Fostering positive academic emotions in overseas Chinese left-behind children: The role of perceived social support, emotion regulation and academic self-efficacy

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Abstract

The current study explored the associations between perceived social support and positive academic emotions and the mediating roles of emotion regulation and academic self-efficacy among overseas Chinese left-behind children. A convenience sample of 418 overseas Chinese left-behind children aged between 11 and 16 completed self-reported questionnaires on perceived social support, emotion regulation, academic self-efficacy, and positive academic emotions. The results indicated that perceived social support positively predicted positive academic emotions among overseas Chinese left-behind children. Additionally, emotion regulation and academic self-efficacy mediated the relationship by a respective mediating role and a chain-mediating role. The results advanced our understanding of the connection between perceived social support and positive academic emotions and have implications for negative academic emotions prevention and interventions of overseas Chinese left-behind children in the future.

Keywords: Overseas Chinese left-behind children; Perceived social support; Positive academic emotions; Emotion regulation; Academic self-efficacy

1. Introduction

In the era of globalization, the massive labor mobility across borders has led to the parent-child separation of many families (McAuliffe & Triandafyllidou, 2021). With parents working away from their homeland, children are geographically separated from one or both parents, resulting in a unique pattern of transnational guardianship. Recent research has shown that these children are more vulnerable to emotional adversities (Ding et al., 2023; Zhou et al., 2020). Long-term parent-child separation is considered to be associated with various adverse psychological and affective outcomes, such as impaired academic adaptability (Zhang et al., 2022), diminished emotional regulation (Liao et al., 2023), and an elevated risk of school dropout. As a result, there is a growing focus on understanding the emotional well-being of left-behind children (Wang et al., 2022; Wu et al., 2023).

Academic emotion is a critical motivating factor for learning interest, which is essential for students learning behavior and school adaptability (Griffiths, 1984). Positive academic emotions are positively associated with learners' cognitive resources (Pekrun, 2016), academic engagement (Linnenbrink-Garcia & Pekrun, 2011), and metacognitive regulation (Taub et al., 2021). This association provides a robust foundation for learning performance. In light of the growing number of students facing a competitive environment with high-stakes examinations, providing a more comprehensive range of support is imperative to sustain positive academic emotions in the classroom (Ansong et al., 2024; Jerrim, 2022). Thus, recent studies have explored the antecedents of positive academic emotions (Feraco et al., 2023; Miao & Gan, 2019). However, few studies have examined the predictors of positive academic emotions among overseas Chinese left-behind children.

Existing literature highlights the significant role of perceived social support in influencing students' academic emotions (Pierce & Quiroz, 2019) . It is also noted as a crucial resource for left-behind children after parent-child separation (Fu et al., 2024). Prior research has indicated that children who have experienced parent-

child separation exhibit reduced levels of social support, particularly emotional support, in comparison to non-left-behind children (Su et al., 2017). However, perceived social support has been found to be an effective coping resource that can influence the psychological adjustment and specific affective outcomes (e.g., enjoyment and enthusiasm) of children facing vulnerable situations (Dong et al., 2019; Xiao et al., 2020). Research has also documented that supportive social relationships play a pivotal role in motivating students to achieve emotional development through higher levels of self-reinforcement (Surkan et al., 2023). Despite this, there is limited research on how perceived social support impacts positive academic emotions.

This study was theoretically informed by the social cognitive theory framework, which suggested a reciprocal relationship between environmental and personal factors and their influence on an individual's ability to regulate cognitive, emotional, and behavioral processes (Bandura & Wessels, 1997). Among the various personal factors, the role of emotion regulation and academic self-efficacy is increasingly emphasized in the emotional development of left-behind children (Chen et al., 2023; Wang & Liu, 2022). These factors are influenced by a supportive environment that promotes learning achievement. Emotion regulation is considered a coping mechanism for controlling and adjusting students' emotional states to the demands of learning tasks (Graziano et al., 2007). Previous studies have found that students who can regulate their emotions effectively can reduce their learning anxiety, cultivate positive emotions, and play an active role in buffering academic stress (Quoidbach et al., 2015; Schmidt et al., 2010). In addition to emotion regulation, academic self-efficacy is also a significant predictor of emotional well-being in the classroom, especially for left-behind children (Putwain et al., 2013; Zhen et al., 2017). Academic self-efficacy has been demonstrated to have a positive relationship with psychological well-being (Pauletto et al., 2021) and positive emotions (Leach et al., 2001). Recent studies have confirmed that students with high academic self-efficacy are more likely to exhibit an optimistic attitude toward learning and experience positive emotions than those with lower beliefs regarding their learning tasks (Zyberaj, 2022). Therefore, due to the unique background and challenges faced by left-behind children, it is crucial to explore how these factors interact and influence positive academic emotions.

