

RESEARCH

Open Access



# When left-behind children become parents in rural china: does their emotional expressiveness influence children's social-emotional competence?

Huijuan Liu<sup>1,2\*</sup> and Ling Li<sup>1,3</sup>

## Abstract

Family emotional expression is considered one of the key contributors to children's development and functions as a precondition that is linked with educational equality in the preschool living environment for young children, especially those who live in rural areas. This study explored the family emotional expression of parents who were once left-behind children and its influence on their children's social-emotional competence (SEC) in less developed areas of western China. A total of 522 families and their children ( $M_{age} = 31.86$  months,  $SD_{age} = 5.66$ ; 280 boys, 242 girls) from three rural counties in western China participated in this study. The parents completed the family emotional expression questionnaire, parent impulsivity questionnaire, parent acceptance-rejection questionnaire, and parenting stress scale. Their children took part in the Bayley-III assessment of social-emotional ability. The results indicated that (1) positive family emotional expression enhances children's social-emotional competence (SEC), whereas negative family emotional expression, parental acceptance and rejection, dysfunctional impulsivity, and parenting stress hinder children's SEC. (2) Family emotional expression, parenting stress, and children's SEC exhibit significant group differences between left-behind and non-left-behind parents, suggesting the unique challenges faced by children in left-behind families. (3) Parenting stress negatively predicts the development of children's SEC in both groups, highlighting the detrimental impact of stress on emotional development. (4) In non-left-behind families, positive family emotional expression predicts improvements in children's SEC, whereas negative emotional expression, parental impulsivity, and rejection negatively affect SEC development.

**Keywords** Social-emotional competence, Family emotional expression, Rural children in China, Bayley-III

Family emotional atmosphere, along with parents' beliefs about appropriate responses to children's emotional expressions and associated behaviours, is considered key components of emotional socialization. Together, these factors play a crucial role in shaping children's social-emotional development [1, 2]. During children's early years, the family context serves as children's first exposure to emotional expression, which can either support or hinder the development of their social-emotional competence (SEC) [3, 4]. However, parents' family emotional expressiveness (FEE) is influenced by a complex interplay

\*Correspondence:

Huijuan Liu  
liuhuijuan1991@126.com

<sup>1</sup> Southwest University, Chongqing 400715, China

<sup>2</sup> Chongqing Youth Vocational & Technical College, Chongqing 400712, China

<sup>3</sup> Center for Education Policy, Southwest University, Chongqing 400715, China



© The Author(s) 2025. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

of factors, including parents' personalities, personal challenges (such as dysfunctional impulsivity), disadvantages (e.g., financial problems), parental acceptance/rejection, and stress within the family context. Although a substantial body of literature demonstrates strong links between parents' FEE and children's SEC, the experiences of parents from diverse backgrounds remain underexplored and inadequately studied. For example, the FEE of parents who grew up as "left-behind" children in rural areas may be shaped by their own childhood experiences, which could influence their parenting practices. Is there a difference in the relationship between parents' FEE and their children's SEC for those with and without a left-behind childhood experience? Are there additional factors that coinfluence the dynamic interaction between parents and children in disadvantaged or rural areas? All of these questions urgently require answers to provide sufficient support and policy guidance for rural families. Accordingly, this study aims to fill this research gap by exploring the predictive link between the FEE of parents and their children's SEC in rural western China and comparing the effects between parents with and without left-behind childhood experiences.

### **Relationship between Parents' FEE and Children's SEC**

The family is a central space for the expression of both positive and negative emotions. Compared with interactions with strangers or individuals outside the family, emotional exchanges are more frequent and intense among family members, particularly during children's early years [5]. Family emotional expressiveness (FEE) can be classified in two ways: a) the parent's positive or negative emotional expressions during interactions with their children and b) the general tendency of the parent to express emotion when interacting with the family as a whole. Overall, FEE refers to the predominant style of emotional expression, whether verbal or nonverbal, within the family [6, 7]. During their early years, young children communicate and exchange affective messages most frequently with their close family members. How affective messages are received and interpreted by young children in the family shapes their later SEC development [5, 8]. According to the most widely accepted definition, SEC refers to the knowledge, attitudes and skills necessary for children to effectively understand and manage emotions, set and achieve positive goals, feel and show compassion for others, establish and maintain positive relationships, and make responsible decisions [9, 10]. SEC is a crucial factor in supporting children's emotional, cognitive, and behavioural development. As such, it is a significant predictor of long-term outcomes, including

future educational attainment, employment prospects, and physical and mental health [11–13].

Many empirical studies have shown that positive FEE predicts positive outcomes in children's SEC, especially in economically deprived families. Fredrickson reported that, in most situations, positive emotional expression within the family (i.e., FEE–P) fosters children's emotional understanding, making them more eager to learn and better equipped to solve problems [14]. Cumberland-Li et al. suggested that positive emotional expression by parents is positively correlated with children's SEC, prosocial behaviours, positive emotions and emotional regulation [15]. Eisenberg et al. proposed that parents' emotional expression may influence children's social and emotional development by directly shaping their emotional expression and emotional awareness. This effect is particularly significant for children from low-income families, who are at greater risk of developing internalizing and externalizing behavioural problems and emotional dysregulation [1].

Conversely, exposure to parents' negative emotions often hampers young children's emotional knowledge. FEE–N is associated with poor social skills as well as with difficulties in emotional regulation and understanding [16]. Parents' emotional expressions and the changes in how they feel are closely intertwined with their children's lives and play a significant role in helping children understand emotions. This phenomenon occurs through both the specific ways in which emotions are expressed and the overall emotional tone set by parents. For example, parents' own style of expressing emotions, parents' reactions to children's emotions, and parents' discussions of emotions with their children all have an impact on the children's emotional experience [17–19]. These parent–child emotional interactions influence not only how children express their own emotions but also how they interpret the emotional experiences and expressions of others [7]. Halberstadt et al. subsequently conducted a meta-analysis on family's and children's emotional expressiveness and reported a consistent association between positive family emotional expressiveness and positive emotional expressiveness in children across all ages. However, the authors also identified a curvilinear or U-shaped relationship between negative family emotional expressiveness and children's emotional expressiveness [20]. In particular, negative FEE is associated with negative emotional expressiveness in children only during middle childhood or later [21].

The direction of emotional expressiveness can alter the nature of the association between family and children's emotional expressiveness. In summary, while the intensity of overall emotional expressiveness may vary within

families [20], FEE generally has a significant influence on children's SEC [8].

However, owing to the complexity of family contexts and the interactions embedded within them, previous studies may have overlooked key influencing factors when examining the relationship between FEE and children's SEC. For example, while many studies have confirmed the link between FEE and SEC, a number of confounding factors have come into play, including parental personality traits such as impulsivity, extraversion, and neuroticism [22], as well as other factors such as nurturing behaviour [23] and parenting stress [24]. These factors should not be overlooked when exploring how FEE influences SEC, as each factor can result in varying outcomes in different family situations, particularly among parents in rural areas. Specifically, the research has identified numerous determinants and factors that affect SEC, including poverty, poor health and nutrition, negative caregiving, the family emotional environment, and other related variables [4]. For example, children living in rural areas tend to have lower overall development levels than do those living in urban areas [25]. A large-scale study conducted in rural China revealed that 35% of the children in the sample presented delays in social-emotional development [26]. The development of children's SEC is a crucial predictor of long-term outcomes, including future educational attainment, employment prospects, and physical and mental health [12, 13]. Despite these efforts, several important variables have rarely been examined, such as parents' experience of being left behind or parental impulsiveness, which could influence children's SEC on the basis of mentalization theory. Furthermore, the SEC research has focused primarily on regions such as North America, Europe, the United Kingdom, and Australia [27, 28]. The main reason for this concentration may be attributed to the relatively late recognition of the importance of children's SEC in developing countries, particularly in remote and economically disadvantaged rural areas. Therefore, considering the unique context of rural families, in which some parents have experienced being left behind during childhood, this study considers all of the potential confounding factors outlined below.

