Cumulative Family Disadvantage Risk and Social Adjustment in Left-Behind Children: The Mediating Role of Stress and the Moderating Role of Psychosocial Resources (Postprint)

Authors: Fan Xinghua, Fang Xiaoyi, Zhao Xian, CHEN Fengju

Date: 2023-10-09T00:00:00+00:00

Abstract

Based on ecological systems theory and the cumulative risk perspective, this study examined the cumulative effects of disadvantaged family circumstances on social adaptation among left-behind children and its underlying mechanisms. A door-to-door questionnaire survey was conducted with 651 rural children, with a follow-up one year later. The analysis focused on 285 children who remained in left-behind status at both pre-test and post-test, while the remaining participants served as a control group for social adaptation comparison only. The results showed: (1) Compared with non-left-behind children, left-behind children had lower social adaptation scores at both pre-test and post-test; the relationships between cumulative risk of disadvantaged family circumstances and immediate and delayed social adaptation were both linear; (2) After controlling for gender and age, the immediate and delayed predictive effects of cumulative risk of disadvantaged family circumstances on social adaptation were both significant ($\beta = -0.42/-0.23$, ps < 0.001). In immediate prediction, stress functioned as a partial mediator, and psychosocial resources moderated the second half of the mediating pathway; as resource levels increased, the mediating effect of stress weakened. In delayed prediction, post-test stress functioned as a partial mediator, and psychosocial resources simultaneously moderated both the main effect and the first half of the mediating pathway; as resource levels increased, both the delayed main effect and the mediating effect of post-test stress weakened, with both effects becoming non-significant in the high-resource group. Thus, cumulative risk of disadvantaged family circumstances is an important proximal environmental factor for low social adaptation in left-behind children, partially operating through stress induction; psychosocial resources have an important protective effect on their social adaptation.

Full Text

Abstract

Based on ecological systems theory and the cumulative risk perspective, this study examined the cumulative effects of family adversity factors on social adjustment among left-behind children and the underlying mechanisms. Using a questionnaire method, 651 rural children were surveyed through household visits, with a follow-up conducted one year later. The analysis focused on 285 children who remained in left-behind status at both time points, with other samples serving as control groups for social adjustment comparisons only. Results showed: (1) Compared with non-left-behind children, left-behind children scored lower on both initial and follow-up social adjustment measures. The relationship patterns between cumulative family adversity risk and immediate/delayed social adjustment were both linear; (2) After controlling for gender and age, cumulative family adversity risk significantly predicted immediate and delayed social adjustment among left-behind children ($\beta = -0.42/-0.23$, ps < 0.001). In the immediate prediction model, stress partially mediated this relationship, with psychosocial resources moderating the latter half of the mediation path—as resource levels increased, the mediating capacity of stress decreased. In the delayed prediction model, follow-up stress partially mediated the relationship, with psychosocial resources simultaneously moderating both the main effect and the first half of the mediation path. As resource levels increased, both the delayed main effect and the mediating effect of follow-up stress weakened, becoming non-significant in the high-resource group. These findings indicate that cumulative family adversity risk is an important proximal environmental factor contributing to low social adjustment in left-behind children, operating partially through stress induction, while psychosocial resources serve a significant protective function.

Keywords: left-behind children, cumulative family adversity risk, social adjustment, stress, psychosocial resources

---

1. Introduction

In China, "left-behind children" refers to minors under 16 years of age whose both parents have migrated for work or whose single parent has migrated while the other lacks guardianship capacity (State Council, 2016). In 2018, China had 6.97 million left-behind children, primarily distributed across seven central and western provinces including Sichuan and Hunan. In recent years, the social adjustment of left-behind children has attracted widespread societal concern. Social adjustment refers to the degree to which individuals modify their physical and mental states through interaction with their environment to meet socially expected developmental standards appropriate for their age and cultural group (Wang et al., 2010). It is a multidimensional concept, with assessments

primarily focusing on emotional and behavioral adjustment (Niu et al., 2019). Compared with non-left-behind children, left-behind children exhibit higher levels of depression (Fan et al., 2018), loneliness (Cheng & Sun, 2015), and anxiety (Dai & Chu, 2016), along with lower levels of well-being (Fan et al., 2017), happiness (Dai & Chu, 2016), and life satisfaction (Sun et al., 2015). They also show more prominent attention deficits (Wen et al., 2019) and peer relationship and conduct problems (Cheng et al., 2010). A State Council document (2016) noted that the left-behind phenomenon has led to mental health problems and even extreme behaviors in some children, eliciting strong public reaction.

Some left-behind children's social adjustment problems may be related to dysfunction in the "engine" of their family rearing environment. Bronfenbrenner's bioecological systems theory posits that individual development occurs through interaction with people, objects, and symbols in the immediate environment (Bronfenbrenner & Evans, 2000). This process serves as the "engine" of development, with its effectiveness depending on four aspects: the nature of the environment, energy transmission between environment and individual, individual characteristics, and the duration and frequency of exposure to that environment (Bronfenbrenner & Evans, 2000). In the context of parental migration, prolonged parent-child separation creates multiple adverse conditions in the family rearing environment. Some children are more sensitive to these conditions and experience significant stress, leading to social adjustment problems; others actively utilize internal and external resources to mitigate these effects and their associated stress, maintaining good social adjustment. Research over the past four decades indicates that when multiple risk factors coexist in the environment, they tend to operate cumulatively and exert important effects on child development (Evans et al., 2013). Does the negative effect of cumulative family adversity risk on left-behind children's social adjustment occur through the psychological energy transmission process of increased stress? Do psychosocial resources, as an individual characteristic, buffer this process, leading to divergent developmental outcomes? Do these effects change over time? This study addresses these questions using a longitudinal design.