The present study was concerned with overseas Chinese left-behind children whose positive academic emotions are generally overlooked. Furthermore, in addition to excessive homework and intense peer competition, left-behind children also suffer from reduced emotional control and social support. Therefore, This study aimed to fill the gap by exploring the generative mechanisms underlying the relationship between perceived social support and positive academic emotions. By identifying the associations between variables, this research could inform educational practices and interventions to facilitate the academic success of left-behind children.

2. Literature Review

2.1. Perceived Social Support and Positive Academic Emotions

Perceived social support (PSS) refers to an individual's perception of the availability and adequacy of support or assistance that they can obtain from their social network (Eagle et al., 2019). These social networks, primarily composed of family, peers, and significant others, become increasingly crucial in psychological and affective development for left-behind children (Fan et al., 2010). Within the framework of social cognitive theory, Bandura emphasised that an individual's cognitive construction and affective orientation are determined by internal factors and external circumstances (Hill et al., 2009). Social support is considered to be a crucial external factor that has a significant impact on the psychological and affective problems of students. Positive Academic emotions (PAE), regarded as a critical prerequisite for students to improve their academic performance, is a combination of positive feelings (enjoyment, pride, and hope) that occur when students are engaged in learning, teaching, and achievement in the academic environment. Previous studies conducted among adolescents in the United States and South Korea noted a strong correlation between high levels of perceived social support and reduced negative emotional status (Brunsting et al., 2021; Kang et al., 2022). Studies of Chinese students have provided similar results (Chen, 2019). Those findings indicated that students are more likely to experience

reduced levels of psychological distress and emotional problems when perceiving high-quality support from their surroundings. Based on the facts presented above, we proposed our first hypothesis:

Hypothesis 1: Perceived social support would be positively associated with positive academic emotions among overseas Chinese left-behind children.

2.2. The mediating role of Emotion regulation

Emotion regulation, referring to an ability of students to influence emotional trajectories during learning tasks toward a goal (Gross et al., 2011).Effective emotional regulation by students can facilitate the management of academic stress, enhance attention, and sustain motivation in the classroom, ultimately resulting in better academic performance (Namaziandost et al., 2023). The existing literature has demonstrated the crucial role of social relationships in facilitating children's early emotional management (Hollenstein et al., 2017; Wong et al., 2022). Li et al. (2021) further elucidated that perceived social support can influence emotion-regulation strategies, and students with high-quality social support were more likely to manage and transform negative emotions into positive experiences effectively. Additionally, emotion regulation is a predisposition to academic emotion. According to the transdiagnostic model, negative emotions are the consequence of emotional dysregulation. In other words, emotion regulation might positively correlate with increased academic emotion, and high levels of emotion regulation would predict positive academic emotion. Empirical studies reveal that employing effective emotion regulation strategies is crucial for handling academic stress and anxiety (Vanderlind et al., 2020), improving self-regulation (Gagne et al., 2021), and promoting positive emotions (Tugade & Fredrickson, 2007). Based on these theoretical insights and empirical evidence, the present study proposed the following hypotheses:

Hypothesis 2: Emotion regulation serves as a mediator between perceived social support and positive academic emotions among overseas Chinese left-behind children.