### Effects of Dysfunctional Impulsivity

Dysfunctional impulsivity leads to rapid yet inaccurate performance and is often described as the pathological component of impulsivity [29]. In measures related to behavioural impulsivity, individuals with high emotional expression often display a lack of inhibition [30]. Mothers who are emotionally expressive may also exhibit some degree of impulsivity [31]. As a result, their children are more likely to exhibit externalizing behaviours than are children from families with optimal functioning [32].

Additionally, a growing body of evidence suggests biological connections among impulsivity, emotional expressiveness and SEC. Cognitive neuroscience studies have shown that emotional expression and impulsivity are significantly correlated with activity in the hypothalamic-pituitary-adrenal axis and the prefrontal cortex [33]. At the same time, the prefrontal cortex activates dorsal cognitive circuits, the hippocampus, and the dorsal anterior cingulate cortex. These structures are believed to play crucial roles in regulating emotional states [34] and controlling impulsivity [35]. All of these areas are equally important for the healthy development of SEC.

### Effects of Parental Acceptance-Rejection

Parental acceptance and rejection constitute the "warmth" dimension of parenting [36]. Parental warmth is understood as a bipolar dimension, with rejection—the absence of warmth and affection—at one end of the spectrum and acceptance at the other. Accepting parents are more likely to express positive emotions towards their children through both verbal and nonverbal gestures, such as caressing, hugging, kissing, and praising. In contrast, rejecting parents tend to express negative emotions through behaviours such as anger, resentment, aggression, abuse, indifference, and neglect [36]. In this context, parental acceptance-rejection theory (PAR theory) offers a framework for examining the impact of parental emotional expression and warmth on children's social development and emotional regulation. For example, a series of studies have supported relationships among parental emotional expression, warmth, and developmental outcomes, including children's social competence, social adjustment, and internalizing behaviour problems [18, 23, 37]. In a meta-analysis, Khaleque concluded that parental warmth is positively correlated with better psychological adjustment in children, including lower levels of hostility, greater independence, higher self-esteem and self-satisfaction, increased emotional responsiveness, enhanced emotional stability, and a more positive worldview [38]. Parental hostility/aggression, apathy/neglect, and undifferentiated rejection were all positively correlated with children's hostility and aggression, dependence, low self-esteem, diminished self-sufficiency, emotional unresponsiveness, emotional instability, and a negative worldview [39]. Coincidentally, other meta-analyses have examined the relationship between parental acceptance and children's externalizing [40] and internalizing behaviours [41] and reported that greater warmth predicted fewer externalizing and internalizing problems and that greater hostility/aggression and indifference/neglect predicted more externalizing and internalizing problems, both of which were manifest approximately 3 years later, on average.

In fact, brain imaging (fMRI) studies have shown that perceived rejection and other forms of long-term emotional trauma are often linked to changes in brain chemistry, which can ultimately impair the central nervous system and hinder the psychosocial development of children [42]. When individuals experience feelings of rejection, the brain's anterior cingulate cortex and right prefrontal cortex are activated [43, 44]. In addition, Luby et al. reported that early maternal experiences were strong predictors of greater hippocampal volume in the same children during their school years [45]. Specifically, the prefrontal cortex is interconnected with regions such as the amygdala, hippocampus, and anterior cingulate cortex. Together, these areas are involved in mental processes such as memory, emotion regulation, impulse control, and stress management—all of which are essential for healthy social–emotional regulation. In summary, long-term parental acceptance or rejection in the family environment can lead to significant changes in the brain, which affect children's SEC.

### Effects of Parenting Stress

Previous studies have generally linked parenting stress to children's SEC [24]. According to the parental stress model [46], parental stress can lead to poor parenting behaviours, which negatively impact children's SEC through inadequate emotional expression [47, 48]. Both emotional disclosure theory and the parent process model indicate that parenting stress is associated with parents exhibiting more negative and less positive emotional expression [24]. Positive parenting behaviours, such as emotional support and strategic guidance, are associated with greater SEC and fewer negative emotions and behaviours in children. [17, 49, 50]. Deater-Deckard suggested that parents who report higher levels of parenting stress and describe their children as moody and difficult often struggle to express warm emotions and respond positively to parent–child interactions. These behaviours result in a contradictory approach to the children's discipline, educational guidance, and developmental expectations [51, 52]. In contrast, parents with lower levels of parenting stress tend to be more emotionally stable, experience less parent–child conflict, and exhibit lower impulsivity in their FEE [53]. Therefore, this study considers parenting stress a key confounding factor that should be controlled, as the positive effect of FEE on dysfunctional impulsivity may be further weakened by parenting stress.

### The Context of Chinese Rural Parents with Left-behind Childhood Experience and its Influence on their Children's SEC

The impact of early separation from parents on the emotional development of young children in rural areas of China has been widely studied [54, 55]. The unique cultural and historical context of left-behind children has

made the study of emotional competence development in this group a compelling topic, offering valuable insights into the early social and emotional growth of young children.

China's rapid economic growth and urbanization since the 1970s have driven labour migrations, resulting in the emergence of left-behind children in rural areas [54, 56]. This migration phenomenon, the largest of its kind in human history, has led to 87.5% of China's left-behind children residing in rural areas, accounting for 21.9% of the country's total child population [56]. Owing to the geographical distance between rural and urban areas, parents who migrate for work are often forced to leave their children behind, placing them under the care of their grandparents [54]. As a result, these left-behind children lack daily interactions with their parents and are deprived of essential emotional support [55, 57, 58]. A large-scale study conducted in rural China revealed that 35% of the children in the sample presented social–emotional delays, underscoring the significant impact of parental separation on their emotional development [26].

Although the research on emotional expression within Chinese families and its influence on children's socioemotional competence is limited, cultural factors likely play a significant role in shaping emotional expressiveness within these families [59]. For example, Morelen et al. revealed that Asian families tended to display fewer positive emotions than their Western counterparts did, which may be attributed to cultural factors such as conservatism. This pattern of less expressive emotional communication within Chinese families may limit children's opportunities to interpret emotions, potentially hindering the development of their SEC [57]. Wang's study, which compared the SEC of left-behind children and boarding students, revealed that left-behind children scored lower in SEC. The lack of parental guidance during their early years was identified as a significant contributing factor [57]. Although SEC has been widely explored in the child development research, further investigation is needed to understand its specific implications for left-behind children, especially in relation to family dynamics.

Interestingly, research is lacking on the influence of parents' experiences as left-behind children on family emotional expressiveness and children's social–emotional development. We hypothesize that parents who have been left-behind children (left-behind parent group) may demonstrate more cautious and nurturing emotional expression in their child-rearing practices than parents without such experiences (non-left-behind parent group). This difference in parental emotional expression may lead to divergent outcomes in children's social–emotional development. In this novel study, we aim to investigate the impact

of parental socioeconomic factors on the SEC development of left-behind children in less developed areas of western China, considering two distinct groups of family dynamics: left-behind parents and non-left-behind parents.

## Method

### Participants

This study utilized baseline data from a large-scale, prospective, longitudinal study involving children born between January 2019 and January 2021 in rural, south-western China. The study focused on rural areas in Provinces X and Y, which include two districts and one county. All selected children, aged between 1.5 and 3.5 years, were invited to participate in this research project in 2022 and completed all of the surveys and assessments included in the study. Children from urban areas and those outside the specified age range were excluded from the study. Separate but simultaneous interviews were conducted with the children's primary caregivers, defined as the individuals living in the same household who were primarily responsible for the children's care. At these time points, two highly trained data collectors visited the families, and the parents completed questionnaires on family demographics, household characteristics, FEE, parental impulsivity, parental acceptance–rejection behaviours, and parenting stress. A total of 522 families and their children ( $M_{\text{age}} = 31.86$  months,  $SD = 5.66$ ; 280 boys, 242 girls) from three rural counties participated in this study. Low-income families and parents without experience as left-behind children were oversampled from these counties. Parents reported their childhood experiences as either left-behind children (23.18%) or non-left-behind children (76.82%).

### Procedure

Ethical procedures were followed throughout the study. First, the study was approved by the Research Ethics Committee of the first author's university prior to data collection. Written consent from the parents and verbal consent from the children were obtained prior to data collection. Trained professionals visited the households of the target children to administer the questionnaires, with each session lasting approximately 60 min. Short breaks were provided between sessions. Testing took place in a quiet room within the toddler's home. Upon completing the questionnaire, each participating family received a 100 RMB cash reward as compensation for their contribution to the research.

