Left-behind children's social adjustment and relationship with parental coping with children's negative emotions during the COVID-19 pandemic in China

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*U*sing data collected from two provinces in China through an online survey, the current study aimed to investigate left-behind children's emotional and academic adjustment during the COVID-19 pandemic in China. The participants included 1780 left-behind (960 boys) and 1500 non-left-behind (811 boys) children in elementary and junior high school with a mean age of 11.23. Self-reported questionnaires concerning children's depression, loneliness, anxiety, and academic adjustment, and parents' coping with children's negative emotions were completed. The results suggested that compared with non-left-behind children, left-behind children's depression and anxiety symptoms were more severe and their academic adjustment was poorer. However, left-behind children had lower levels of loneliness than non-left-behind children. Additionally, supportive coping types, especially emotion-focused and problem-focused reactions, were significantly negatively correlated with children's depression and anxiety. Unsupportive coping types, especially distress and punitive reactions, were significantly positively correlated with children's depression and anxiety symptoms. Moreover, the relationships between punitive reactions and depression, ignoring and loneliness and problem-focused reactions and academic adjustment were significantly stronger in left-behind children. Hence, during the pandemic, left-behind children were still at a disadvantage even with their parents' company. However, parents' coping style towards left-behind children's negative emotions played a significant role in their adjustment.

Keywords: Emotional adjustment; Academic adjustment; Parental coping with children's negative emotions; Left-behind children; COVID-19 pandemic.

"Left-behind children" (LBC) refers to the children and adolescents who are left behind in rural communities and whose parents moved to cities to look for higher income jobs to support their families. In this study, the operational definition of LBC is children and adolescents under 18 who have been left alone in their hometown and were cared for by people other than their parents for over 12 months (Lin & Yuan, 2007). By 2019, China comprised the largest LBC group with a population of 15 million. Compared to the non-left-behind children (NLBC), LBC are at high risk of emotional and behavioural problems and have poor academic performance (Sun et al., 2010).

Between January and March 2020, the preliminary stage of the outbreak of the COVID-19 in China, most children and parents were staying home due to the shutdown across the country; therefore, LBC had a chance to spend more time with their parents. However, the pandemic brought many challenges to LBC's families: first, LBC had difficulties taking courses online because of their low family economic status and the poor network infrastructure in rural communities (Chen et al., 2019); second, like general children, LBC experienced a stress response to the pandemic, such as negative emotions; third, LBC's parents need to rebuild bonds with their children (Louise et al., 2019) and manage pressure from

children's negative emotions as well as the danger of being unemployed. Hence, although LBC and their parents had a chance to live together for a longer time, they both faced a disadvantaged situation.

Social adjustment of left-behind children

Previous research has shown that LBC exhibits many negative developmental outcomes, including external problem behaviours (e.g. crime and health risk behaviour) (Wen & Lin, 2012), emotional problems (e.g. loneliness and depression) (Sun et al., 2010) and lower academic performance (e.g. academic motivation and achievement) (Fan & Sang, 2005). In general, compared to NLBC in the same rural communities, both cross-sectional and longitudinal evidence suggested that LBC exhibited a lower level of social adjustment in multiple domains (Chen et al., 2019; Su et al., 2015).

The early stages of the COVID-19 pandemic occurred during a Chinese spring festival, so parents of LBC from different professions could not return to work out of town for at least one-and-a-half months on average. Compared to NLBC, this situation brought greater changes to LBC's family income and parent–child bonds. However, the reunion between parents and children is a dynamic process of physical return after separation (Louise et al., 2019). In this process, both parents and children need to adapt their behaviour patterns to fit the new family environment, which may result in a maladaptive child–parent bond. Louise et al. (2019) indicated that LBC have disrupted attachment, which makes them vulnerable to environmental changes. Hence, during the COVID-19 pandemic, LBC encountered more challenges in their family environment, which would make them have poorer adjustment levels compared with NLBC.