2.3. The mediating roles of Academic Self-Efficacy

Academic self-efficacy(ASE) is defined as a belief or confidence in one's ability to complete academic tasks and overcome learning challenges (Elias & MacDonald, 2007). The social cognitive model suggested that there are predisposing factors to self-efficacy, of which the main predisposing factor is the external environment (e.g., social support) (Lakey & Drew, 1997). Brouwer et al. (2018) believed that the supportive social network is a bidirectional ecosystem in which students mutually seek mutual support to build beliefs and confidence in their learning. Previous studies have also found a positive correlation between perceived social support and academic self-efficacy (Akanni & Oduaran, 2018). The more support obtained from peers and teachers in early adolescence, the higher the academic self-efficacy level during adolescence (Adler-Constantinescu et al., 2013). Similar findings were reported among left-behind children (Fan & Fan, 2021; Zhang et al., 2019). In addition, beliefs and confidence toward learning play a crucial role in influencing an individual's academic emotions (Putwain et al., 2013). Insufficient self-efficacy is associated with a variety of adverse outcomes (e.g., anxiety, stress, depression, and sadness) during the learning process (Kristensen et al., 2023; Muris, 2002). Thelwell et al. (2007) stated that self-efficacy provided the essential information to maintain positive emotional states in the classroom. Previous studies have shown that high levels of self-efficacy are associated with reduced emotional exhaustion and improved academic well-being (Rahmati, 2015).

Building on these findings, this study puts forward the following hypotheses.

Hypothesis 3: Academic self-efficacy serves as a mediator between perceived social support and positive academic emotions among overseas Chinese left-behind children.

2.4. The chain mediating effect

Emotion regulation influences an individual's confidence in learning by affecting information processing across multiple domains. The process model of emotion regulation suggests that managing emotions (i.e.,

attentional deployment, cognitive change and response modulation) can activate positive emotions and cognitive arousal, thereby enhancing self-esteem and beliefs in performance tasks (Benfer et al., 2018). Adolescents who can effectively regulate negative emotions have been shown to have enhanced self-identity, academic satisfaction, optimism, and reduced academic stress (Feraco et al., 2023; Müller & Bonnaire, 2021). Medrano et al. (2016) highlighted that students with lower emotional regulation capabilities may struggle to manage anxiety and tension when faced with challenging tasks, thus undermining their self-efficacy. Usán Supervía and Quílez Robres (2021) provided direct evidence that academic emotion regulation is a strong predictor of student self-efficacy belief. Similar results have been found in studies on left-behind children (Huang et al., 2023; Lu et al., 2024), indicating that students with high social support may have improved emotional regulation, leading to higher academic self-efficacy and positive academic emotions. Therefore, emotional regulation and academic self-efficacy are mediators of the relationship between perceived social support and positive academic emotions among overseas Chinese left-behind children. Based on the evidence presented, the following hypothesis was formulated:

Hypothesis 4: Emotion regulation and academic self-efficacy play mediating chain roles in the association between perceived social support and positive academic emotions among overseas Chinese left-behind children.

2.5. The current study

This study aimed to examine a complex model links social cognitive and emotion regulation theories. adopting variables such as perceived social support, emotion regulation, academic self-efficacy, and positive academic emotions. We adopted a cross-sectional design with a sample of overseas Chinese left-behind children to validate the hypotheses above. The results of this study not only contributed to understanding the relationship between perceived social support, emotion regulation, and academic self-efficacy, but also had implications for fostering positive academic emotions among overseas Chinese left-behind children.

3. Method

3.1. Research setting and Participants

This study utilized a convenience sample method to collect data from the hometown of overseas Chinese in Wenzhou, Zhejiang Province, China. A total of 460 questionnaires were delivered and 418 valid responses were received. The sample consisted of 206 girls and 212 boys, all with at least one parent employed overseas. The age of the participants varied between 11 and 16 years, with an average age of 13.88 years (standard deviation = 1.27). Participants were selected depending on the accessibility of schools. Initially, we contacted school administrators to explain the study's objectives, potential risks, and benefits. After obtaining consent from the administration, we obtained official authorization from the children's guardians. Subsequently, students were invited to participate in the study, with the explicit understanding that their involvement was voluntary and that they could withdraw at any time.