### Measures

#### Demographic information

All of the children and their families completed a set of questions gathering information about their gender, age,

household composition, parental stay-behind status, and parents' educational levels.

#### Family Expressiveness Questionnaire

Parental emotional expression was assessed via the Family Expressiveness Questionnaire (FEQ) [7]. The Chinese version of the FEQ has been employed to explore mothers' negative emotional expression and children's negative emotional regulation strategies in Beijing, China [60]. The FEQ consists of 40 items, which are divided into two subscales: negative expressions (17 items, e.g., "get angry with family members for their carelessness") and positive expressions (23 items, e.g., "praise family members for doing good things"). For each item, parents were asked to rate the frequency of expressing that emotion on a 9-point scale (1–3 = "never or rarely"; 4–6 = "sometimes"; 7–9 = "very frequently"), with higher scores indicating greater levels of emotional expressiveness. In a validation study [61], the FEQ was found to be an effective tool with satisfactory reliability and validity for assessing both negative and positive emotional expressiveness. In this study, the Cronbach's alpha coefficients for the test items ranged from 0.91 to 0.94, with the overall Cronbach's alpha for the FEQ being 0.94.

#### Dysfunctional Impulsivity Scale

The level of parental impulsiveness was assessed using the Dickman Impulsivity Inventory (DII), which contains 23 items. Each item was rated on a 4-point scale ranging from 1 ("totally agree") to 4 ("totally disagree") [62]. It consists of two dimensions: functional impulsivity (FI, 11 even-numbered items) and dysfunctional impulsivity (DI, 12 odd-numbered items). The FI and DI scores were calculated by summing the relevant items for each dimension. The DII has demonstrated stable reliability and validity. In the original, American version, Cronbach's alpha was used to assess internal consistency, yielding values of 0.74 for the FI scale and 0.85 for the DI scale. The DII has been translated and adapted for use in different linguistic contexts, maintaining high reliability and validity. The Chinese version of the DII has also been shown to have good reliability and validity in a previous study [63]. In this study, only the dysfunctional impulsivity dimension of the Dickman Impulsivity Instrument was used, consisting of 12 items (e.g., "I often say whatever comes into my head without thinking first" and "I frequently make appointments without considering whether I will be able to keep them."). The Cronbach's alpha for Dysfunctional Impulsivity was 0.71.

#### Parental Acceptance–Rejection Questionnaire (Short Version)

The frequency of their parenting behaviours was assessed using the short version of the Parental

Acceptance–Rejection Questionnaire (PARQ/S) [64]. The parents rated each item on a scale ranging from 1 to 4, where 1 = “never or almost never”, 2 = “once a month”, 3 = “once a week”, and 4 = “every day”. The PARQ/S consists of 24 items and measures four constructs: warmth–affection, hostility–aggression, rejection, and neglect–indifference. In this study, we used the total acceptance–rejection scale, which is typically calculated by summing the scores from 8 warmth–affection items (reversed, e.g., “I make my child feel wanted and needed.”), 6 hostility–aggression items (e.g., “I say unkind things to my child.”), 4 rejection items (e.g., “My child is a nuisance to me.”), and 6 neglect–indifference items (e.g., “I pay no attention to my child.”). In a validation study [65], the Cronbach’s alpha coefficients for the individual items ranged from 0.78 to 0.79, with the overall Cronbach’s alpha for the PARQ/S being 0.80.

#### **Parenting Stress Index (Short Form)**

The Parenting Stress Index–Short Form–15 (PSI–SF–15) is a self-report questionnaire consisting of 15 items. It was adapted by Luo et al. on the basis of the original Parenting Stress Index and is used to assess the level of parenting stress [54]. The PSI–SF–15 uses a 5-point Likert-type scale (1 = “strongly disagree”, 2 = “disagree”, 3 = “neutral”, 4 = “agree”, 5 = “strongly agree”) and consists of 15 items across three domains: (1) parental distress (PD), for which higher scores indicate greater perceived parenting stress; (2) parent–child dysfunctional interaction (PCDI), for which higher scores reflect more negative parent–child interactions; and (3) difficult children (DC), for which higher scores indicate that parents perceive their children as more difficult to care for. The combined score for each subscale represents the total score for that domain. In this study, we used the overall parenting stress scale, on which a higher total score indicates greater levels of parenting stress [66]. The PSI–SF–15 has been shown to be a reliable and effective tool for assessing parental stress in China [54]. In this study, the Cronbach’s alpha coefficients for the three subscales—parental distress (PD), parent–child dysfunctional interaction (PCDI), and difficult children (DC)—were 0.74, 0.72, and 0.66, respectively. The overall Cronbach’s alpha for the PSI–SF–15 was 0.82.

#### **Social–emotional Scale in the Bayley-III**

All of the children were administered the Bayley Scales of Infant and Toddler Development–III (BSITD–III), an internationally recognized assessment [67]. The BSITD–III consists of five standardized subscales, one of which, the social–emotional scale, was utilized in this study. This scale assesses functional emotional skills, including self-regulation and the ability to use emotions

purposefully [67]. Following BSITD–III guidelines, the raw scores were converted into composite scores [68]. Studies evaluating the validity of the BSITD–III have shown that it has strong inter- and intrarater reliability, high internal consistency, and excellent test–retest stability, even when it is applied in different cultural contexts [69–72]. In this study, the Cronbach’s alpha for the social–emotional scale was 0.90.

#### **Missing value analysis**

A total of 545 completed questionnaires were collected for the study. An analysis of the missing data revealed that the missing rates for the Social–emotional Scale total score, Parenting Stress Scale total score, and Parental Acceptance–Rejection Scale total score were 1.5%, 2.2%, and 1.8%, respectively. Little’s MCAR test indicated that the missing data were completely random ( $\chi^2 = 8.46$ ,  $p = 0.29$ ). As a result, a list-wise deletion method was applied to the questionnaires with missing values, yielding a final sample size of 522, which represented 95.78% of the total sample.

#### **Data analysis**

Statistical analyses in this study were conducted using SPSS 27.0 and Amos 24.0 software. Frequency descriptions were used for the categorical data, whereas the continuous data that followed or approximated a normal distribution were described using means and standard deviations ( $M \pm SD$ ). Reliability was assessed using Cronbach’s alpha coefficient. Group differences between the left-behind parents and the non-left-behind parents in regard to variables such as family emotional expression, dysfunctional impulsivity, parental acceptance–rejection, parenting stress, and children’s SEC were examined using a multivariate analysis of variance (MANOVA). A Pearson correlation analysis was used to examine the relationships among the variables, and a hierarchical regression analysis was employed to assess the direct predictive effects of the variables and the moderating role of parental left-behind experiences.

## **Results**

#### **Descriptive statistics**

The final sample consisted of 522 rural families and their children, with a mean age of 31.86 months ( $SD = 5.66$ ). The sample included slightly more boys than girls, with 242 females (46.4%) and 280 males (53.6%). Correlation analyses revealed that FEE–P was significantly correlated with FEE–N ( $r = 0.47$ ,  $p < 0.01$ ), dysfunctional impulsivity ( $r = -0.16$ ,  $p < 0.01$ ), parental acceptance–rejection ( $r = -0.30$ ,  $p < 0.01$ ), and children’s SEC ( $r = 0.22$ ,  $p < 0.01$ ). FEE–N was significantly related to dysfunctional

impulsivity ( $r=0.28$ ,  $p<0.01$ ), parental acceptance–rejection ( $r=0.30$ ,  $p<0.01$ ), children's SEC ( $r=-0.09$ ,  $p<0.05$ ), and parenting stress ( $r=0.42$ ,  $p<0.01$ ). Dysfunctional impulsivity was significantly correlated with parental acceptance–rejection ( $r=0.43$ ,  $p<0.01$ ), children's SEC ( $r=-0.21$ ,  $p<0.05$ ), and parenting stress ( $r=0.21$ ,  $p<0.01$ ). Parental acceptance–rejection was significantly correlated with children's SEC ( $r=-0.30$ ,  $p<0.01$ ) and parenting stress ( $r=0.41$ ,  $p<0.01$ ). Children's SEC was significantly correlated with parenting stress ( $r=-0.15$ ,  $p<0.01$ ). A similar pattern of results was observed in the sample of non-left-behind parents. Intercorrelations, means, and standard deviations for the observed variables are presented in Table 1.