1.1 Cumulative Family Adversity Risk and Social Adjustment Among Left-Behind Children

Family adversity for left-behind children refers to a series of risk factors in the perceived family rearing environment that are detrimental to healthy development compared with non-left-behind children (Fan et al., 2011). The family rearing environment encompasses the conditions and circumstances under which guardians provide care, protection, education, and nurturing activities for minor children (Fan et al., 2011). Cumulative family adversity risk is created by converting family adversity factors into dichotomous risk variables and summing them. Two conversion methods exist (Gach et al., 2018; Wade et al., 2018): First, for categorical variables, certain categories are designated as reference categories ("0" = risk absent) based on a priori theory, while comparison cate-

gories are coded as "1" (= risk present). Second, for continuous variables, cases scoring in the high range ($X \geq P75$ or $Z \geq 1$) on risk variables or in the low range ($X \leq P25$ or $Z \leq -1$) on positive variables are coded as "at risk" (= 1), with remaining cases coded as "no risk" (= 0).

The cumulative risk perspective holds that when risk factors occur in isolation, their impact on individual adaptation is small; when they occur cumulatively, the harm to individuals is greater and more enduring (Evans et al., 2013). Overall, cumulative risk factors—not single risk factors—significantly impact child development. The relationship patterns between cumulative risk factors and child development outcomes can be categorized as linear or nonlinear. Linear models posit that each risk factor operates independently, influencing development through linear combination. Each additional risk factor decreases developmental level or increases adjustment problems by one unit, demonstrating a "gradient effect" (Rauer et al., 2008; Li et al., 2016). Nonlinear models assume interactions among risk factors that create "massive cumulative effects" through mutual enhancement, causing developmental levels to plummet or psychopathology to surge as risk numbers increase. When risk numbers reach a threshold, the negative impact of additional risk factors on positive outcomes or their positive impact on psychopathology diminishes and stabilizes. Two classification systems exist: Rauer et al. (2008) termed these "exacerbation" and "saturation" models, while Li et al. (2016) called them "positive acceleration" and "negative acceleration" models. Both classifications address positive versus negative developmental outcomes, but their descriptions of variable relationships are essentially similar.

Both linear and nonlinear patterns have received partial empirical support. Gach et al. (2018) found that cumulative ecological risk experienced at age 3 positively predicted externalizing problems at age 10, supporting a linear pattern. Biederman et al. (1995) showed that compared with children from risk-free families, children experiencing 2 or 3 risk factors had 9.5 and 34.6 times higher odds of ADHD diagnosis, respectively, supporting a nonlinear positive acceleration pattern. Different relationship patterns imply different practical implications. Under linear patterns, interventions targeting specific risk factors are unaffected by other risk factors, making comprehensive or targeted prevention valuable. Under exacerbation or positive acceleration patterns, simultaneous intervention on multiple risk factors is required, increasing difficulty. Under saturation or negative acceleration patterns, interventions are more effective for individuals with fewer cumulative risk factors (below threshold) than for those with more. Therefore, examining the relationship pattern between cumulative risk factors and developmental outcomes is crucial.

In the left-behind context, 96% of children are cared for by grandparents (Ministry of Civil Affairs, 2018). Compared with parental care, grandparent-care families contain adverse factors such as poor communication, which correlate positively with child depression and loneliness and negatively with subjective vitality and life satisfaction (Fan & Jian et al., 2018). These adverse factors are

closely related to the left-behind phenomenon, share a common occurrence basis, increase children's negative developmental outcomes, and constitute risk factors children must confront. Due to prolonged parent-child separation, their impact on child development may persist. Evans et al. (2013) noted that when risk factors co-occur, cumulative risk is an effective method for examining their impact. As no research has examined cumulative family adversity risk among left-behind children, we make no assumptions about its impact pattern. However, based on the cumulative risk perspective, we propose Hypothesis H1: Cumulative family adversity risk has both immediate and delayed predictive effects on social adjustment among left-behind children.

1.2 The Mediating Role of Stress in the Relationship Between Cumulative Family Adversity Risk and Social Adjustment

Stress arises when the balance between individuals and their environment is disrupted, and individuals experience insufficient resources or threat of resource loss (Hobfoll, 2001). The integrative model of the stress process (Cohen et al., 1997) posits that when facing stressors, individuals assess whether they pose potential threats or whether they have adequate coping capacity. If stressors overwhelm individuals or exceed their coping capacity, stress emerges, triggering negative emotions, affective disorders, and behavioral or physiological responses. Research has shown that stress fully mediates the relationship between cybervictimization and adolescent depression (Hu et al., 2014) and between life stress events and anxiety/depression among female cancer patients (Seib et al., 2018). Thus, stress serves as a mediator between stressors and adjustment problems.

In contexts of family adversity, left-behind children experience long-term deficits in family support resources. According to Hobfoll's (2001) stress perspective, this triggers sustained stress experiences. In other words, cumulative family adversity risk has both immediate and delayed predictive effects on stress among left-behind children. Integrating the aforementioned assertion that "stress triggers negative emotional and behavioral responses," we propose Hypothesis H2: In both immediate and delayed predictions of social adjustment, immediate/delayed stress mediates the relationship between cumulative family adversity risk and social adjustment among left-behind children.

1.3 The Moderating Role of Psychosocial Resources in Stress Coping Processes

Psychosocial resources refer to individual and social-relational factors that promote physical and mental health (Taylor & Broffman, 2011). Researchers have used different operational indicators. For example, Burns et al. (2022) assessed coping styles, school belonging, and parental support, while Manove et al. (2021) used life goals, religiosity, and social support. Despite these variations, previous research has focused on intrapersonal psychological resources and interpersonal social resources. The former includes positive internal characteristics (e.g., op-

timism), belief systems (e.g., self-confidence), and affective states (e.g., positive mood) (Harber et al., 2007), while the latter primarily involves social networks and social support. Cognitive adaptation theory (Taylor, 1983) suggests that when facing stressful events, certain psychological and social resources spontaneously emerge to jointly address threats and challenges; researchers have thus synthesized them as "psychosocial resources" (Taylor & Broffman, 2011). This study selected psychological capital and social support as representative indicators of psychological and social resources to characterize left-behind children's psychosocial resources.