The role of parental coping with children's negative emotions

Parental coping with children's negative emotions (PNRs) is a specific parental emotion socialisation behaviour that is exhibited in varied distressing contexts (Li et al., 2010). How parents cope with children's negative emotions has a critical impact on children's social response, which is an important aspect of their social adjustment process (Fabes et al., 2001). Specifically, researchers explored how each coping style affected children's social adjustment. Parental punitive reactions positively predicted externalising problems, whereas emotion-focused reactions were negatively related to internalising problems (Tao et al., 2010). Additionally, parents' problem-focused reactions tended to promote children's social skills. Mirabile (2015) also found that parental ignoring reactions increase the risk of child

socioemotional maladjustment. In general, parental supportive reactions to children's negative emotions, such as problem-focused protected child social adjustment, are more helpful, whereas unsupportive reactions are risk factors.

For the specific period between January and March during the COVID-19 pandemic in China, both LBC and NLBC families confronted changed family daily life. Parents and children spent much more time together, but their outdoor activities were limited, which brought varied outcomes to children depending on the quality of their family interaction. According to attachment theory, repeating separations and reunions with caregivers is stressful and disrupts LBC's attachment behaviours (Rosmalen et al., 2014). Hence, when they reunited with their parents, the previous attachment network pattern changed, in which children needed to make great efforts to adapt to the parent–child bond. A previous study found that LBC lack emotional care and socialisation from parents, so they are more vulnerable when their parents cannot provide positive reactions when they have negative emotions (Zhao et al., 2015). Thus, because LBC are more sensitive to cohesion and emotional relationships with their parents than NLBC (Fan et al., 2018), how parents cope with LBC's negative emotions during the COVID-19 would be vitally important.

The current study

The current study aimed to determine the protective and risk functions of different PNRs during the COVID-19 pandemic of LBC in China. Using cross-sectional data collected from two provinces in China, this study examined whether LBC and NLBC differed in the two aspects of social adjustment (first, emotional adjustment: depression, loneliness and anxiety; second, academic adjustment: academic lifestyle, academic achievement and academic motivation) during the COVID-19 pandemic. Furthermore, we tested the different protective roles of supportive PNRs on social adjustment, including problem-focused, emotion-focused and expressive encouragement as well as the risky role of unsupportive PNRs including punitive reactions, distress reactions, minimisation reactions and ignoring reactions between LBC and NLBC.

Based on previous relevant research and theory, three main hypotheses are as follows:

H1: LBC's emotional and academic adjustment level will be lower than NLBC during the COVID-19 pandemic.

H2: Supportive PNRs will be related to positive emotional and academic adjustment, and unsupportive PNRs will be related to negative emotional and academic adjustment in both LBC and NLBC during the COVID-19 pandemic.

H3: The protective effect of supportive PNRs and the risk effect of unsupportive PNRs on children's emotional and academic adjustment will be stronger in LBC than NLBC during the COVID-19 pandemic.

METHODS

Participants and procedure

Appropriate permission from the county board and participants' consent was obtained before all participants engaged in the study using the instruments described below. The present study was conducted in two provinces (Guizhou and Guangxi) that have consistently had a large population of LBC. A two-step sampling procedure was used to obtain a representative sample of children and their parents. In both provinces, we randomly selected 5 poor counties from 15 poor counties and then randomly selected two villages from each targeted county. Then, we contacted the Women's Federation Chairman of each village, who agreed to collaborate with us. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The experimental protocol was approved by the Liaoning Normal University ethics committee. All participants participated voluntary and informed consent was obtained from each child by his or her parent or adult relative caretaker.

Due to the shutdown caused by the COVID-19, the questionnaires were administered to participants via Questionnaire Star, a professional online questionnaire platform. We imported the instruments to Questionnaire Star, which generated a link, and then the Women's Federation Chairmen sent the link to parents in their village (2237 LBC parents and 1599 NLBC parents) who agreed to participate in the study.

Based on the operational definition of LBC in this study, which included children and adolescents who have been left alone in their hometown and were cared for by people other than their parents for over 12 months (Lin & Yuan, 2007), the LBC group was selected accurately by these eligibility criteria. The NLBC group comprised children and adolescents living in the same area as the LBC with both parents after birth. In the selection process, some children and adolescents were excluded from the LBC group for the following reasons: 311 had one of their parents working outside town and another living with them; 135 had been left alone for less than 12 months; 8 did not report clear important basic information; and 3 had a parent who had abandoned them or had not contacted them for years. In addition, some children and adolescents were excluded from the NLBC group for the following

reasons: 96 had one of their parents living outside the town for several months in a year and 3 did not report clear important basic information. The final sample for analysis consisted of 1780 LBC (960 boys and 820 girls) and 1500 NLBC (811 boys and 689 girls) with a total participation rate of 85.51%.