4. Measures

4.1. Perceived social support

The Multidimensional Scale of Perceived Social Support (MSPSS), developed by Zimet et al. (1990), was utilized to assess practical assistance, emotional support, and decision-making assistance from friends, family, and significant others. The scale comprises 12 items designed to measure children's perceived social support, rated on a 7-point scale from 1=strongly disagree to 7=strongly agree. (e.g., "There is a special person who is around when I am in need."). Higher scores indicate a higher perceived level of social support. In this study, the Cronbach's α coefficient was 0.96, demonstrating good internal consistency. A confirmatory factor analysis was conducted, and

the results [$\chi 2/df = 1.79$, RMSEA = 0.044, GFI = 0.964, AGFI = 0.945, NFI = 0.990, CFI = 0.995, TLI = 0.994, SRMR=0.012] indicate a high level of validity and reliability of the questionnaire structure.

4.2. Academic Self-Efficacy

The Academic Self-Efficacy Scale, developed by Pintrich and De Groot (1990), was adopted to evaluate students' perceptions and judgements of academic task completion. In this study, we employed a revised Academic Self-Efficacy Scale by Wei et al. (2014), which was validated in Rui Zhen's (2017) study to guarantee its appropriateness for Chinese students. The scale consists of 9 items rated on a 7-point Likert scale from 1 (completely disagree) to 7 (completely agree). Each item adds a learning context. For example, "I expect to do well compared to other students in Chinese/Maths/English classes". In the current study, the scale showed good internal reliability ($\alpha = 0.94$), and the fit indices from the validated factor analysis were adequate [$\chi 2/df = 4.26$, RMSEA = 0.070, GFI = 0.971, AGFI = 0.933, NFI = 0.978, CFI = 0.983, TLI = 0.972, IFI = 0.983, SRMR=0.022].

4.3. Emotion Regulation

Emotion regulation was assessed by using the Emotion Regulation Scale developed by Ji J (2010) and validated by Liu et al. (2023). The scale comprises 25 items and includes 6 subdimensions: emotion perception (4 items), emotion assessment (3 items), emotion regulation self-efficacy (5 items), application of emotion regulation strategies (4 items), emotion control (5 items), and emotion regulation reflection (4 items) (e.g., "When in a bad mood, I am confident that I can adjust as quickly as possible"; "When frustrated or aggravated, I am able to remain optimistic"). All items were rated on a 6-point Likert scale (from 1 = "not at all" to 6 = "always"). Higher scores indicate greater emotional regulation ability. In this study, the confirmatory factor analysis on the structure was good [$\chi 2/df = 3.96$, RMSEA = 0.080, GFI = 0.835, AGFI = 0.894, NFI = 0.928, CFI = 0.963, TLI = 0.957, IFI = 0.963, RMSEA = 0.035]. The Cronbach's alpha coefficient is 0.93, indicating strong validity and reliability of the questionnaire structure.

4.4. Positive Academic Emotions

The Adolescent Academic Emotion Scale, developed by Dong & Yu (2007), was used to assess students' positive academic emotions. The scale consists of 15 items that cover three positive academic emotions: enjoyment, pride, and hope. 5 items measure the pride dimension (e.g., "I feel proud when I perform well in class"), 6 items assess the happiness dimension (e.g., "Studying brings me a lot of joy"), and 4 items measure the hope dimension (e.g., "I always hope that I can learn more"). The scale used a 7-point Likert scale ranging from 1 (completely disagree) to 7 (completely agree), with higher scores indicating higher levels of positive academic emotions. The confirmatory factor analysis on the structure showed good results [$\chi 2/df = 3.73$, RMSEA = 0.072, GFI = 0.898, AGFI = 0.860, NFI = 0.941, CFI = 0.953, TLI = 0.943, IFI = 0.953, RMSEA = 0.03]. Additionally, the internal consistency coefficient of the academic emotion scale was above 0.95, indicating high levels of validity and reliability.

4.5. Research procedures

The survey was conducted on a voluntary basis, with students given permission to participate beforehand. The questionnaires took 25 to 30 minutes to complete, and trained undergraduate and postgraduate students were available to address any questions. The entire process was supervised by school administrators. Prior to the study, participants were given a thorough explanation of the study's objectives and were assured that their responses would remain anonymous and would only be used for research purposes. The measurements were carried out based on the participants' preferences, and any complaints resulted in the survey being terminated. Upon completion, participants received a gift.