Left-behind children's psychological capital refers to state-like positive psychological capacities (e.g., optimism, self-confidence, gratitude) that promote social adjustment in the left-behind context (Fan et al., 2015), encompassing the three types of psychological resources proposed by Harber et al. (2007). During stress coping, both intrapersonal psychological resources and interpersonal social resources help individuals reasonably assess potential threats from stressors and respond actively, and help people develop resilience in the face of natural disasters and other stressors (Taylor & Broffman, 2011). In other words, psychosocial resources can buffer the negative impact of stressors on adjustment. This process may operate through two pathways. First, they may buffer the direct effect of stressors on adjustment. Luthar et al. (2000) proposed that protective factors can reduce the harm of risk factors on developmental outcomes. Research shows that psychological capital buffers the negative effects of family cumulative risk on adolescent depression and anxiety (Xiong et al., 2020) and workplace ostracism on employee deviant behavior (Preena & Janadari, 2021), while social support mitigates the adverse effects of family violence on female depression and anxiety (Costa & Gomes, 2018) and negative life events on migrant children's behavior problems (Zeng, 2013). Second, they may moderate the mediating process of stress between stressors and adjustment. The resource perception model (Harber et al., 2011) posits that individuals rich in psychosocial resources strengthen social connections, enhance self-confidence and self-worth, and improve the self, making the self more secure. This helps them perceive self-threatening stimuli (i.e., stressors) in more reasonable, appropriate ways, thereby experiencing lower stress and using positive coping strategies to alleviate stress-induced negative effects. Research shows that psychological capital reduces the positive predictive effect of life stressors on college student stress (Dan et al., 2021) and mitigates the negative effects of stress on left-behind children's loneliness and well-being (Fan et al., 2017) and graduate students' academic engagement (Saleem et al., 2022). Social support buffers the negative impact of school bullying on middle school student stress (Kang, 2019) and the effects of stress on adolescent depression (Hu et al., 2014) and deviant behavior (Shan, 2021). This suggests that psychological capital and social support can both reduce the positive impact of stressors on stress and enhance individuals' capacity to cope with stress-related harm.

In the left-behind context, some children demonstrate self-reliance, ambition, and good social adjustment. The reasons may be their higher levels of psycho-

logical capital and more complete social support systems (Fan & Fan, 2021), which together may provide a protective barrier against cumulative family adversity risk. Based on the above reasoning, we propose two hypotheses: H3: Psychosocial resources buffer the immediate predictive effects of cumulative family adversity risk on stress, social adjustment, and the effect of stress on social adjustment among left-behind children; H4: Psychosocial resources reduce the delayed effects of cumulative family adversity risk on stress and social adjustment among left-behind children.

Integrating these hypotheses, the research content is summarized in Figure 1 [Figure 1: see original paper] (immediate model) and Figure 2 [Figure 2: see original paper] (delayed model). Since left-behind girls and left-behind elementary school students show better social adjustment than left-behind boys (Zhang, 2017) and left-behind middle school students (Miao et al., 2021), gender and age effects were controlled in the analyses. In the delayed model, the autoregressive effects of stress and social adjustment were also controlled.

2. Method

2.1 Participants

Since 96% of left-behind children are cared for by grandparents (Ministry of Civil Affairs, 2018), this study selected left-behind children with both parents working away from home and under grandparental care, along with a control group of non-left-behind children. The initial sample (T1) comprised 655 rural children from intact families in grades 4–9, residing in 65 townships in Hunan Province, including 329 left-behind children and 326 non-left-behind children. A follow-up (T2) was conducted one year later, with four participants lost to attrition. Among the 651 valid participants, 285 remained in left-behind status at both waves, 287 remained non-left-behind, 44 transitioned from left-behind to non-left-behind status, and 35 transitioned from non-left-behind to left-behind status. Gender and school-level distributions are shown in Table 1 . T1 participants ranged in age from 9 to 15 years ($M = 11.76$, $SD = 1.61$). The 285 children who remained left-behind throughout both waves served as the analysis sample, with other children serving as controls for social adjustment comparisons only. Missing values for individual items were replaced with the sample mean for that item.

2.2 Measures

2.2.1 Cumulative Family Adversity Risk We used the revised version of the Family Adversity Questionnaire for Rural Left-Behind Children (Fan et al., 2011; Fan & Jian et al., 2018). The questionnaire comprises six dimensions: lack of parental care, cold family atmosphere, poor learning management, inadequate supervision, poor family coping capacity, and lack of communication, with 27 items rated on a 5-point scale (1 = “completely true” or “very much (good)” or “never”; 5 = “completely untrue” or “very little (poor)” or “always”). Dimen-

sions and items were extracted from interview data. After reverse-scoring some items, dimension means were computed, with higher scores indicating more severe problems in the family rearing environment. Cronbach's α coefficients for the questionnaire and its dimensions ranged from 0.56 to 0.90. MANOVA revealed that left-behind children scored significantly higher than non-left-behind children on all dimensions. Therefore, using all 651 participants, cases scoring at or above the 75th percentile ($X \geq P75$) on each dimension were coded as "1" (risk present), with remaining cases coded as "0" (risk absent). The six risk factor scores were summed to create the cumulative family adversity risk index.

2.2.2 Psychosocial Resources Psychosocial resources were computed as a composite of psychological capital and social support. Psychological capital was measured using the Psychological Capital Questionnaire for Rural Left-Behind Children (Fan et al., 2015), comprising 25 items rated on a 5-point scale (1 = "completely true"; 5 = "completely untrue"). After reverse-scoring positively worded items, item means were computed, with higher scores indicating stronger psychological capacities. Cronbach's α was 0.88. Social support was measured using the Chinese version of the Multidimensional Scale of Perceived Social Support (Zimet et al., 1988; Su et al., 2017), comprising 16 items rated on a 5-point scale (1 = "completely untrue"; 5 = "completely true"). Item means were computed, with higher scores indicating greater perceived support. Cronbach's α was 0.90.

Following Niu et al. (2019), psychological capital and social support were combined: First, principal component analysis of the two indicators yielded one factor with eigenvalue > 1.00 (eigenvalue = 1.29), with factor loadings of 0.80 for both indicators, explaining 64.2% of the variance. Second, using the indicators' Z-scores, factor loadings, and corresponding eigenvalue, we computed the composite psychosocial resources score as (0.80 × Z_{psychological} capital + 0.80 × Z_{social} support) / 1.29. Scores ranged from −2.79 to 2.85 (M = 0.00, SD = 0.99), with higher scores indicating richer psychosocial resources.

