of emotion regulation ([Morris et al., 2007](#)). Parents who had more positive emotion and were not troubled by psychopathology might be able to provide more warmth and support to their children, protecting them from stress during the pandemic. Indeed, in a clinical sample of Italian adolescents receiving cognitive-behavioral therapy, researchers found that supportive parenting prior to the COVID outbreak significantly predicted adolescents' adaptive emotion regulation eight months later ([Di Giunta et al., 2021](#)). However, those who experienced more negative emotion and suffered from psychopathology might actually have created additional stress at home, leading to poor adjustment of the child ([Cluver et al., 2020](#); [Cobham and McDermott, 2014](#); [Ohannessian et al., 2005](#)).

There were several limitations of the study worth discussion. First, a sizeable number of adolescents and parents did not complete the study at later time points, mostly as a result of graduation and leaving home of older students at T2 and T3. While acknowledging that the present results run the risk of biasing towards younger adolescents, the robust and consistent correlation found between parental psychosocial variables and children's mental health at different time points emphasizes the critical role parents play in adolescents' adjustment during the pandemic across all ages.

A related limitation was that participants were only recruited in Shanghai, where direct impact of the pandemic was relatively small at the time of the study. As COVID swept globally and continued to pose new threats, follow-up studies and data from a wide range of areas are warranted. Nevertheless, research investigating parental influence on children's adaptation to the pandemic conducted thus far, including the present study, all points to the critical role parents play in protecting children from extreme stress, as well as facilitating children's own capacity of emotion regulation and adaptive behavior under stress (e.g., [Petrocchi et al., 2020](#); [Cimino and Cerniglia, 2021](#)). Lastly, as an initial attempt to understand parent's role in adolescents' adjustment in COVID-19, we did not explore mediation and moderation effects among the parental factors, or interaction effects between parent and child variables—investigation that is necessary and imperative to better understand parental influence on adolescents' mental health in the pandemic.

Notwithstanding the limitations, the study found strong evidence that parents play a critical role on adolescents' psychological adjustment during the COVID-19 pandemic, especially parental emotion, psychopathology, appraisal and social support. At the time when the threats and detrimental consequences of the pandemic continue, and concerted efforts have been carried out to protect adolescents and children's mental health in this unprecedented humanitarian crisis, the study results emphasized the need to pay attention and provide help to the parents, in order to utilize family resources and maximize the effects of

helping programs.

Footnote

We measured the severity of the direct impact of COVID by survey items asking different levels of contact with COVID-patients and travel history to Wuhan, where most confirmed cases were reported. Only two parents reported close contact, and seven parents reported having been to Wuhan during the initial COVID outbreak. Because most students and parents had not suffered from direct impact of the pandemic, the severity variable was not included in the analyses.

CRedit authorship contribution statement

Li and X. Huang are joint first authors. Z. Zhu developed the study concept and contributed to the study design. Recruitment and data collection were performed by Z. Zhu, C. Li and J. Qiu. Y. Li and X. Huang performed the data analysis and interpretation under the supervision of Z. Zhu. Y. Li and X. Huang drafted the manuscript, and Z. Zhu and Y. Xu provided critical revisions. All of the authors approved the final manuscript for submission.

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Declaration of competing interest

None.

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