#### Group differences between the left-behind and the non-left-behind parents

The MANOVA results revealed a significant main effect of parental left-behind experience on FEE–P [ $F(1, 520)=8.29$ ,  $p<0.001$ ,  $\eta^2=0.02$ ], children's SEC [ $F(1, 520)=5.78$ ,  $p<0.05$ ,  $\eta^2=0.01$ ], and parenting stress [ $F(1, 520)=6.05$ ,  $p<0.01$ ,  $\eta^2=0.01$ ]. However, no significant effect of parental left-behind experience was found for FEE–N [ $F(1, 520)=0.44$ ,  $p>0.05$ ,  $\eta^2=0.0008$ ], dysfunctional impulsivity [ $F(1, 520)=0.22$ ,  $p>0.05$ ,  $\eta^2=0.0004$ ], or parental acceptance–rejection [ $F(1, 520)=0.06$ ,  $p>0.05$ ,  $\eta^2=0.0001$ ]. Compared with the non-left-behind parents, the left-behind parents reported significantly higher scores on the FEE–P, children's SEC, and parenting stress. The means and standard deviations of these variables across different parental left-behind experiences are presented in Table 2.

#### Predicting the development of children's social–emotional competence

To assess the relative contribution of the correlated factors, we performed a five-step hierarchical regression

**Table 2** Results of MANOVAs

	Left-behind parent group (N = 121)	Non-left-behind parent group (N = 401)	F
FEE–P	5.19 ± 1.34	4.78 ± 1.39	8.29***
FEE–N	3.29 ± .98	3.22 ± 1.12	.44
DI	.53 ± .10	.53 ± .10	.22
PAR	1.82 ± .35	1.81 ± .34	.06
PS	2.67 ± .79	2.47 ± .80	6.05**
Children's SEC	89.75 ± 15.36	86.11 ± 14.38	5.78*

FEE–P refers to Positive Family Expressiveness; FEE–N refers to Negative Family Expressiveness; DI denotes Dysfunctional Impulsivity; PAR stands for Parental Acceptance–Rejection; Children's SEC represents Children's Social–Emotional Competence; and PS denotes Parenting Stress

\*  $p<.05$ ; \*\*  $p<.01$ ; \*\*\*  $p<.001$

analysis with children's SEC as the dependent variable. The results are presented in Table 3. In Step 1, we included the children's age and gender to control for their effects. In Step 2, we introduced dysfunctional impulsivity to account for the effects of parental personality traits. In Step 3, we incorporated parental acceptance–rejection, as these variables have a direct effect on children's SEC. In Step 4, we included parental positive and negative family expressiveness to evaluate their contribution to the variation in children's SEC. Finally, in Step 5, we added parenting stress, as the research has identified it as a significant factor influencing children's SEC [47, 48].

The hierarchical regression analysis revealed the following patterns of explained variance: (1) Demographic characteristics (age and gender) jointly accounted for 4.8% ( $\Delta R^2=0.048$ ,  $F=2.985$ ) and 1.5% ( $\Delta R^2=0.015$ ,  $F=2.966$ ) of the variation in children's SEC between the left-behind and non-left-behind parents, respectively. In the non-left-behind parent group, gender

**Table 1** Demographic characteristics of the participating parents and correlation matrix (N = 522)

	M (SD)	1	2	3	4	5	6
Male	280 (53.6%)						
Female	242 (46.4%)						
Age	31.86 (5.66)						
1. FEE–P	4.87 (1.39)	1					
2. FEE–N	3.23 (1.09)	.47**	1				
3. DI	.53 (1.01)	-.16**	.28**	1			
4. PAR	1.81 (.34)	-.30**	.30**	.43**	1		
5. Children's SEC	86.95 (14.68)	.22**	-.09*	-.21**	-.30**	1	
6. PS	2.51 (.80)	-.02	.42**	.21**	.41**	-.15**	1

FEE–P refers to Positive Family Expressiveness; FEE–N refers to Negative Family Expressiveness; DI denotes Dysfunctional Impulsivity; PAR stands for Parental Acceptance–Rejection; Children's SEC represents Children's Social–Emotional Competence; and PS denotes Parenting Stress

\*  $p<.05$ ; \*\*  $p<.01$ ; \*\*\*  $p<.001$

**Table 3** Hierarchical regression analyses predicting Children's Social Emotional Competence Left-behind parent group Versus Non-left-behind parent group

Variable	Left-behind parent group						Non-left-behind parent group					
	<i>B</i>	$\beta$	<i>p</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>F</i>	<i>B</i>	$\beta$	<i>p</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>F</i>
Step 1				.048	.048	2.985				.015	.015	2.966
age	.302	.113	.216				.127	.05	.317			
gender	5.255	.172	.061				3.162	.11	.028			
Step 2				.080	.032	3.377*				.065	.051	9.257***
age	.268	.100	.266				.153	.06	.218			
gender	5.621	.184	.043				3.189	.111	.023			
DI	−28.209	−.178	.048				−31.85	−.225	<.001			
Step 3				.123	.043	4.054**				.117	.051	13.096***
age	.269	.101	.255				.189	.074	.118			
gender	4.895	.160	.074				2.737	.095	.046			
DI	−14.365	−.091	.340				−15.798	−.112	.035			
PAR	−9.87	−.226	.019				−10.927	−.255	<.001			
Step 4				.130	.008	2.847*				.147	.030	11.296***
age	.253	.095	.288				.184	.072	.123			
gender	4.667	.153	.091				2.299	.08	.089			
DI	−13.176	−.083	.385				−9.338	−.066	.228			
PAR	−9.425	−.216	.065				−6.695	−.156	.009			
FEE-P	.728	.063	.586				2.466	.0239	<.001			
FEE-N	.676	.043	.696				−2.198	−.171	.011			
Step 5				.149	.019	2.825**				.148	.001	9.745***
age	.237	.089	.316				.188	.074	.116			
gender	4.162	.136	.131				2.323	.081	.086			
DI	−12.798	−.081	.396				−8.929	−.063	.251			
PAR	−7.294	−.167	.164				−7.087	−.165	.007			
FEE-P	.616	.054	.643				2.551	.247	<.001			
FEE-N	1.359	.087	.444				−2.458	−.191	.008			
PS	−3.047	−.157	.119				.726	.04	.47			

In Model 1, the tolerance values for the independent variables ranged from .977 to 1.000, with variance inflation factors (VIF) ranging from 1.000 to 1.023. In Model 2, the tolerance values ranged from .963 to .999, with VIF values ranging from 1.001 to 1.038. In Model 3, the tolerance values ranged from .946 to .996, and the VIF values ranged from 1.004 to 1.057. In Model 4, the tolerance values ranged from .695 to .994, with VIF values ranging from 1.007 to 1.439. In Model 5, the tolerance values ranged from .532 to .988, and the VIF values ranged from 1.012 to 1.878. FEE-P refers to Positive Family Expressiveness; FEE-N refers to Negative Family Expressiveness; DI denotes Dysfunctional Impulsivity; PAR stands for Parental Acceptance–Rejection; Children's SEC represents Children's Social–Emotional Competence; and PS denotes Parenting Stress