2.2.3 Stress Stress was measured using the Perceived Stress Scale for Adolescents (Cohen et al., 1983; Fan et al., 2017), comprising 14 items rated on a 5-point scale (1 = "never"; 5 = "always"). After reverse-scoring positive items, item means were computed, with higher scores indicating greater stress. Cronbach's α coefficients were 0.62 and 0.69 at T1 and T2, respectively.

2.2.4 Social Adjustment Social adjustment, an important indicator of mental health, lacks a unified assessment tool. Previous measurements have addressed positive emotions, negative emotions, and problem behaviors (Niu et al., 2019). The dual-factor model of mental health posits that mental health encompasses not only the absence of psychopathology but also high well-being; positive psychology theory further suggests that problem behaviors do not necessarily indicate a lack of positive behaviors. Accordingly, we selected four

indicators—depression, well-being, problem behaviors, and positive behaviors—to comprehensively assess children's social adjustment from both negative and positive emotional and behavioral perspectives.

Depression was measured using the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977; Wang et al., 1999), comprising 20 items assessing symptom frequency during the past week on a 4-point scale (1 = "occasionally (less than 1 day) or none"; 4 = "most of the time (5–7 days) or persistent"). After reverse-scoring positive items, item means were computed, with higher scores indicating more severe depressive symptoms. Cronbach's α coefficients were 0.81 and 0.85 at T1 and T2, respectively. Well-being was measured using a single item from Shen (2009): "Overall, in the past year, how happy have you felt with your life?" rated on an 11-point scale (0 = "not at all happy" to 10 = "happy every day"). Problem behaviors were assessed using the revised Adolescent Problem Behavior Questionnaire (Fang et al., 1996), covering 11 problem behaviors such as cheating on exams. Participants reported frequency during the past six months on a 4-point scale (1 = "never"; 4 = "often"). Item means were computed, with higher scores indicating more problem behaviors. Cronbach's α coefficients were 0.70 and 0.87 at T1 and T2, respectively. Positive behaviors were adapted from Yang and Kong (2005), comprising four behaviors such as "consciously studying hard," rated on a 4-point scale (1 = "never"; 4 = "often"). Participants responded based on the past six months. Item means were computed, with higher scores indicating more positive behaviors. Cronbach's α coefficients were 0.68 and 0.70 at T1 and T2, respectively.

Finally, following Niu et al. (2019), social adjustment was computed as a composite. Principal component analysis of the four indicators at each wave revealed one common factor with eigenvalue > 1.00 (1.94 at T1, 1.91 at T2), explaining 48.6% and 47.8% of variance, respectively. Factor loadings for well-being, positive behaviors, depression, and problem behaviors were 0.60/0.60, 0.71/0.67, −0.73/−0.79, and −0.74/−0.69 at T1/T2, respectively. Using factor loadings, Z-scores, and eigenvalues, we computed composite social adjustment scores as [0.60 × Z_{well}-being + 0.71 × Z_{positive} behaviors − 0.73 × Z_{depression} − 0.74 × Z_{problem} behaviors] / 1.94 at T1 and [0.60 × Z_{well}-being + 0.67 × Z_{positive} behaviors − 0.79 × Z_{depression} − 0.69 × Z_{problem} behaviors] / 1.91 at T2. Scores ranged from −3.47 to 2.25 at T1 and −2.95 to 2.22 at T2 (M = 0.00, SD = 1.00 for both waves), with higher scores indicating better adjustment.

2.3 Data Collection Procedure

Sixty-five rural college students from Hunan Province were recruited as research assistants, representing 62 counties/cities in Hunan. During the 2016 winter vacation, assistants conducted household surveys of children in their home villages within a designated week, after obtaining consent from children and their (proxy) guardians. At T1, assistants sampled left-behind and non-left-behind children at a 1:1 ratio. For elementary school students, assistants read items

aloud to facilitate understanding; middle school students completed questionnaires independently after instructions. Assistants checked questionnaire completeness immediately after completion. A follow-up was conducted during the 2017 winter vacation.

2.4 Common Method Bias Check

Harman's single-factor test was used to assess common method bias in left-behind children's T1 and T2 data. Exploratory factor analysis revealed 36 and 12 factors with eigenvalues > 1.00 at T1 and T2, respectively, with the first factor explaining 12.4% and 18.9% of variance—both below the 40% critical threshold, indicating no significant common method bias.

2.5 Data Analysis

Data were analyzed using SPSS 24.0 and AMOS 22.0, including preliminary analyses and model testing. Preliminary analyses comprised: (1) comparisons of social adjustment scores and developmental trends across the four child groups; (2) distribution of cumulative family adversity risk among left-behind children and its relationship pattern with social adjustment; and (3) correlations among study variables for left-behind children. Model testing used Z-scores to examine immediate/delayed main effect models, mediation models, and moderated mediation models for left-behind children.

3. Results

3.1 Preliminary Analyses

3.1.1 Comparisons of Social Adjustment Across Four Child Groups and Their Developmental Trends Social adjustment scores for the four groups at T1/T2 are shown in Table 2 . A MANOVA with child group as the independent variable and T1/T2 social adjustment as dependent variables revealed significant main effects of child group on T1 social adjustment ($F(3, 647) = 13.90$, $p < 0.001$, $^2 = 0.061$) and T2 social adjustment ($F(3, 647) = 2.74$, $p < 0.05$, $^2 = 0.013$). Post-hoc tests showed that at T1, children who were left-behind at T1 but not at T2 and those continuously left-behind scored significantly lower than non-left-behind children and those who became left-behind at T2; additionally, children who were left-behind at T1 but not at T2 scored significantly lower than continuously left-behind children. At T2, continuously left-behind children scored significantly lower than non-left-behind children.

A 4 (child group) $\times$ 2 (time) repeated-measures ANOVA examined developmental trends. Results showed significant main effects of child group ($F(3, 647) = 9.63$, $p < 0.001$, $^2 = 0.043$) and a significant child group $\times$ time interaction ($F(3, 647) = 4.57$, $p < 0.01$, $^2 = 0.021$), but no main effect of time. Simple effects analysis revealed that children who were left-behind at T1 but not at T2

showed significantly higher T2 than T1 social adjustment (MD = 0.48, F(1, 647) = 9.11, p < 0.01, ^{2} = 0.014). Because the left-behind status of children who transitioned between groups changed during the follow-up period, they were excluded from subsequent analyses. Non-left-behind children served as controls and were also excluded from further analyses.