Measures

Demographic information

Parents reported children's date of birth, gender, grade, father's and mother's educational attainment (elementary or lower, middle school, high school or higher), family poverty status relative to fellow villagers (under average, average, above average), parents' condition before the COVID-19 (both parents lived with the child; one parent worked outside; both parents worked outside longer than 12 months; divorced; others), and parent's condition during the COVID-19 (both parents lived with the child; one parent worked outside; both parents worked outside; divorced; others) and parent's working condition (both stopped working; one parent stopped working; both working). We combined the higher level of education achieved by either parent and family economic status as a measure of family SES (the two measures were each standardised and averaged to provide an overall index).

Social adjustment

Depression. The Children's Depression Inventory—Short Form (CDI−S) is a 10-item self-report questionnaire that assesses children's depression symptoms, such as sleeping difficulty, poor appetite and suicidal ideation (Kovacs, 1992), a Chinese version of the CDI-S has been validated (Liu, 1997). Each item has three descriptions of one specific symptom corresponding to no symptoms, moderate depressive symptoms and severe depressive symptoms, which are scored 0, 1 and 2, respectively. The total score ranges from 0 to 20. Higher scores indicate more severe depressive symptoms in children. Participants were asked to choose the best statement describing their feelings after the COVID-19 pandemic. We obtained a Cronbach's alpha score of .79 in the present study.

Loneliness. Four items were selected and revised from Asher et al. (1984). The Loneliness and Social Dissatisfaction Questionnaire and the Chinese version was widely used and well validated in China (Sun et al., 2010). Each item addresses how often children feel lonely. Participants rated each item on a 5-point scale to choose the best statement describing their feeling of loneliness after the COVID-19 pandemic (e.g. "Do you feel sad and alone during this winter break?"). Items were averaged such that higher scores indicated higher levels of loneliness. Cronbach's alpha score was .88 in the present study.

Anxiety. The State–Trait Anxiety Inventory (STAI) developed by Spielberger (1983) is a self-reported questionnaire that assesses children's state anxiety and trait anxiety, and the Chinese version has been widely used and has demonstrated good reliability and validity (Liu et al., 2007). In the present study, we selected the previous 20 items in full version for measuring state anxiety because we considered assessing the more changeable state of anxiety during the COVID-19 pandemic. Hence, participants rated each item on a 4-point scale to choose the best statement describing their feelings after the COVID-19 pandemic and with larger averaged scores representing higher levels of anxiety. Cronbach's alpha score was .85 in the present study.

Academic adjustment. The Academic Adjustment Scale (AAS) is a self-reported questionnaire that measures students' academic adjustment, which has been designed and validated for use for individuals whose study environment might or might not have changed (e.g. living abroad) (Anderson et al., 2016). Because all the children took courses online, which is far different from traditional classroom settings, ASS is more suitable for this situation than others in that it assesses a more stable state of academic adjustment. ASS was originally developed in English, so it was translated into Chinese and back-translated into English to ensure linguistic and conceptual equivalence (Marsella & Leong, 1995). AAS consists of three dimensions: academic lifestyle, academic achievement and academic motivation. Each dimension has three items. In the current study, we adopted the expression of each item to help children of different ages better understand the items and asked children to report academic adjustment during the pandemic (e.g. "I am enjoying the lifestyle of studying at home" [academic lifestyle]; "I am satisfied with the level of my academic performance lately" [academic achievement]; "After this winter break, I think I will do my best to overcome the difficulties of the subject I don't like" [academic motivation]. Responses ranged from 1 (rarely applies to me) to 5 (always applies to me). Scores were computed by averaging items to indicate children's academic adjustment during the pandemic. Cronbach's alpha score was .84 in the present study.