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

demonstrated significant predictive power for children's SEC ( $\beta = 0.11$ ,  $p = 0.028$ ). (2) Dysfunctional impulsivity emerged as a negative predictor in both groups, explaining an additional 3.2% of the variance in the left-behind parents ( $\Delta R^2 = 0.032$ ,  $F = 3.377$ ,  $p < 0.05$ ) and 5.1% of the variance in the non-left-behind parents ( $\Delta R^2 = 0.051$ ,  $F = 9.257$ ,  $p < 0.001$ ). The standardized coefficients indicated stronger negative associations in the non-left-behind parents ( $\beta = -0.225$  vs.  $\beta = -0.178$ ). (3) Parental acceptance–rejection significantly improved the model fit for both groups, contributing to a 4.3% variance in the left-behind parent group ( $\Delta R^2 = 0.043$ ,  $F = 4.054$ ,  $p < 0.01$ ;  $\beta = -0.226$ ,  $p = 0.019$ ) and a 5.1% variance in the left-behind

parent group ( $\Delta R^2 = 0.051$ ,  $F = 13.096$ ,  $p < 0.001$ ;  $\beta = -0.255$ ,  $p < 0.001$ ), with stronger predictive effects observed in the latter group. (4) Family emotional environment factors (FEE-P/N) had divergent effects: In the left-behind parent group, these factors provided marginal explanatory improvement ( $\Delta R^2 = 0.008$ , ns), with neither positive ( $\beta = 0.063$ ,  $p = 0.586$ ) nor negative ( $\beta = 0.043$ ,  $p = 0.696$ ) emotional environments reaching significance. Conversely, the non-left-behind parent group showed a significant 3.0% variance explanation ( $\Delta R^2 = 0.030$ ,  $F = 11.296$ ,  $p < 0.001$ ), driven by both positive ( $\beta = 0.239$ ,  $p < 0.001$ ) and negative ( $\beta = -0.171$ ,  $p = 0.011$ ) emotional dimensions. (5) Parenting stress in the final step contributed

modestly to the left-behind parent group ( $\Delta R^2=0.019$ ,  $F=2.825$ ,  $p<0.01$ ) that did not rise to the level of significance ( $\beta=-0.157$ ,  $p=0.119$ ), whereas no meaningful improvement occurred in the non-left-behind parent group ( $\Delta R^2=0.001$ , ns;  $\beta=0.04$ ,  $p=0.47$ ).

#### Moderating effect of parental left-behind experiences

The results from Table 4 (Step 2) indicate that parental left-behind experience has a positive effect on children's SEC ( $\beta=-3.593$ ,  $p<0.05$ ). A further analysis reveals that parental left-behind experience negatively moderates the relationship between FEE-N and children's SEC ( $\beta=-3.872$ ,  $p<0.05$ ).

To further examine the moderating role of the left-behind experience in the relationship between FEE-N and children's SEC, a simple slope analysis was conducted [73]. High and low groups were defined on the basis of the mean  $\pm 1$  standard deviation of left-behind experience, and the differences in the effects of FEE-N at varying levels of left-behind experience were tested. The results show that, in the non-left-behind parent group, FEE-N significantly predicted lower children's SEC ( $\beta=-2.981$ ,  $p<0.05$ ). In the left-behind parent group, however, the effect of FEE-N on children's SEC was not significant ( $\beta=0.892$ ,  $p>0.05$ ) (see Fig. 1).

#### Discussion

The present study aimed to examine the relationships among children's SEC and various factors—including family emotional expression, parental acceptance and rejection, dysfunctional impulse level, and parenting stress—by comparing parents with and without left-behind childhood experience in rural China. Although an extensive body of literature has highlighted the importance of these factors in shaping children's social-emotional development, the present study revealed findings that are worth consideration.

Our findings are consistent with the literature. First, we observed a positive correlation between children's SEC and positive family emotional expression, which aligns with previous studies [57, 59]. This finding suggests that children who experience more positive emotional expression within their families tend to exhibit higher SEC levels. Conversely, a negative correlation was found between children's SEC and negative family emotional expression, indicating that children exposed to negative emotional expression within their families tend to have lower SEC levels.

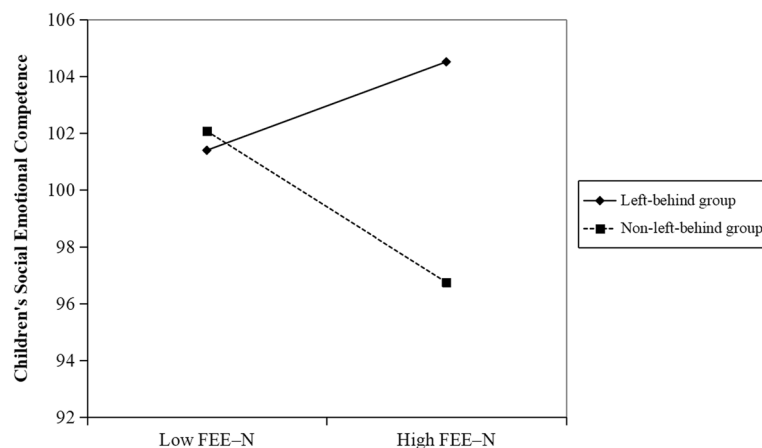
Second, our study explored the differences in these factors between left-behind and non-left-behind parents as well as their impact on children's SEC. We found significant group effects between these two groups regarding

**Table 4** The moderating effect of parental left-behind experience on the relationship between independent variables and preschool children's social-emotional competence

Variable	B	$\beta$	p	$R^2$	$\Delta R^2$	F
Step 1				.022	.022	5.757**
age	.172	.066	.127			
gender	3.775	.128	.003			
Step 2				.157	.135	7.264***
age	.203	.078	.056			
gender	2.753	.094	.023			
DI	-12.084	-.083	.387			
PAR	-7.417	-.171	.127			
FEE-P	.654	.062	.597			
FEE-N	1.431	.106	.386			
PS	-3.19	-.174	.077			
Left-behind experience	-3.539	-.102	.018			
DI * Left-behind experience	3.006	.018	.851			
PAR * Left-behind experience	.317	.006	.954			
FEE-P * Left-behind experience	1.879	.157	.184			
FEE-N * Left-behind experience	-3.872	-.259	.043			
PS * Left-behind experience	3.93	.188	.058			

In Model 1, the tolerance values for the independent variables was .998, with variance inflation factors (VIF) was 1.002. In Model 2, the tolerance values ranged from .459 to .992, with VIF values ranging from 1.009 to 2.179. FEE-P refers to Positive Family Expressiveness; FEE-N refers to Negative Family Expressiveness; DI denotes Dysfunctional Impulsivity; PAR stands for Parental Acceptance-Rejection; Children's SEC represents Children's Social-Emotional Competence; and PS denotes Parenting Stress

\*  $p<.05$ ; \*\*  $p<.01$ ; \*\*\*  $p<.001$



**Fig. 1** Moderating effect of parental left-behind experience

family emotional expression, parenting stress, and children's SEC. This finding highlights the unique influence of having been a left-behind child on family dynamics and children's social-emotional development. Specifically, we suggest that left-behind parents exhibit distinct patterns of emotional expression within the family compared with non-left-behind parents. These patterns may be influenced by their own experiences and a heightened awareness of their children's emotional needs, which is consistent with recent empirical studies in rural areas worldwide [74, 75]. Compared with non-left-behind parents, left-behind parents reported significantly higher levels of parenting stress. This result could be traced to the unique experience of being separated from one's parents and being raised as a left-behind child. The closeness of relationships or emotional attachments with primary caregivers contributes to children's development of emotional regulation [76–78]. The deprivation of such factors could lead to increased stress or effort when a grown individual then manages their own children [5, 79].

Furthermore, a hierarchical regression analysis revealed significant differences in the predictors of children's SEC between the left-behind and non-left-behind parent groups. Notably, the demographic characteristics explained part of the variance, with gender emerging as a significant predictor for the non-left-behind parent group. This finding aligns with those of previous studies, which suggest that gender differences in parenting practices can impact children's emotional development [80]. In both groups, dysfunctional impulsivity was identified as a strong negative predictor, with its influence being notably stronger in the non-left-behind parent group. These findings support the notion that impulsivity hinders children's emotional regulation and social skills development [29]. Parental acceptance–rejection

consistently improved the model fit in both groups, highlighting the importance of emotional support and warmth in fostering SEC development, in line with attachment theory [64]. Finally, the impact varies of family emotional environment factors on children's emotional development. Left-behind parents exhibit higher levels of positive emotional expression; however, only stress emerges as a significant predictor of children's social-emotional competence. This finding suggests that the higher FEE–P among left-behind parents may reflect compensatory emotional efforts made to mitigate the psychological effects of parental absence. However, the benefits of these efforts on children's social-emotional competence may be attenuated by chronic stressors such as financial difficulties and social isolation. This finding aligns with the "stress-buffering" hypothesis, which posits that positive emotional expression may lose its protective effect under high-stress conditions [81]. These findings emphasize the complex interplay between family dynamics and individual differences in the development of children's SEC.