3.1.2 Distribution of Cumulative Family Adversity Risk and Its Relationship Pattern with Social Adjustment Frequency analysis of T1 cumulative family adversity risk scores among left-behind children revealed values of 0, 1, 2, 3, 4, 5, and 6. The frequency for value 6 was only 7 (2.5%), so it was merged with value 5 for analysis. Frequencies, percentages, and social adjustment scores for the six categories are shown in Table 3 .

Following Cohen et al. (2003), we included both linear and quadratic terms of cumulative risk. If the quadratic term significantly predicted the outcome, a nonlinear relationship was indicated. Three analytical methods exist: One-Way ANOVA trend analysis (Appleyard et al., 2005), hierarchical regression (Ashworth & Humphrey, 2020), and covariance structural equation modeling (Li et al., 2016). Covariance structural equation modeling was selected because it can control for nuisance variables while estimating residual correlations between linear and quadratic terms and overall model fit.

After controlling for gender and age, we examined the predictive effects of T1 cumulative risk linear and quadratic terms on T1/T2 social adjustment. Results showed that T1 cumulative risk quadratic term → T1/T2 social adjustment paths were non-significant. After adding residual correlations between the linear and quadratic terms, both immediate and delayed models showed excellent fit (^{2}/df = 0.57/0.57, NFI = 0.97/0.96, CFI = 1.00/1.00, RMSEA = 0.000/0.000). Paths from T1 cumulative risk linear term → T1 social adjustment ($\beta = -0.42$) and → T2 social adjustment ($\beta = -0.37$), gender → T1 social adjustment ($\beta = -0.22$) and → T2 social adjustment ($\beta = -0.14$), and age → T1 social adjustment ($\beta = -0.14$) and → T2 social adjustment ($\beta = -0.18$) were all significant (ps < 0.01). However, paths from T1 cumulative risk quadratic term → T1 social adjustment ($\beta = -0.03$) and → T2 social adjustment ($\beta = -0.08$) remained non-significant (ps > 0.08). Thus, the relationship patterns between cumulative family adversity risk and both immediate and delayed social adjustment were linear rather than nonlinear. Subsequent analyses therefore examined only the linear term's mechanisms.

The linear pattern indicated that social adjustment levels declined linearly with increasing cumulative risk numbers, but this pattern did not clearly describe differences across risk categories. Therefore, MANOVA was used to examine group differences. Results showed significant main effects of T1 cumulative risk on T1 social adjustment (F(5, 279) = 14.27, p < 0.001, ^{2} = 0.204) and T2 social adjustment (F(5, 279) = 10.90, p < 0.001, ^{2} = 0.163). Post-hoc LSD tests (see Table 3) revealed that children with 0 or 1 risk factors scored significantly higher on T1/T2 social adjustment than those with $ $2 risk factors; children with 2

or 3 risk factors scored significantly higher than those with $ $5 risk factors.

3.1.3 Correlations Among Study Variables for Left-Behind Children Pearson correlations are shown in Table 4 . T1 cumulative family adversity risk correlated negatively with T1 psychosocial resources and T1/T2 social adjustment, and positively with T1/T2 stress. T1 psychosocial resources correlated positively with T1/T2 social adjustment and negatively with T1/T2 stress. T1/T2 stress correlated negatively with T1/T2 social adjustment. All correlations were significant at $p < 0.001$. Additionally, gender and age correlated significantly with T1/T2 social adjustment (ps < 0.05).

3.2 Model Testing

3.2.1 Immediate Prediction Model First, an immediate main effect model was built with T1 cumulative family adversity risk predicting T1 social adjustment, controlling for gender and age. The model showed excellent fit (^{2}/df = 0.59, NFI = 0.98, CFI = 1.00, RMSEA = 0.000), with T1 cumulative family adversity risk significantly predicting T1 social adjustment ($\beta = -0.42$, $p < 0.001$).

Second, T1 stress was added as a mediator to the main effect model. The model showed excellent fit (^{2}/df = 0.91, NFI = 0.97, CFI = 1.00, RMSEA = 0.000). Paths from T1 cumulative risk → T1 social adjustment ($\beta = -0.33$) and → T1 stress ($\beta = 0.34$), and from T1 stress → T1 social adjustment ($\beta = -0.30$) were all significant (ps < 0.001). The indirect effect through stress was −0.101, accounting for 23.9% of the total effect, with a 95% CI of (−0.150, −0.062), indicating significant mediation ($p = 0.001$). Thus, cumulative family adversity risk partially predicted left-behind children's social adjustment through stress.

Third, a moderated mediation model was built by adding paths from T1 psychosocial resources → T1 stress/T1 social adjustment, T1 cumulative risk × T1 psychosocial resources → T1 stress/T1 social adjustment, and T1 stress × T1 psychosocial resources → T1 social adjustment. Paths from T1 cumulative risk × T1 psychosocial resources → T1 stress ($\beta = 0.07$) and → T1 social adjustment ($\beta = -0.01$) were non-significant (ps > 0.08). After removing these paths and adding residual correlations between T1 cumulative risk and T1 psychosocial resources and between T1 stress and the T1 stress × T1 psychosocial resources interaction term, the model showed good fit (^{2}/df = 1.64, NFI = 0.94, CFI = 0.98, RMSEA = 0.047). The path from T1 stress × T1 psychosocial resources → T1 social adjustment was significant ($\beta = 0.11$, $p < 0.05$), as shown in Figure 3 [Figure 3: see original paper].