Parental coping with children's negative emotions

The Coping with Children's Negative Emotions Scale (CCNES) is a self-report questionnaire that measures the degree to which parents perceive themselves as reactive to children's negative affect in distressful situations (Fabes et al., 1990). The CCNES consists of six subscales that reflect the specific types of coping response parents tend to use when children have negative emotions, which include distress reactions (DR), punitive reactions (PR), expressive encouragement (EE), emotion-focused reactions (EFR), problem-focused reactions (PFR) and minimisation reactions (MR). Mirabile (2015) added one subscale Ignoring Reactions (IR) that was well validated.

In the original version, the CCNES includes 12 scenarios depicting times a child experiences negative emotion such as being upset, scared and angry. Each scenario is followed by six different types of responses to children's negative emotions. In this study, we adopted the 12 scenarios to the children's emotional problems induced by the COVID-19 pandemic and quarantine to explore the parent's coping style during the COVID-19. For instance, fear (e.g. if my child watched the news on TV and found everyone wearing masks and protection suits on the street and then gets scared and cries, I would …) scenario is followed by seven coping methods. After reading each scenario, parents are asked to rate how likely it is that they would respond using these possible ways. Responses were given on a 5-point scale ranging from "very unlikely" to "very likely." Items were averaged such that the scores in each subscale indicate the specific type of coping response parents tend to use when children have negative emotions. In addition, CCNES was originally developed in English, so it was translated into Chinese and back-translated into English to ensure linguistic and conceptual equivalence (Marsella & Leong, 1995). The current study found internal consistency for each dimension: Cronbach's alpha scores were .81, .73, .77, .78, .80, .77 and .85 for punitive reactions, distress reactions, minimisation reactions, problem-focused reactions, emotion-focused reactions, expressive encouragement, and ignoring reactions, respectively.

Data processing

All analyses were conducted using SPSS version 23. First, preliminary analyses, including descriptive statistics for and intercorrelations between all variables, were conducted. Second, regression analyses were conducted to explore the prediction of independent variables to dependent variables. Third, hierarchical regression was conducted to test the moderating effect. Continuous predictors were centred to decrease non-essential collinearity.

RESULTS

Preliminary analyses

Descriptive statistics for and correlations among key variables are presented in Tables 1–3. The correlation analyses included the following covariates: child's

TABLE 1
Demographics for Left-behind children (LBC) and non-left-behind children (NLBC) before and during the COVID-19 pandemic

Demographic variables		LBC (1780)	NLBC (1500)
Parents' working condition before the COVID-19 pandemic	Both stopped working	0 (0.00%)	79 (5.27%)
	One parent stopped working	217 (12.19%)	511 (34.07%)
	Both working	1563 (87.81%)	910 (60.67%)
Parents condition before the COVID-19 pandemic	Both parents lived with child	0 (0.00%)	1500 (100%)
	One of parents worked outside	0 (0.00%)	0 (0.00%)
	Both parents worked outside	1780 (100%)	0 (0.00%)
Parent condition during the COVID-19 pandemic	Both parents live with the child	1693 (95.11%)	1482 (98.80%)
	One parent works outside	84 (4.72%)	16 (1.07%)
	Both parents work outside	0 (0.00%)	0 (0.00%)
	Divorced and others	3 (0.17%)	2 (0.13%)

TABLE 2
Descriptive statistics for key variables

Variable	M (LBC/NLBC)	SD (LBC/NLBC)	Min	Max
SES	0.51/0.48	0.55/0.57	0	1
Depression	5.10/3.48	9.60/8.59	0	20
Loneliness	1.98/2.43	0.72/0.76	1	5
Anxiety	2.05/1.86	0.63/0.66	1	4
Academic adjustment	3.12/3.54	0.75/0.77	1	5
Expressive encouragement	3.21/3.46	0.69/0.66	1	5
Emotion-focused reactions	4.01/4.12	0.47/0.46	1	5
Problem-focused reactions	4.10/4.23	0.53/0.49	1	5
Distress reactions	2.77/2.54	0.65/0.68	1	5
Punitive reactions	1.98/1.39	0.90/0.88	1	4.67
Minimisation Reactions	2.33/2.42	0.72/0.75	1	5
Ignoring reactions	2.34/2.67	0.91/0.93	1	4.83

LBC = left-behind children; NLBC = non-left-behind children.