We subsequently examined the predictive factors for the improvement in children's SEC in the non-left-behind parent group. Positive family emotional expression was identified as a significant predictor of improved children's SEC, whereas negative family emotional expression, parental impulsivity, and rejection jointly predicted a decline in children's SEC. These findings emphasize the importance of addressing negative emotional expression and impulsive parenting behaviours to promote optimal social-emotional development in children.

Finally, this study revealed that the negative impact of FEE–N on children's SEC is weaker for left-behind parents than for non-left-behind parents, suggesting that intergenerational experiences may buffer the

transmission of negative emotions through specific mechanisms. This phenomenon can be explained from the following dimensions: The first is intergenerational reflection on traumatic experiences and neural regulation. Left-behind experiences prompt parents to reconstruct childhood separation trauma through “emotional rumination” [82], forming an “intergenerational protective awareness” aimed at avoiding emotional deprivation for the next generation. Neuroscientific research suggests that such reflection may enhance prefrontal regulation of the limbic system [83], improving emotional regulation and reducing the frequency and intensity of negative emotional expression. The second is the activation of compensatory parenting through two pathways. To compensate for their own emotional deficiencies, left-behind parents adopt strategies of “explanatory emotional management” (e.g., providing situational explanations following negative emotional expressions) and “positive emotional rebalancing” (e.g., intentionally increasing parent–child interaction frequency). These behaviours align with the “secure base reparation” mechanism in attachment theory [84], buffering the impact of negative emotions by reconstructing emotional connections. Social-learning theory further posits that these strategies may interrupt the intergenerational transmission cycle of negative emotional expression [1]. The third is the pressure–diffusion mechanism in cultural contexts. The intergenerational mutual support tradition in rural China provides unique buffering resources for left-behind families [85]. When emotional pressure on the core family increases, the involvement of grandparents in child-rearing helps to disperse the direct impact of negative emotions on the parent–child system [86]. This “pressure diffusion” enables left-behind parents to implement emotional regulation strategies more effectively, thereby indirectly weakening the detrimental effects of negative emotional expression on children’s development. This study also offers a new perspective for understanding the cross-cultural repair paths of intergenerational trauma.

Policy interventions for parents with left-behind childhood experiences should adopt a comprehensive, multi-level support system that integrates both socioeconomic and psychosocial strategies. First, economic empowerment, achieved through targeted subsidies and accessible childcare services, could help alleviate the financial stressors that hinder effective parenting, thereby preserving the benefits of positive emotional expression (e.g., rural parenting allowances). Second, community-based mental health programs utilizing trauma narrative therapy should be implemented to enhance emotional regulation, leveraging the neural mechanisms of “emotional rumination” to strengthen prefrontal–limbic regulation. Third, intergenerational caregiving networks should be

reinforced through grandparent training programs to activate cultural traditions of mutual support, optimizing the pressure–diffusion mechanisms that buffer the transmission of negative emotions. Simultaneously, school–family partnerships should include training to manage parental impulsivity on the basis of social learning theory, with the aim of breaking the intergenerational cycle of negative emotional expression. Culturally sensitive program design must amplify protective effects through stress-buffering strategies while addressing systemic barriers, such as rural–urban disparities, that exacerbate parenting stress.

### Limitations

We acknowledge several limitations of our study that suggest directions for future research. First, our sample size is relatively small, which raises concerns about the robustness of our results. Thus, future research could choose more representative and broader research objects. Second, our data were collected through cross-sectional surveys, and the results are insufficient to infer causalities. We suggest that future research adopt longitudinal designs—such as time series studies; randomized controlled trials; or prospective, longitudinal studies—to better understand the causal relationships between parental factors and children’s emotional development. Such designs would help overcome the limitations of cross-sectional designs and provide stronger evidence for the dynamics of these variables. Third, all of the measures in this study were self-reported by mothers, which may restrict the validity of the findings. Future research could consider collecting data from different sources (e.g., fathers’ self-reports) to explore the gender differences of caregivers in the dynamic relationships influencing preschool children’s SEC, as well as the interactive effects of caregiver gender and child gender. Fourth, we used list-wise deletion to handle missing data. Although the missing data mechanism test supported the MCAR assumption, future research could further validate the robustness of the results by using multiple imputation.

### Acknowledgements

This paper was sponsored by National Social Science and Humanity Foundation (18ZDA338), Decision Making Laboratory for Western China Education and Human Development, Innovation Research 2035 Pilot Plan of Southwest University (SWUPilotPlan004), Chongqing Social Science and Humanity Foundation (2022YC028), 111 program (B21036), Science and Technology Research Program of Chongqing Municipal Education Commission (Grant No. KJQN202204101), Chongqing Vocational Education Teaching Reform Research Project (Z2241487X). Acknowledgements are also registered to the children, parents, educators, research students, and research assistants who participated and helped in this research.

### Authors’ contributions

Ling Li contributed to research design and field survey. Huijuan Liu contributed to data analysis, charting and writing.

## Funding

This paper was sponsored by National Social Science and Humanity Foundation (18ZDA338), Decision Making Laboratory for Western China Education and Human Development, Innovation Research 2035 Pilot Plan of Southwest University (SWUPilotPlan004), Chongqing Social Science and Humanity Foundation (2022YC028), 111 program (B21036), Science and Technology Research Program of Chongqing Municipal Education Commission (Grant No. KJQN202204101), Chongqing Vocational Education Teaching Reform Research Project (Z2241487X).

## Data availability

The data that support the findings of this study are available from Southwest University Faculty of Education but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of Southwest University Faculty of Education.

## Declarations

### Ethics approval and consent to participate

This study was conducted in full compliance with the ethical standards of the Southwest University Faculty of Education Ethics Committee that approved the research protocol (Approval Number: SWU-2022-02-28-01, Date of Approval: 2022-02-28). Written informed consent was obtained from all individual participants included in the study. For studies involving minors, informed consent was obtained from a parent or legal guardian. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Participants were informed about the purpose of the research, the procedures involved, potential risks and benefits, and their right to withdraw consent at any time without repercussion. Privacy and confidentiality of personal information were strictly maintained throughout the study. The specific ethical review form has been uploaded to the system "relevant documents".

### Consent for publication

Not Applicable.

### Competing interests

The authors declare no competing interests.