Finally, simple slope analysis of the interaction was conducted by testing the immediate stress mediation model separately for low ($Z \leq -1$), medium ($-1 < Z < 1$), and high ($Z \geq 1$) T1 psychosocial resource groups. In the low-resource group, the path from T1 cumulative risk → T1 social adjustment was non-significant ($\beta = -0.13$, $p > 0.05$), while paths from T1 cumulative risk → T1 stress ($\beta =$

0.50, p < 0.001) and T1 stress → T1 social adjustment ($\beta = -0.39$, p < 0.01) were significant. The indirect effect through stress was −0.192, accounting for 59.3% of the total effect, with a 95% CI of (−0.381, −0.040), indicating significant full mediation (p = 0.015). In the medium-resource group, paths from T1 cumulative risk → T1 social adjustment ($\beta = -0.24$, p < 0.001) and → T1 stress ($\beta = 0.28$, p < 0.001), and from T1 stress → T1 social adjustment ($\beta = -0.31$, p < 0.001) were all significant. The indirect effect was −0.086, accounting for 26.1% of the total effect, with a 95% CI of (−0.150, −0.040), indicating significant partial mediation (p = 0.001). In the high-resource group, paths from T1 cumulative risk → T1 social adjustment ($\beta = -0.44$, p < 0.001) and → T1 stress ($\beta = 0.29$, p < 0.05) were significant, but the path from T1 stress → T1 social adjustment was non-significant ($\beta = -0.10$, p > 0.08). The indirect effect was −0.028, with a 95% CI of (−0.132, 0.033), indicating non-significant mediation (p = 0.252). In summary, as psychosocial resource levels increased, the mediating capacity of stress in the relationship between cumulative family adversity risk and left-behind children's social adjustment decreased.

3.2.2 Delayed Prediction Model First, a delayed main effect model was built with T1 cumulative family adversity risk predicting T2 social adjustment, controlling for gender, age, and T1 social adjustment. After adding residual correlations between T1 cumulative risk and T1 social adjustment and between gender and T1 social adjustment, the model showed acceptable fit (^{2}/df = 2.24, NFI = 0.95, CFI = 0.97, RMSEA = 0.066). T1 cumulative family adversity risk significantly predicted T2 social adjustment ($\beta = -0.23$, p < 0.001).

Second, T2 stress was added as a mediator, controlling for the effect of T1 stress on T2 stress. After adding residual correlations between T1 stress and both T1 cumulative risk and T1 social adjustment, the model showed acceptable fit (^{2}/df = 2.24, NFI = 0.94, CFI = 0.97, RMSEA = 0.066). Paths from T1 cumulative risk → T2 social adjustment ($\beta = -0.18$) and → T2 stress ($\beta = 0.15$), and from T2 stress → T2 social adjustment ($\beta = -0.35$) were all significant (ps < 0.01). The indirect effect through T2 stress was −0.054, accounting for 23.6% of the total effect, with a 95% CI of (−0.102, −0.016), indicating significant mediation (p = 0.009). Thus, cumulative family adversity risk partially affected left-behind children's social adjustment through delayed stress.

Third, a delayed moderated mediation model was built by adding paths from T1 psychosocial resources → T2 stress/T2 social adjustment and T1 cumulative risk × T1 psychosocial resources → T2 stress/T2 social adjustment. After adding residual correlations between T1 psychosocial resources and T1 cumulative risk/T1 stress/T1 social adjustment, the model showed good fit (^{2}/df = 1.83, NFI = 0.93, CFI = 0.97, RMSEA = 0.054). Paths from T1 cumulative risk × T1 psychosocial resources → T2 stress ($\beta = -0.12$, p = 0.022) and → T2 social adjustment ($\beta = 0.09$, p = 0.051) were significant or marginally significant, as shown in Figure 4 [Figure 4: see original paper].

Finally, the delayed stress mediation model was tested separately for low (Z

≤ -1), medium ($-1 < Z < 1$), and high ($Z \geq 1$) T1 psychosocial resource groups. In the low- and medium-resource groups, paths from T1 cumulative risk → T2 social adjustment ($\beta = -0.37/-0.14$, ps < 0.05) and → T2 stress ($\beta = 0.40/0.15$, ps < 0.05), and from T2 stress → T2 social adjustment ($\beta = -0.34/-0.37$, ps < 0.01) were all significant. Indirect effects were -0.138 and -0.055, accounting for 27.2% and 28.9% of total effects, with 95% CIs of (-0.344, -0.031) and (-0.114, -0.008), respectively, indicating significant mediation (p $= 0.007/0.025$). In the high-resource group, paths from T1 cumulative risk → T2 social adjustment ($\beta = 0.13$) and → T2 stress ($\beta = -0.09$) were non-significant (ps > 0.08), while the path from T2 stress → T2 social adjustment was significant ($\beta = -0.47$, $p < 0.001$). The indirect effect was 0.044, with a 95% CI of (-0.056, 0.188), indicating non-significant mediation (p = 0.347). Thus, as T1 psychosocial resource levels increased, the direct effect of T1 cumulative risk on T2 social adjustment and the indirect effect through T2 stress both decreased, becoming non-significant in the high-resource group.

4. Discussion

Using a longitudinal design based on ecological systems theory, this study examined the effects of cumulative family adversity risk on social adjustment among left-behind children and the underlying mechanisms.

4.1 Effects of the Left-Behind Phenomenon on Children's Social Adjustment

First, compared with non-left-behind children, left-behind children reported lower scores on both T1 and T2 social adjustment, indicating that the left-behind phenomenon negatively affects social adjustment. Second, children who were left-behind at T1 but not at T2 showed significantly higher T2 than T1 social adjustment, suggesting that non-left-behind status is more conducive to child development than left-behind status. Third, children who were non-left-behind at T1 but left-behind at T2 showed a non-significant declining trend in adjustment during the follow-up period. This may be because their experience in a low-risk environment ($M = 1.26 \pm 1.27$ risk factors) during T1 equipped them with resilience experiences that laid a foundation for subsequent adjustment.

4.2 Predictive Effects of Cumulative Family Adversity Risk on Social Adjustment

The relationship patterns between cumulative family adversity risk and both immediate and delayed social adjustment were linear and negative. This indicates that each additional risk factor decreased social adjustment by one unit at both time points, suggesting that comprehensive or targeted interventions for left-behind children's family adversity are valuable. Further analysis revealed that immediate and delayed adjustment levels declined as cumulative risk num-

bers increased: children with 0–1 risk factors showed better adjustment than those with $ $2 risk factors; children with 2–3 risk factors showed better adjustment than those with $ $5 risk factors. This demonstrates that multiple risks within family adversity constitute important proximal environmental factors for low social adjustment among left-behind children. The cumulative risk perspective suggests that multiple risks create developmental vulnerability because they demand resources beyond what children possess, easily causing distress and impairing normal development (Evans et al., 2013). In left-behind children's lives, multiple adverse factors such as lack of parental care challenge their development. Because multiple risk factors often operate synergistically, they substantially increase the resources needed for left-behind children to cope, magnifying harm to social adjustment.