TABLE 3
Intercorrelations among children's social adjustment and parental coping with children's negative emotions

Variable	EE	EFR	PFR	DR	PR	MR	IR
1. Depression	−0.07	−0.18*	−0.20**	0.22**	0.46***	0.07	0.14
2. Loneliness	−0.18*	−0.22**	−0.15	0.15	0.41***	0.11	0.36***
3. Anxiety	−0.09	−0.17*	−0.24**	0.20**	0.51***	0.13	0.12
4. Academic adjustment	0.13	0.24**	0.41***	−0.11	−0.17*	−0.09	−0.14

DR = distress reactions; EE = expressive encouragement; EFR = emotion-focused reactions; IR = ignoring reactions; MR = minimisation reactions; PFR = problem-focused reactions; PR = Punitive Reactions.
*$p < .05$. **$p < .01$. ***$p < .001$.

gender, child's age and SES. The results showed that emotion-focused reactions were significantly negatively correlated with three indicators of children's emotional adjustment and significantly positively correlated with academic adjustment. Punitive reactions were significantly positively correlated with three indicators of children's emotional adjustment and significantly negatively correlated with academic adjustment. Children's loneliness was significantly negatively correlated with parental coping style of expressive encouragement and emotion-focused reactions and significantly positively correlated with punitive and ignoring reactions.

Children's social adjustment and PNRS in LBC and NLBC

Separate hierarchical multiple regressions were conducted to test the effect of predicting variables on each child's emotional adjustment and academic adjustment. Variables included age, gender and SES in Model 1 as covariates, LBS in Model 2, one PRNs dimension in Model 3 and the LBS × the PRNs dimension in Model 4. Table 4 only presents the summary results of the regression analyses in which the interactions were significant. Separate simple slope analyses were conducted to evaluate significant interactions.

TABLE 4
Hierarchical regressions for key variables predicting emotional and academic adjustment

	Depression							
	Model 1		Model 2		Model 3		Model 4	
Variable	B	SE	B	SE	B	SE	B	SE
Age	.01	.02	.00	.02	.00	.02	.00	.02
Gender	.14*	.04	.09	.04	.09	.04	.09	.04
SES	−.23**	.20	−.17	.20	−.16	.20	−.16	.20
LBS			1.18***	.25	1.18***	.23	1.20***	.23
PR					1.33***	.29	1.24***	.29
LBS × PR							1.12***	.44
R^2	.02		.04		.15		.16	
ΔR^2			.02***		.11***		.01***	

	Loneliness							
	Model 1		Model 2		Model 3		Model 4	
Variable	B	SE	B	SE	B	SE	B	SE
Age	.02	.02	.02	.02	.02	.02	.02	.02
Gender	.03	.03	.03	.03	.03	.03	.03	.03
SES	−.05	.04	−.04	.04	−.05	.04	−.05	.04
LBS			−.21**	.04	−.20**	.04	−.20**	.04
IR					1.21***	.36	1.10***	.34
LBS × IR							.89**	.32
R^2	.01		.02		.14		.16	
ΔR^2			.01**		.12***		.02**	

	Academic adjustment							
	Model 1		Model 2		Model 3		Model 4	
Variable	B	SE	B	SE	B	SE	B	SE
Age	.02	.02	.02	.02	.02	.02	.02	.02
Gender	−.07	.06	−.06	.06	−.06	.06	−.06	.06
SES	.03	.05	.04	.05	.04	.05	.04	.05
LBS			−.87***	.21	−.76***	.21	−.76***	.21
PFR					1.43**	.32	1.31**	.31
LBS × PFR							−.96**	.35
R^2	.01		.02		.16		.17	
ΔR^2			.01***		.14***		.01**	