The data for this study was analyzed using SPSS 25.0 and AMOS 17.0. Statistical methods employed

included descriptive statistics, correlation analysis, regression analysis, and factor analysis. The model for chain mediation effects was tested using structural equation modeling and Bootstrap techniques.

5. Results

5.1. Common Method Deviation Test

To improve the precision of the questionnaire, mitigate systematic errors, and avoid common methodological biases, the study utilized ex-ante design controls. This was achieved through the implementation of question-item significance concealment, question-item randomization, and reverse question-item design techniques. In addition, the Harman one-way test was used to test for common method deviation. The results showed that there were 7 factors with eigenvalues greater than 1, and the variance explained by the first factor was 29.418%, which was less than the critical criterion of 40%, indicating that the possibility of common method bias in this study was low.

5.2. Descriptive statistics and correlation analysis of variables

Table 2 showed the descriptive statistics and the correlation analysis of the variables. The mean values of perceived social support, emotion regulation, academic self-efficacy, and positive academic emotions in overseas Chinese left-behind children were 3.412, 3.775, 3.771, and 2.636, respectively. The results of the correlation analysis indicated that perceived social support was positively associated with emotion regulation ($r = .548$, $p < 0.01$), academic self-efficacy($r = .493$, $p < 0.01$), and positive academic emotions ($r = .466$, $p < 0.01$). Besides, emotion regulation was positively associated with academic self-efficacy ($r = .581$, $p<.001$) and positive academic emotions ($r = .587$, $p < 0.01$). Moreover, academic self-efficacy was also positively associated with positive academic emotions ($r = .571$, $p<.001$).

Table 2 Mean, standard deviation, and correlation coefficient of variables

	PSS	ER	ASE	PAE
PSS	1			
ER	.548**	1		
ASE	.493**	.581**	1	
PAE	.466**	.587**	.571**	1
M	3.423	3.755	3.771	2.636
SD	1.135	.862	1.019	.881

The study used hierarchical regression analysis to explore the relationship between different variables. The results, shown in Table 3, revealed that perceived social support significantly predicted positive academic emotions ($\beta = .280$, $p < .001$). After including the emotion regulation and academic self-efficacy in the regression analysis, perceived social support significantly and positively predicted emotion regulation ($\beta = .416$, $p < .001$) and academic self-efficacy ($\beta = 0.224$, $p < .01$). Furthermore, perceived social support was positively predicted the positive academic emotions ($\beta = .077$, $p < .05$) after including emotion regulation ($\beta = .265$, $p < .001$) and academic self-efficacy ($\beta = .209$, $p < .01$) while emotion regulation was a significant positive predictor of academic self-efficacy ($\beta = .525$, $p < .001$) and positive academic emotions ($\beta = .265$, $p < .001$). These three variables explained 43.5% of the variance in positive academic emotions.

5.3. Structural equation model analyses of mediating effects

This study employed structural equation modelling (SEM) to analyse the impact of perceived social support on the positive academic emotions of overseas Chinese left-behind children, along with its mediating effects.

First, the structural model was analysed, yielding χ^2 = 493.017, df = 183, RMSEA = 0.064, CFI = 0.951, GFI = 0.890, AGFI = 0.861, SRMR = 0.035, indicating a good fit to the data. Figure 1 showed that the overall path coefficients for the mediation analysis were statistically significant. The results suggested that increasing perceived

Table 3 Analysis of the regression relationship between the variables

Regression equation (N=418)			Overall fit coefficient			Significance of regression coefficients		
Model	Resulting variables	Predictor variables	R	R2	F	β	SE	t
Model 1	PAE	PSS	.466	.217	115.347	.280	.026	10.740***
Model 2	ER	PSS	.548	.300	178.138	.416	.031	13.347***
Model 3	ASE	PSS	.493	.243	133.285	.224	.041	5.404**
		ER	.617	.381	127.531	.525	.055	9.616***
Model 4	PAE	PSS	.466	.217	115.347	.077	.027	2.808*
		ER	.612	.375	124.253	.265	.039	6.871***
		ASE	.660	.435	106.271	.209	.031	6.660**

Note:*p < .05; **p < .01; ***p < .001.

social support among overseas Chinese left-behind children has a positive and significant effect on ER (β = .52, p < 0.001), ASE (β = .21, p < 0.001), and PAE (β = .07, p < 0.05). Furthermore, enhancing ER had a positive and significant effect on ASE (β = .50, p < 0.001) and PAE (β = .25, p < 0.001). Additionally, improving ASE among overseas Chinese left-behind children positively and significantly affected PAE (β = .21, p < 0.001).