Cumulative family adversity risk showed significant immediate and delayed negative predictive effects on left-behind children's social adjustment. This aligns with Gach et al. (2018) and confirms the cumulative risk perspective: simultaneous exposure to multiple risk factors causes greater and more enduring harm than single risk factors (Evans et al., 2013). The family is the cradle of healthy child development. Ecological systems theory posits that unresponsive parenting is a distal factor for children's psychological distress and other negative adjustment outcomes, hindering not only immediate personality and ability development but also predicting social developmental dysregulation (Bronfenbrenner & Evans, 2000). Process-oriented family function theory also suggests that the processes through which family systems achieve communication, emotional involvement, and behavioral control directly affect physical and mental health (Fang et al., 2004). With parents working away long-term, they cannot respond promptly to children's needs; in grandparent-care families, basic family functions such as parent-child communication and behavioral supervision are weakened. These factors combine to form cumulative family adversity risk, threatening left-behind children's healthy development in the present (significant immediate effects) and, under continued left-behind status, the negative impact of adverse family rearing environments persists (significant delayed effects). This suggests that improving weakened aspects of family function to reduce risk factors is an effective approach to promoting left-behind children's social adjustment.

4.3 The Mediating Role of Stress

The immediate and delayed predictive effects of cumulative family adversity risk on left-behind children's social adjustment were partially mediated by immediate and delayed stress. This aligns with the "adversity → stress → maladjustment" paradigm proposed by Wadsworth et al. (2011) and confirms that stress is an intermediate sequence between stressors and stress responses (Cohen et al., 1997). The cumulative stressors model suggests that risk factors in specific families tend to operate cumulatively (Jaffee et al., 2007). Family adversity risk factors for left-behind children are closely related to the left-behind

phenomenon, can co-occur temporally, and are spatially confined to the family environment, meeting the temporal and spatial conditions for cumulative effects. From an immediate perspective, left-behind children perceive deficits in family support resources within adverse family contexts, generating stress that leads to maladjustment, such as reduced positive emotions (e.g., well-being), increased negative emotions (e.g., loneliness), and more problem behaviors (e.g., smoking, internet addiction) (Fan et al., 2017; Ugarte et al., 2021). From a delayed perspective, under continued left-behind status, family adversity risk factors persist, making it difficult for children's stress experiences to dissipate and their stress responses to cease. Therefore, both immediate and delayed mediating effects of stress were significant. This suggests that intervening on stress induced by cumulative family adversity risk may help improve left-behind children's social adjustment.

4.4 The Moderating Role of Psychosocial Resources

In the immediate prediction model, psychosocial resources did not significantly moderate the paths from cumulative risk → stress/adjustment. However, they significantly buffered the path from stress → adjustment: as resource levels increased, stress's predictive power on adjustment decreased, thereby weakening stress's mediating capacity. The resource perception model posits that richer psychosocial resources create a more secure self, enhancing resources' effectiveness in coping with stress (Harber et al., 2011). Our findings support this model and reveal the resource enrichment effect of combining psychological capital and social support in the left-behind context.

Although psychosocial resources did not significantly moderate the immediate effects of cumulative risk on stress/adjustment, their delayed moderating effects were significant: psychosocial resources effectively buffered the effects of cumulative family adversity risk on T2 stress and T2 social adjustment. Under continued left-behind status, left-behind children's cognitive schema that "parents are irreplaceable" may remain constant, but their psychosocial resources continue developing. From a group-level developmental trend, left-behind duration significantly positively predicts teacher support, peer support (Liu et al., 2007), and psychological capital (Li et al., 2020). From an individual-level developmental trend, left-behind children with higher psychological capital (i.e., possessing gratitude, self-reliance, self-confidence, ambition, friendliness) more easily receive various forms of help in daily life, maintaining adequate resource reserves that are easily replenished after depletion. By contrast, those with lower psychological capital have difficulty obtaining desired help when facing stressors, easily falling into a loss spiral of resources. Thus, as left-behind duration extends, left-behind children's psychosocial resources increase at the group level while individual differences expand.

This heterogeneity in psychosocial resource development among left-behind children explains the significant delayed moderating effects. The motivated effort-allocation model of self-regulation posits that to reduce self-depletion and neg-

ative effects from stressors, individuals tend to allocate their own resources to enhance coping effectiveness (Molden et al., 2016). Left-behind children with richer psychosocial resources possess internal motivation for positive growth. When facing cumulative family adversity risk, they can allocate resources from abundant reserves for sustained coping, not only neutralizing threats experienced during stress appraisal but also buffering the delayed impact of this risk on social adjustment. By contrast, left-behind children with poorer psychosocial resources have limited resources to allocate and poorer sustainable development of resources, resulting in less effective coping with cumulative risk and greater harm to T2 stress and social adjustment.

Additionally, although the "family support" dimension of social support and the "lack of parental care" dimension of family adversity are conceptually related ($r = -0.29$, $p < 0.001$), the moderating effects described above remained robust after removing the "family support" dimension.

4.5 Study Significance, Implications, and Limitations

Based on ecological systems theory, this longitudinal study examined the effects of cumulative family adversity risk on left-behind children's social adjustment and its mechanisms. The findings enrich research on disadvantaged children and help understand low social adjustment among left-behind children. From an immediate perspective, cumulative family adversity risk is an important proximal environmental factor triggering low social adjustment, with negative effects partially occurring through stress induction; richer psychosocial resources effectively reduce stress's harm to adjustment. From a delayed perspective, cumulative family adversity risk is an important antecedent of low social adjustment; high-level psychosocial resources can successfully block both the direct and indirect harmful effects of this risk on subsequent adjustment.