IR = ignoring reaction; LBS = left-behind situation; PFR = problem-focused reactions; PR = punitive reactions. *Note:* Gender was coded as 0 for boys and 1 for girls. The left-behind situation was coded as 0 for the non-left-behind children group and 1 for left-behind children.
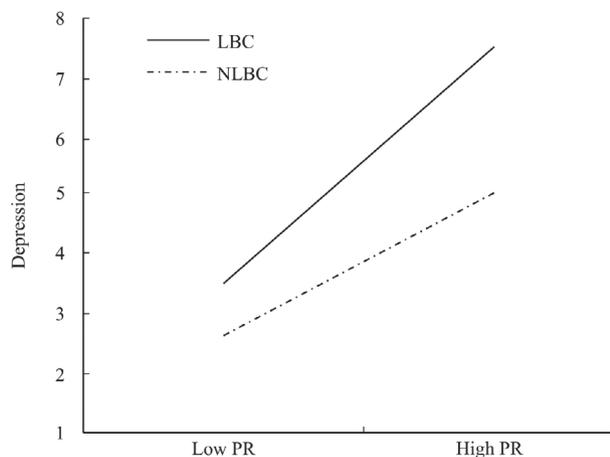*$p < .05$. **$p < .01$. ***$p < .001$.

For depression, after controlling for age, gender and SES, the left-behind situation was a significant predictor, which indicated that LBC's level of depression was significantly higher than that of NLBC during the COVID-19 pandemic. Model 3 revealed that parental punitive reactions predicted depression in both LBC and NLBC groups during the pandemic. Furthermore, the interaction between the left-behind situation and punitive reactions was significant. As shown in Figure 1, Simple slope analysis showed that the relationship between punitive reactions and depression was significantly stronger in LBC (*simple slope* = 2.44, $t = 5.74$, $p < .001$) than in NLBC (*simple slope* = 1.19, $t = 3.81$, $p < .001$).

For loneliness, after controlling age, gender and SES, left-behind situation was a significant predictor and it was inconsistent with our prediction. We found that NLBC's level of loneliness was significantly higher than LBC during the COVID-19. In Model 3, ignoring reactions was a significant predictor of loneliness for both LBC and NLBC during the pandemic. Moreover, the interaction between the left-behind situation and ignoring reactions was significant. Simple slope analysis revealed that the relationship between ignoring reactions and loneliness was significantly stronger in LBC (*simple slope* = 1.31, $t = 2.97$, $p < .01$) than in NLBC (*simple slope* = .27, $t = 1.28$, $p > .05$), as shown in Figure 2.

For academic adjustment, after controlling for age, gender and SES, the left-behind situation was a significant predictor where LBC's level of academic adjustment was significantly lower than that of NLBC during the COVID-19. Model 3 revealed that parental problem-focused reactions predicted academic

Figure 1. Simple slope analysis of significant left-behind situation × punitive reactions interaction on depression.
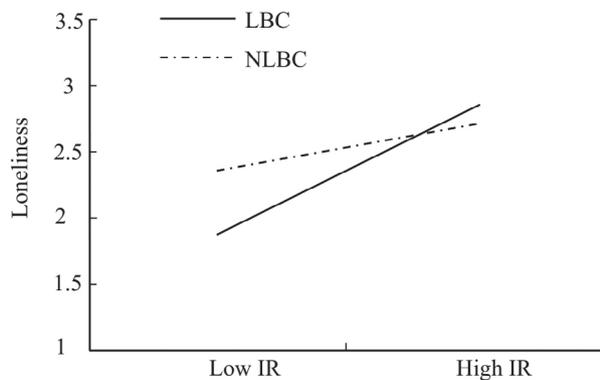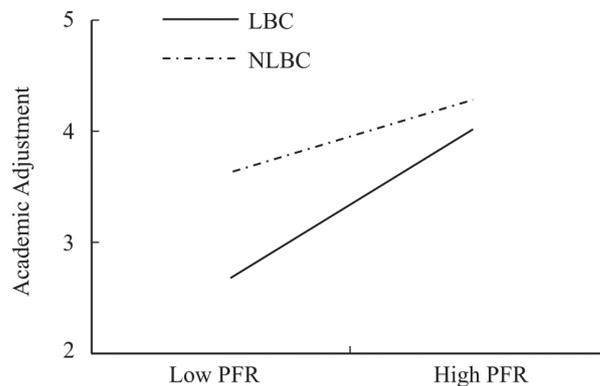

Figure 2. Simple slope analysis of significant left-behind situation × ignoring reactions interaction on loneliness.

adjustment in both LBC and NLBC groups during the pandemic. Simple slope analysis showed that the association between problem-focused reactions and academic adjustment was significantly stronger in LBC (*simple slope* = 1.24, *t* = 3.33, *p* < .001) than in NLBC (*simple slope* = .51, *t* = 1.97, *p* < .05), as shown in Figure 3.