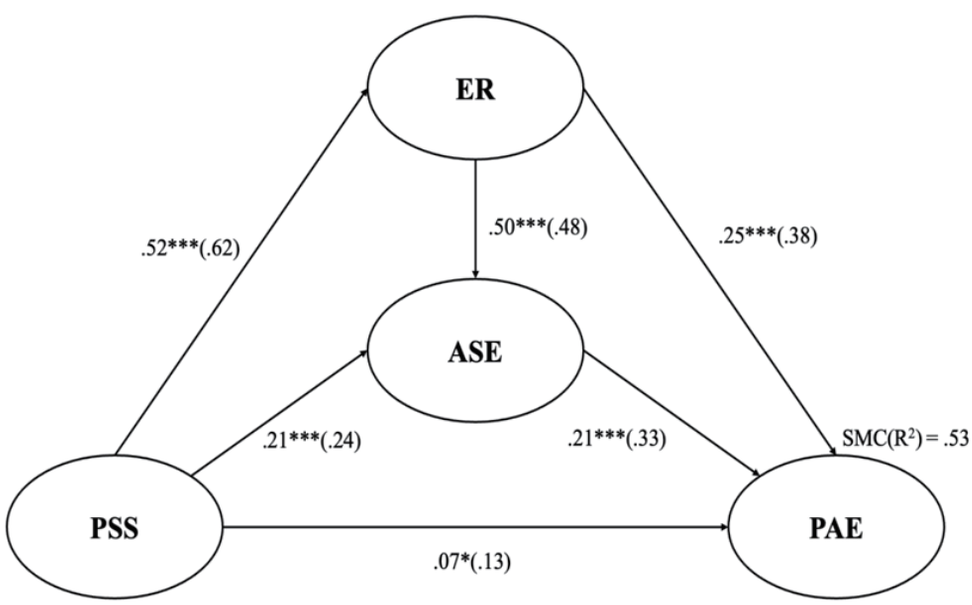

Figure 1. Structural equation modeling of the hypothesized model. Notes: PSS = perceived social support, ER= emotion regulation, ASE= academic self-efficacy, PAE = positive academic emotions. the numbers in the model indicated unstandardized (standardized) predictive coefficients. *p < .05; **p < .01; ***p < .001.

This study performed percentile and bias-corrected percentile bootstrapping at a 95% confidence interval with 5,000 bootstrap samples. According to Preacher and Hayes (2008), the path coefficients were considered significant if the 95% confidence interval of the lower and upper bounds did not include 0. As shown in Table 4, The results indicated that the total effect in this study was confirmed statistically significant, the 95% bias-corrected percentile and percentile CI: [.229, .369]; [.227, .368]. The direct effect of perceived social support on positive academic emotions was statistically significant.(95% bias-corrected percentile and percentile CI: [.008,

.146]; [.007 - .144]). Thus, hypothesis 1 was supported.

Table 4 The total, direct, and indirect effects of the hypothesized model.

Paths	Point estimate	Product of coef.		Bootstrapping			
				Bias-corrected percentile 95%CI		Percentile 95%CI	
		Std.E	Z	lower	upper	lower	upper
			Indirect effects				
PSS-ER-ASE-PAE	.054	.015	3.600	.003	.089	.026	.085
PSS-ER-PAE	.128	.003	4.267	.074	.192	.074	.193
PSS-ASE-PAE	.043	.016	2.688	.019	.084	.016	.080
Total mediating effect	.226	.031	7.290	.168	.291	.166	.287
			Direct effect				
PSS-PAE	.074	.036	2.055	.008	.146	.007	.144
			Total effect				
Total effect	.300	.036	8.333	.229	.369	.227	.368

Note:Standardized estimating of 5000 bootstrap sample. PSS = perceived social support, ER= emotion regulation, ASE= academic self-efficacy, PAE = positive academic emotions. Bias-corrected and Percentile upper and lower bounds refer to indirect effects estimated by the bias-corrected percentile Bootstrap method, respectively.