Received: 11 November 2024 Accepted: 18 April 2025

Published online: 24 April 2025

## References

- Eisenberg N, Cumberland A, Spinrad TL. Parental socialization of emotion. *Psychol Inq*. 1998;9(4):241–73.
- Spinrad TL, Eisenberg N, Gaertner B, Popp T, Smith CL, Kupfer A, Hofer C. Relations of maternal socialization and toddlers' effortful control to children's adjustment and social competence. *Dev Psychol*. 2007;43(5):1170.
- Briggs-Gowan MJ, Carter AS, Bosson-Heenan J, Guyer AE, Horwitz SM. Are infant-toddler social-emotional and behavioral problems transient? *J Am Acad Child Adolesc Psychiatry*. 2006;45(7):849–58.
- Morris AS, Silk JS, Steinberg L, Myers SS, Robinson LR. The role of the family context in the development of emotion regulation. *Soc Dev*. 2007;16(2):361–88.
- Harris VW, Anderson J, Visconti B. Social emotional ability development (SEAD): An integrated model of practical emotion-based competencies. *Motivation and emotion* 2022, 1–28.
- Are F, Shaffer A. Family emotion expressiveness mediates the relations between maternal emotion regulation and child emotion regulation. *Child Psychiatry Hum Dev*. 2016;47(5):708–15.
- Halberstadt AG, Cassidy J, Stifter CA, Parke RD, Fox NA. Self-expressiveness within the family context: Psychometric support for a new measure. *Psychol Assess*. 1995;7(1):93–103.
- Eisenberg N, Cumberland A, Spinrad TL, Fabes RA, Shepard SA, Reiser M, Murphy BC, Losoya SH, Guthrie IK. The relations of regulation and emotionality to children's externalizing and internalizing problem behavior. *Child Dev*. 2001;72(4):1112–34.
- Cornell C, Kiernan N, Kaufman D, Dobee P, Frydenberg E, Deans J: Developing social emotional competence in the early years. *Social and emotional learning in Australia and the Asia-Pacific: Perspectives, programs and approaches* 2017, 391–411.
- Weissberg RP, Durlak JA, Domitrovich CE, Gullotta TP: Social and emotional learning: Past, present, and future. In Durlak JA, Domitrovich CE, Weissberg RP, Gullotta TP (Eds.), *Handbook of social and emotional learning: Research and practice* (pp. 3–19). New York, NY: Guilford Press; 2015.
- Carman SN, Chapparo CJ. Children who experience difficulties with learning: Mother and child perceptions of social competence. *Aust Occup Ther J*. 2012;59(5):339–46.
- Heckman JJ, Lochner LJ, Todd PE. Earnings functions and rates of return. *J Hum Cap*. 2008;2(1):1–31.
- Moffitt TE, Arseneault L, Belsky D, Dickson N, Hancox RJ, Harrington H, Houts R, Poulton R, Roberts BW, Ross S, Sears MR, Thomson WM, Caspi A. A gradient of childhood self-control predicts health, wealth, and public safety. *Proc Natl Acad Sci*. 2011;108(7):2693–8.
- Fredrickson BL. Cultivated emotions: Parental socialization of positive emotions and self-conscious emotions. *Psychol Inq*. 1998;9(4):279–81.
- Cumberland-Li A, Eisenberg N, Champion C, Gershoff E, Fabes RA. The relation of parental emotionality and related dispositional traits to parental expression of emotion and children's social functioning. *Motiv Emot*. 2003;27(1):27–56.
- Garner PW, Jones DC, Miner JL. Social competence among low-income preschoolers: Emotion socialization practices and social cognitive correlates. *Child Dev*. 1994;65(2):622–37.
- Denham SA, Mitchell-Copeland J, Strandberg K, Auerbach S, Blair K. Parental contributions to preschoolers' emotional competence: Direct and indirect effects. *Motiv Emot*. 1997;21(1):65–86.
- Dunn J, Brown JR. Affect expression in the family, children's understanding of emotions, and their interactions with others. *Merrill-Palmer Q*. 1994;40(1):120–37.
- Ramsden SR, Hubbard JA. Family expressiveness and parental emotion coaching: Their role in children's emotion regulation and aggression. *J Abnorm Child Psychol*. 2002;30(6):657–67.
- Halberstadt AG, Eaton KL. A meta-analysis of family expressiveness and children's emotion expressiveness and understanding. *Marriage Fam Rev*. 2002;34(1–2):35–62.
- Halberstadt AG, Crisp VW, Eaton KL: Family expressiveness: A retrospective and new directions for research. 1999.
- Riggio HR, Riggio RE. Emotional expressiveness, extraversion, and neuroticism: A meta-analysis. *J Nonverbal Behav*. 2002;26(4):195–218.
- Swanson J, Valiente C, Lemery-Chalfant K, Caitlin O'Brien T. Predicting early adolescents' academic achievement, social competence, and physical health from parenting, ego resilience, and engagement coping. *The Journal of Early Adolescence*. 2011;31(4):548–76.
- Anthony L, Anthony B, Glanville D, Naiman D, Waanders C, Shaffer S. The relationship between parenting stress, parenting behavior and preschoolers' social competence and behavior problems in the classroom. *Infant Child Dev*. 2005;14:133–54.
- Black MM, Walker SP, Fernald LC, Andersen CT, DiGirolamo AM, Lu C. Lancet Early Childhood Development Series Steering Committee: Early childhood development coming of age: science through the life course. *The Lancet*. 2017;389(10064):77–90.
- Luo R, Jia F, Yue A, Zhang L, Lyu Q, Shi Y, et al: Passive parenting and its association with early child development. *Early Child Development and Care* 2017, 0(0), 1–15.
- Broekhuizen ML, Slot PL, van Aken MA, Dubas JS. Teachers' emotional and behavioral support and preschoolers' self-regulation: Relations with social and emotional skills during play. *Early Educ Dev*. 2017;28(2):135–53.
- Chung KKH, Lam CB, Liew J. Studying children's social-emotional development in school and at home through a cultural lens. *Early Educ Dev*. 2020;31(6):927–9.
- Vigil-Colet A, Codorniu-Raga MJ. Aggression and inhibition deficits of functional and dysfunctional impulsivity. *Personality Individ Differ*. 2004;37:1431–40.