For anxiety, after controlling for age, gender and SES, the left-behind situation was a significant predictor ($B = .15$, $SE = .28$, $p < .01$) where LBC's level of anxiety was significantly lower than that of NLBC during the COVID-19 pandemic. However, none of the interactions between the left-behind situation and any dimensions of PRNs were significant.

DISCUSSION

Previous studies have revealed that LBC are at risk when it comes to many aspects of social adjustment compared to the general population. Due to the quarantine and shutdown from the COVID-19 pandemic, the family situation of LBC changed such that their parents could not

Figure 3. Simple slope analysis of significant left-behind situation × problem-focused reactions interaction on academic adjustment.

go to work and rather stayed with them at home, which brought changes in their family environment as well as parent–child bonds. Therefore, the current study explored the emotional and academic adjustment of LBC during this period compared to NLBC and the protective and risk roles of different types of parents' coping with children's negative emotions.

The results of the comparisons between LBC and NLBC on emotional and academic adjustment indicated that LBC had a higher level of emotional problems of depression and anxiety and lower levels of academic adjustment than NLBC during the COVID-19, which is consistent with our first hypothesis and previous studies (Fan & Sang, 2005). Though LBC had their parents with them during the pandemic, their parent–child bonds were still not stable since their family environment changed because of the pandemic. However, we found that LBC had a lower level of loneliness than NLBC during the COVID-19, which is in disagreement with H1 and inconsistent with previous research (Jia & Tian, 2010). This incompatible result could be explained by the difference in the relationship between peer relationships and loneliness in LBC and NLBC. Sun and his colleagues (2010) found that the predictive effect of peer relationships on loneliness in LBC was significantly weaker than NLBC because the major predictor of LBC's loneliness is parental absence but for NLBC, friendship played a more important role in their feelings of loneliness. Hence, on account of the quarantine, NLBC had fewer chances to maintain peer relationships, which might increase their feelings of loneliness. In contrast, LBC reunited with their parents and regain the concern from their families during the pandemic, which was the reason for their lower level of loneliness (Jia & Tian, 2010).

According to the theory of Fabes et al. (2001) and Mirabile (2015), the seven dominating types of parental coping with children's negative emotions can be divided into unsupportive and supportive reactions. The preponderance of evidence suggests that PNRs play a more

prominent role in children's adjustment outcomes than emotional adjustment itself (Li et al., 2010). In the present study, the results underscored the association between PNRs and children's emotional and academic adjustment during the pandemic, which was verified and detailed in H2. On the one hand, supportive coping types, especially emotion-focused and problem-focused reactions, were closely related to children's depression and anxiety. Indeed, previous research has stressed the importance of parental responses to release children's negative emotions and help solve the problem induced by emotions, which is an emotional socialisation process (Yan et al., 2016) and would help children socialise their own abilities of emotional adjustment. On the other hand, unsupportive coping types, in particular, distress reactions and punitive reactions, endangered children's depression and anxiety symptoms (Fabes et al., 2001), because there was an intergenerational transmission between parents' emotional behaviours and children's emotional problems (Zhao et al., 2018). Therefore, if parents use harsh coping strategies in response to children's negative emotions, then their children would express emotion in relatively intense ways (Fabes et al., 2001). In addition, there were significant associations between academic adjustment and parental emotion-focused, problem-focused and punitive reactions. Consistent with an Emotion-Attention Process Model advanced by Moed et al. (2016), parent–child negative emotion reciprocity predicted children's school success through children's negative emotionality as well as their low attention focusing.

Crucially, the present study found that punitive, ignoring and problem-focused reactions are important moderators of the relationship between the left-behind situation and children's depression, loneliness and academic adjustment, respectively, during which indicated that LBC were more sensitive to parent–child interaction patterns since they had less time with their parents overall. More specifically, for LBC, if parents conducted more punitive reactions when they had negative emotions, their depression symptoms would be amplified more significantly; if parents adopted ignoring reactions frequently, LBC's feeling of loneliness would be significantly increased, although their overall level of loneliness was lower than that of NLBC during the pandemic; if the parent used more problem-focused reactions towards children's negative emotions, LBC's academic adjustment would be protected though they had more academic adjustment difficulties. Since the multidimensionality of social adjustment and PRNs, it is significant to identify the adjustment in different domains that were affected by which specific coping ways. Previous findings revealed that, in comparison with other parental coping types, LBC's emotional adjustment was more vulnerable to punitive and ignoring reactions and their academic adjustment significantly improved by problem-focused reaction. To summarise, though PRNs were important to children's social adjustment generally, LBC were more sensitive to these three reactions for their emotional and academic adjustment, respectively.