For the mediating effects, As the results show in Table 4, The total mediating effect of the present model was significant (point estimate = 0.226, 95% bias-corrected percentile and percentile CI [.168, .291]; [.166, .287], see Table 4), accounting for 75.3% of the total effect of perceived social support on positive academic emotions (.226/.300). The current study also confirmed that the existence of a positive and significant mediating effect for ER between PSS and positive academic emotions (point estimate = .128, 95% bias-corrected percentile and percentile CI: [.074, .192]; [.074, .193]), a positive and significant mediating effect for ASE between PSS and positive academic emotion (point estimate = .043, 95% bias-corrected percentile and percentile CI: [.019, .084]; [.016, .080]), accounting for 56.6% and 19% of the total mediating effect of perceived social support on positive academic emotions, respectively.Positive and significant mediating affected ER and academic self-efficacy between PSS and positive academic emotions (point estimate = .054, 95% bias-corrected percentile and percentile CI: [.003, .089]; [.026, .085]), contributing to 23.9% of the total mediated effect of perceived social support on positive academic emotions. Hypotheses 2, 3, and 4 were thus supported.

6. Discussion

This study empirically examined overseas Chinese left-behind children, who were highly susceptible to negative emotions, with an emphasis on the impact of perceived social support on positive academic emotions and the underlying mechanisms of this relationship. The findings emphasized the importance of perceived social support, emotion regulation, and academic self-efficacy for the positive academic emotions of left-behind children. Additionally, perceived social support promoted positive academic emotions through three pathways: (1) affecting their emotion regulation, (2) enhancing their academic self-efficacy, and (3) influencing emotion regulation and academic self-efficacy. These findings contributed to our understanding of the relationship between social factors and academic emotions among overseas Chinese left-behind children.

For the first hypothesis, the findings revealed that children with higher levels of perceived social support scored higher on positive academic emotions, meaning that perceived social support could significantly predict positive academic emotions among overseas Chinese left-behind children. The findings supported the argument

that supportive social networks were associated with the emotional experiences of adolescents (Baumeister & Leary, 2017). According to the stress-buffering model, perceived social support could serve as a protective resource (Cohen & Wills, 1985), assisting individuals in buffering negative emotions, improving psychological resilience, and promoting positive emotions and behavioral motivation (Zhao et al., 2015; Zhu et al., 2024). Kong et al. (2019) also found that that perceived social support may trigger a self-regulatory mechanism that alleviates unpleasant experiences, enhancing the probability of positive emotions. Additionally, students with high perceived social support were less likely to experience emotional exhaustion from studying (Li et al., 2018). Therefore, overseas Chinese left-behind children with high perceived social support are more likely to maintain positive emotions when facing learning challenges. The extant literature indicates that the most significant extra-individual factors influencing the development of self-regulation originate from parents (Seidl-de-Moura et al., 2012). This study confirmed that children will draw upon alternative resources from the social networks to mitigate the adverse effects of parent-child separation, which may subsequently exert a heterogeneous effect on their academic emotion.

Regarding the second hypothesis, this study revealed that emotion regulation mediates the relationship between perceived social support and positive academic emotions among overseas Chinese left-behind children. The result aligned with previous empirical research, which suggested that positive emotions require a specific psychological regulatory mechanism to shift negative emotional experiences (i.e., cognitive reappraisal, expressive suppression, and rumination) (Wante et al., 2018). The conceptual act theory of emotion also confirmed that individuals categorize basic emotions by utilizing their emotional knowledge to generate specific emotional experiences (Barrett, 2006). Additionally, extensive research has documented that social support can lead to cognitive change in ways that may serve an essential regulatory function, thereby helping students to develop and adopt effective metacognitive strategies related to emotions, mitigating the psychological impact of negative emotions when facing challenging tasks (Zeidner et al., 2016). Previous studies have documented that social support can mitigate the adverse effects of emotional sensitivity(Zimmer-Gembeck, 2015), and low self-esteem (Hoffman et al., 1988), facilitating the development of self-regulation and emotional management . Therefore, overseas Chinese left-behind children with strong and supportive social networks exhibit enhanced psychological resilience and emotional management abilities, which play an active role in cultivating positive academic emotions. The results affirmed the motivational and emotional significance of perceived social support in early academic adaptation among adolescents.