30. Lavender JM, Wonderlich SA, Engel SG, Gordon KH, Kaye WH, Mitchell JE. Dimensions of emotion dysregulation in anorexia nervosa and bulimia nervosa: A conceptual review of the empirical literature. *Clin Psychol Rev*. 2015;40:111–22.
31. Harvey E, Danforth JS, McKee TE, Ulaszek WR, Friedman JL. Parenting of children with attention-deficit/hyperactivity disorder (ADHD): the role of parental ADHD symptomatology. *J Atten Disord*. 2003;7(1):31–42.
32. Brophy-Herb HE, Zajicek-Farber ML, Bocknek EL, McKelvey LM, Stansbury K. Longitudinal connections of maternal supportiveness and early emotion regulation to children's school readiness in low-income families. *Journal of the Society for Social Work and Research*. 2013;4(1):2–19.
33. Liu P, Feng T. The overlapping brain region accounting for the relationship between procrastination and impulsivity: a voxel-based morphometry study. *Neuroscience*. 2017;360:9–17.
34. Phillips ML, Drevets WC, Rauch SL, Lane R. Neurobiology of emotion perception I: The neural basis of normal emotion perception. *Biol Psychiat*. 2003;54(5):504–14.
35. Brown SM, Manuck SB, Flory JD, Hariri AR. Neural basis of individual differences in impulsivity: contributions of corticolimbic circuits for behavioral arousal and control. *Emotion*. 2006;6(2):239.
36. Rohner RP. Worldwide tests of parental acceptance-rejection theory: An overview. *Behavior Science Research*. 1980;15(1):1–21.
37. McElwain NL, Halberstadt AG, Volling BL. Mother- and father-reported reactions to children's negative emotions: relations to young children's emotional understanding and friendship quality. *Child Dev*. 2007;78(5):1407–25.
38. Khaleque A. Perceived parental warmth, and children's psychological adjustment, and personality dispositions: A meta-analysis. *J Child Fam Stud*. 2013;22(2):297–306.
39. Ali S, Khatun N, Khaleque A, Rohner RP. They love me not: A meta-analysis of relations between parental undifferentiated rejection and offspring's psychological maladjustment. *J Cross Cult Psychol*. 2019;50(2):185–99.
40. Pinquart M. Associations of parenting dimensions and styles with externalizing problems of children and adolescents: An updated meta-analysis. *Dev Psychol*. 2017;53(5):873.
41. Pinquart M. Associations of parenting dimensions and styles with internalizing symptoms in children and adolescents: A meta-analysis. *Marriage Fam Rev*. 2017;53(7):613–40.
42. Ford JD, Courtois CA, Steele K, Hart OVD, Nijenhuis ER. Treatment of complex posttraumatic self-dysregulation. *Journal of Traumatic Stress: Official Publication of the International Society for Traumatic Stress Studies*. 2005;18(5):437–47.
43. Eisenberger NI. The pain of social disconnection: examining the shared neural underpinnings of physical and social pain. *Nat Rev Neurosci*. 2012;13(6):421–34.
44. Eisenberger NI, Lieberman MD, Williams KD. Does rejection hurt? An fMRI study of social exclusion. *Science*. 2003;302(5643):290–2.
45. Luby JL, Barch DM, Belden A, Gaffrey MS, Tillman B, Babb C, et al: Maternal support in early childhood predicts larger hippocampal volumes at school age. *Proceedings of the National Academy of Sciences* 2012, 109(8), 2854–2859.
46. Abidin R. The determinants of parenting behavior. *J Clin Child Psychol*. 1992;21(4):407–12.
47. Carapito E, Ribeiro MT, Pereira AI, Roberto MS: Parenting stress and preschoolers' socio-emotional adjustment: the mediating role of parenting styles in parenchild dyads. *Journal of Family Studies* 2018, 1–17.
48. Liu L, Wang M. Parenting stress and children's problem behavior in China: The mediating role of parental psychological aggression. *J Fam Psychol*. 2015;29(1):20–8.
49. Chan MHM, Feng X, Inboden K, Hooper EG, Gerhardt M. Dynamic, bidirectional influences of children's emotions and maternal regulatory strategies. *Emotion*. 2022;22(8):1841.
50. Morris AS, Ratliff EL, Cosgrove KT, Steinberg L. We know even more things: A decade review of parenting research. *J Res Adolesc*. 2021;31(4):870–88.
51. Deater-Deckard K. Parenting stress and child adjustment: Some old hypotheses and new questions. *Clin Psychol Sci Pract*. 1998;5:314–32.
52. Pinderhughes EE, Dodge KA, Bates JE, Pettit GS, Zelli A. Discipline responses: influences of parents' socioeconomic status, ethnicity, beliefs about parenting, stress, and cognitive-emotional processes. *J Fam Psychol*. 2000;14(3):380.
53. Hutteman R, Bleidorn W, Keresteš G, Brković I, Butković A, Denissen JJ. Reciprocal associations between parenting challenges and parents' personality development in young and middle adulthood. *Eur J Pers*. 2014;28(2):168–79.
54. Luo S, Liu Y, Zhang D: Socioeconomic status and young children's problem behaviours—mediating effects of parenting style and psychological suzhi. *Early Child Development and Care* 2019.
55. Mo X, Shi G, Zhang Y, Xu X, Ji C. How to promote the social-emotional competence of rural left-behind children? An empirical study based on propensity score matching. *Front Psychol*. 2023;14:1052693.
56. Sun X, Tian Y, Zhang Y, Xie X, Heath MA, Zhou Z. Psychological development and educational problems of left-behind children in rural China. *Sch Psychol Int*. 2015;36(3):227–52.
57. Wang L, Mesman J, Childs S, Vermeer H. Emotional expressiveness in Chinese and Dutch mothers: Relations with sensitive and directive parenting. *J Cross Cult Psychol*. 2017;48(1):84–99.
58. Graham E, Jordan LP. Migrant parents and the psychological well-being of left-behind children in Southeast Asia. *J Marriage Fam*. 2011;73(4):763–87.
59. Morelen D, Thomassin K, Suveq C, Dimler LM. Emotional expressiveness in mothers of children with anxiety: Associations with children's anxiety severity and emotional expressiveness. *J Appl Dev Psychol*. 2013;34(6):287–93.
60. Cheng F, Wang Y, Zhao J, Wu X. Mothers' negative emotional expression and preschoolers' negative emotional regulation strategies in Beijing, China: The moderating effect of maternal educational attainment. *Child Abuse Negl*. 2018;84:74–81.
61. Wu X, Wang Y, Liu A. Maternal emotional expressiveness affects preschool children's development of knowledge of display rules. *Soc Behav Personal Int J*. 2017;45(1):93–103.
62. Dickman SJ. Functional and Dysfunctional Impulsivity: Personality and Cognitive Correlates. *J Pers Soc Psychol*. 1990;58:95–102.
63. Gao Q, Zhang J, Jia C. Psychometric properties of the Dickman Impulsivity Instrument in suicide victims and living controls of rural China. *J Affect Disord*. 2011;132(3):368–74.
64. Rohner RP: Parental Acceptance-Rejection Questionnaire (PARQ): Test manual. In R. P. Rohner & A. Khaleque (Eds.), *Handbook for the study of parental acceptance and rejection* (4th ed., pp. 43–106). Storrs: Rohner Research Publications; 2005.
65. Putnick DL, Bornstein MH, Lansford JE, Chang L, Deater-Deckard K, Di Giunta L, et al. Parental acceptance-rejection and child prosocial behavior: Developmental transactions across the transition to adolescence in nine countries, mothers and fathers, and girls and boys. *Dev Psychol*. 2018;54(10):1881.
66. Lee SJ, Gopalan G, Harrington D. Validation of the parenting stress index—short form with minority caregivers. *Res Soc Work Pract*. 2016;26(4):429–40.
67. Weiss LG, Oakland T, Aylward GP (Eds.): *Bayley-III clinical use and interpretation*. Academic Press; 2010.
68. Bayley N: *Bayley scales of infant and toddler development: Technical manual* (3rd ed.). San Antonio (TX): Harcourt Assessment; 2005.
69. Azari N, Soleimani F, Vameghi R, Sajedi F, Shashahani S, Karimi H, et al. A psychometric study of the Bayley scales of infant and toddler development in Persian language children. *Iranian Journal of Child Neurology*. 2017;11(1):50–6.
70. Madaschi V, Mecca TP, Macedo EC, Paula CS. Bayley-III scales of infant and toddler development: Transcultural adaptation and psychometric properties. *Paidéia (Ribeirão Preto)*. 2016;26(64):189–97.
71. Yu YT, Hsieh WS, Hsu CH, Chen LC, Lee WT, Chiu NC, et al: A psychometric study of the Bayley scales of infant and toddler development - 3rd edition for term and preterm Taiwanese infants. *Research in Developmental Disabilities* 2013, 34(11), 3875–3883.
72. Zakaria S, Seok CB, Sombuling A, Ahmad MS, Iqbal S. Reliability and validity for Malay version of Bayley scales of infant and toddler development—third edition (Bayley-III): Preliminary study. *International Proceedings of Economics Development and Research*. 2012;40:116–9.
73. Aiken LS, West SG, Reno RR. (1991). *Multiple regression: Testing and interpreting interactions*. Sage, 1991.
74. Okelo KO, Kitsao-Wekulo P, Onyango S, Wambui E, Hardie I, King J, et al: Sociodemographic predictors of parenting stress among mothers in disadvantaged settings: evidence from rural and urban study sites in Kenya and Zambia. 2023.

75. Zhao M, Zhu Z, Kong C, Zhao C. Caregiver burden and parenting stress among left-behind elderly individuals in rural China: a cross-sectional study. *BMC Public Health*. 2021;21(1):846.
76. La Rosa VL, Geraci A, Iacono A, Commodari E. Affective touch in preterm infant development: neurobiological mechanisms and implications for child–caregiver attachment and neonatal care. *Children*. 2024;11(11):1407.
77. Montirosso R, McGlone F. The body comes first. Embodied reparation and the co-creation of infant bodily-self. *Neuroscience & Biobehavioral Reviews* 2020, 113, 77–87.
78. Silvestri V, Giraud M, Macchi Cassia V, Nava E. Touch me or touch me not: Emotion regulation by affective touch in human adults. *Emotion*. 2024;24(4):913–22.
79. Darling-Churchill KE, Lippman L. Early childhood social and emotional development: Advancing the field of measurement. *J Appl Dev Psychol*. 2016;45:1–7.
80. Chaplin TM, Aldao A. Gender differences in emotion expression in children: a meta-analytic review. *Psychol Bull*. 2013;139(4):735.
81. Han J, Hao Y, Cui N, Wang Z, Lyu P, Yue L. Parenting and parenting resources among Chinese parents with children under three years of age: rural and urban differences. *BMC primary care*. 2023;24(1):1–10.
82. Nolen-Hoeksema S, Morrow J. A prospective study of depression and posttraumatic stress symptoms after a natural disaster: the 1989 Loma Prieta Earthquake. *J Pers Soc Psychol*. 1991;61(1):115.
83. Braun K: The prefrontal-limbic system: development, neuroanatomy, function, and implications for socioemotional development. *Clinics in perinatology* 2011, 38(4), 685–702.
84. Bowlby, J: A secure base: Parent-child attachment and healthy human development. Basic books, 2008.
85. Whyte MK: Filial obligations in Chinese families: Paradoxes of modernization. Na, 2004.
86. Chen F, Liu G, Mair CA. Intergenerational ties in context: Grandparents caring for grandchildren in China. *Soc Forces*. 2011;90(2):571–94.

## Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.