For the emotional adjustment, according to attachment theory, repeating separations and reunions with caregivers would damage the attachment between children and parents, which make children more insecure when there are changes in the family environment (Rosmalen et al., 2014). During the COVID-19, LBC and their parents both need to make efforts to adjust to rebuild their attachment pattern. Therefore, if parents exhibit an unsupportive coping style when LBC have negative emotions, they would only make the emotional problem more severe. Punitive and ignoring but not distress and minimisation reactions played a moderator role between the left-behind situation and children's emotional adjustment, which might be because the punitive reaction is more intense than other coping methods (Mirabile, 2015), especially for vulnerable children like LBC. Additionally, because LBC were neglected by their parents and society for a long time (Chen et al., 2010), their emotional adjustment would be damaged more severely if they were still ignored when they were together with their parents.

For academic adjustment, the Emotion-Attention Process Model declared that negative parent–child relationships affect reciprocity and elicit children's low attention focusing because children's emotionality influenced their ability to focus and shift attention, and children's attention focusing would influence their academic adjustment (Moed et al., 2016). From February to March of the pandemic period, all students were taking classes at home after the winter break, which needed a higher level of self-discipline and attention ability to learn efficiently (Gaytan, 2013). LBC had poorer academic performance and higher level of academic anxiety due to the lack of appropriate family education and family warmth (Fan & Sang, 2005). However, during the pandemic, if they had great instruction from parental problem-focused reactions when they confronted with academic difficulties and anxiety, they would get additional improvement in academic adjustment than NLBC, since NLBC already had a stable parental problem-focused reaction pattern. Hence, LBC would benefit more from problem-focused reactions on their academic adjustment. Other supportive PNRs did not show significant interactions with the left-behind situation, which might be because problem-focused strategy is a more direct way for children to learn how to deal with academic difficulties that involve solvable problems (Liu et al., 2009).

The present study has some limitations. First, due to the unpredictive outbreak of COVID-19, all data were collected through an online survey, so although the reliability reached an acceptable standard, it might decrease compared with previous studies at other times. In addition, a sampling bias might exist because the

counties with poorer network infrastructure were out of reach, although the counties we selected are the typical areas where the left-behind phenomenon is more frequently observed. Second, since parents of LBC might not perceive children's situations immediately after returning home in the short term, children's adjustment outcomes were self-reported, which might increase common method bias. Third, the family condition was complicated during the pandemic, and there might be more stressors on children and parents, such as the dangers of unemployment for parents and peer distancing for children. The current study only assessed the outcomes of children's social adjustment during this period; further exploration is required to understand the major stressors induced by a pandemic such as COVID-19. Fourth, we explored different effects of the types of PNRs, but LBC's family reunion was a dynamic process (Louise et al., 2019), so future research could focus on the family functioning process of reunion in LBC.

Despite these limitations, this study provided evidence about the situation of LBC's emotional and academic adjustment during the COVID-19 pandemic and specifically how PRNs buffer or endanger their adjustment outcomes induced by left-behind situations. Our study suggests that LBC parents should conduct more supportive coping reactions towards children's negative emotions when they are reunited and reduce the frequency of using unsupportive coping reactions.

CONCLUSIONS

During the COVID-19 pandemic, LBC's depression and anxiety symptoms were more severe and had poorer academic adjustment than that of the NLBC. However, the left-behind group had a lower level of loneliness. Moreover, the relationships between punitive reactions and depression, ignoring reactions and loneliness and problem-focused reactions were significantly stronger in LBC. The present findings suggested that, during the pandemic, compared with NLBC, LBC were still in a disadvantaged place even with parents' company as parents' coping style towards children's negative emotions caused by unprecedented crisis played a significant role on their emotional and academic adjustment.

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