Consistent with the third hypothesis, the findings of the present study support the argument that academic self-efficacy can serve as an explanatory mechanism for the relationship between perceived social support and positive academic emotions among overseas Chinese left-behind children. This conclusion was consistent with previous research, which suggested that supportive relationships with teachers, peers and significant others can decrease anxiety and enhance learning beliefs, subsequently leading to adaptive learning outcomes (Tomás et al., 2020; Wang et al., 2023). In the framework of social cognitive theory, Bandura and Wessels (1997) has confirmed the crucial role of self-efficacy as it impacts emotional status. Therefore, social support can change students' subjective perceptions of their abilities (Cicognani, 2011). In other words, the higher the social support perceived by overseas Chinese left-behind children, the higher their confidence in the learning task and the easier it is for them to maintain positive academic emotions.

For the fourth hypothesis, this study confirmed that emotion regulation and academic self-efficacy play a chain mediating role between perceived social support and positive academic emotions among overseas Chinese left-behind children. This conclusion differs from previous studies where self-efficacy was seen as a predictor of emotional regulation (Liu et al., 2019; Luberto et al., 2014; Zyberaj, 2022). The relationships among these variables show the complexity of the connection between perceived social support and emotional development among overseas Chinese left-behind children. According to Richards and Gross (2006), the emotion regulation process could activate emotionally expressive memories (i.e., physiological reactions, behavioral inclinations, and memories of past emotional experiences), which in turn affects their assessment of their ability to accomplish learning tasks. From the perspective of control-value theory, when learners perceive that they exert influence

over subjectivity-related outcomes, such as emotional management and value judgment, they may experience a heightened sense of achievement (Pekrun et al., 2007). In light of its potency, this sense of achievement can influence an individual's self-concept and learning beliefs. In other words, emotion regulation, as a source of internal control, significantly impacts academic self-efficacy.

7. Implications

The current study developed a chain-mediated model to explain the connections between perceived social support, emotion regulation, academic self-efficacy, and positive academic emotions among overseas Chinese left-behind children. This model offers empirical evidence for the stress response model of positive academic emotion and the social cognitive theory of social support. Additionally, the study provides practical insights for educators and intervention pathways to cultivate students' positive academic emotions. The data in our study demonstrates that social support can mitigate the negative effects of spatial parental separation on transnational left-behind children, enabling them to access resources for psychological development and self-management. This, in turn, fosters emotional regulation, which can bolster an individual's confidence and resilience in academic life. Therefore, establishing a community-based support program for left-behind children would be beneficial. Implementing intervention strategies involving teachers, peers, and significant others, as well as teaching emotion regulation techniques to overseas Chinese left-behind children, is essential for nurturing positive academic emotions.

8. Limitations

Despite these implications, several limitations should be considered when evaluating the conclusions of the current study. First, the research sample was restricted to a single region, which may be influenced by region-specific socialization factors (e.g., specific policies, culture, education level). Therefore, future studies should increase the sample size and include a broader sampling region to gain a more precise understanding of the complex relationship. Second, the cross-sectional design employed in this study makes it difficult to ascertain the causal associations among the variables. Therefore, future research should incorporate a longitudinal design to improve the persuasion of the analysis. Finally, all data in the current study depended on self-reports from overseas Chinese left-behind children and may thus be susceptible to measurement bias. Subsequent studies may use objective metrics from alternative samples to corroborate the findings.

Ethics approval

This study was performed in accordance with the principles of the Declaration of Helsinki 1964 and its amendments or comparable ethical standards. This study received approval and continuous oversight from the Ethics Committee of the author’s institution

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