These findings have implications for improving left-behind children's social adjustment. First, based on the structure of family adversity, systematic coparenting training should be provided to grandparent caregivers and migrant parents, teaching skills such as parent-child communication and behavioral supervision to improve weakened aspects of family function and reconstruct the family ecosystem from the source. During reconstruction, special attention should be paid to children with more than 2 cumulative risk factors, particularly strengthening parental guardianship responsibilities for children with more than 5 risk factors to create a better family rearing environment. Second, based on the components of psychosocial resources (psychological capital and social support), targeted intervention activities should be implemented to enhance left-behind children's psychosocial resource levels and strengthen their immunity against cumulative family adversity risk. In summary, the dual approach of "reconstructing the family ecosystem" and "cultivating psychosocial resources" may help improve left-behind children's social adjustment.

This study has several limitations. First, the follow-up interval was relatively

short, limiting the ability to fully reveal developmental trends and mechanisms. Future research should use multi-wave longitudinal designs for more explanatory power. Second, immediate and delayed mediating effects of stress accounted for only 23.9% and 23.6% of total effects, suggesting other mediators exist. Research shows that basic psychological need satisfaction partially mediates the relationship between family adversity and left-behind children's psychological adjustment (Fan & Jian et al., 2018), and deviant peer association partially mediates the relationship between ecological cumulative risk and left-behind children's problem behaviors (Lei et al., 2019). Future research incorporating these variables could improve internal validity. Third, the concept of "psychosocial resources" is broad; this study only used psychological capital and social support as indicators. Other psychosocial resource factors may also exert protective effects between cumulative family adversity risk and left-behind children's adjustment, warranting further investigation.

5. Conclusions

1. The relationship patterns between cumulative family adversity risk and both immediate and delayed social adjustment among left-behind children are linear.
2. Higher cumulative family adversity risk index predicts lower immediate and delayed social adjustment among left-behind children; these predictive effects are partially mediated by immediate and delayed stress.
3. In immediate prediction, psychosocial resources buffer the effect of stress on social adjustment; as resource levels increase, stress's predictive power on adjustment weakens. In delayed prediction, psychosocial resources buffer the effects of cumulative family adversity risk on both delayed social adjustment and stress; at high resource levels, both the direct effect of cumulative risk on delayed adjustment and the indirect effect through delayed stress become non-significant.

References

Appleyard, K., Egeland, B., van Dulmen, M. H. M., & Sroufe, L. A. (2005). When more is not better: The role of cumulative risk in child behavior outcomes. *Journal of Child Psychology and Psychiatry, 46*(3), 235–245.

Ashworth, E., & Humphrey, N. (2020). More than the sum of its parts: Cumulative risk effects on school functioning in middle childhood. *British Journal of Educational Psychology, 90*(1), 43–61.

Biederman, J., Milberger, S., Faraone, S. V., Kiely, K., Guite, J., Mick, E., … Reed, E. (1995). Family-environment risk factors for attention deficit hyperactivity disorder: A test of Rutter's indicators of adversity. *Archives of General Psychiatry, 52*(6), 464–470.

Bronfenbrenner, U., & Evans, G. W. (2000). Developmental science in the 21st

century: Emerging questions, theoretical models, research designs and empirical findings. *Social Development, 9*(1), 115–125.

Burns, E. C., Collie, R. J., van Bergen, P., & Martin, A. J. (2022). Intrapersonal and interpersonal psychosocial resources and achievement: A multilevel latent profile analysis of students and schools. *Journal of Educational Psychology, 14*(8), 1912–1930.

Cheng, J., & Sun, Y. H. (2015). Depression and anxiety among left-behind children in China: A systematic review. *Child: Care, Health and Development, 41*(4), 515–523.

Cheng, P. X., Da, C. J., Cao, F. L., Li, P., Feng, D. J., & Jiang, C. J. (2010). A comparative study on psychological abuse and neglect and emotional and behavioral problems of left-behind children and non-left-behind children in rural areas. *Chinese Journal of Clinical Psychology, 18*(2), 250–251+253.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*(4), 385–396.

Cohen, S., Kessler, R. C., & Gordon, L. U. (1997). Strategies for measuring stress in studies of psychiatric and physical disorders. In S. Cohen, R. C. Kessler, & L. U. Gordon (Eds.), *Measuring stress: A guide for health and social scientists* (pp. 7–11). Oxford: Oxford University Press.

Costa, E. C., & Gomes, S. C. (2018). Social support and self-esteem moderate the relation between intimate partner violence and depression and anxiety symptoms among Portuguese women. *Journal of Family Violence, 33*(5), 355–368.

Dai, Q., & Chu, R. X. (2016). Anxiety, happiness and self-esteem of western Chinese left-behind children. *Child Abuse & Neglect, 86*, 403–413.

Dan, Z., Guan, F., & You, X. Q. (2021). The relationship between psychological stressors and stress experience of college students in Tibet: The mediating and regulating effects of psychological capital. *Journal of Tibet University (Social Sciences),* (3), 229–234.

Evans, G. W., Li, D. P., & Whipple, S. S. (2013). Cumulative risk and child development. *Psychological Bulletin, 139*(6), 1342–1396.

Fan, X. H. (2012). *Impact of family adversity on psychological adaptation among left-behind-children in rural China.* Changsha, China: Hunan Normal University Press.

Fan, X. H., Fang, X. Y., & Chen, F. J. (2011). The development of family adversity scale for parent-absent children in rural China. *Chinese Journal of Clinical Psychology, 19*(6), 915–919.

Fan, X. H., Fang, X. Y., Chen, F. J., Huang, Y. S., & Zhang, S. Y. (2015). The development of psychological capital scale for parent-absent children in rural China. *Chinese Journal of Clinical Psychology, 23*(1), 1–6.

Fan, X. H., Fang, X. Y., Huang, Y. S., Chen, F. J., & Yu, S. (2018). The influence mechanism of parental care on depression among left-behind rural children in China: A longitudinal study. *Acta Psychologica Sinica, 50*(9), 1029–1040.

Fan, X. H., Jian, J. P., Chen, F. J., Yu, M. J., Zhou, Y., & Chen, Q. (2018). Family adversity and psychological adaptation among the left-behind children. *Chinese Journal of Clinical Psychology, 26*(2), 353–357.

Fan, X. H., Yu, S., Peng, J., & Fang, X. Y. (2017). The relationship between perceived life stress, loneliness and general well-being among the left-behind rural children: Psychological capital as a mediator and moderator. *Journal of Psychological Science, 40*(2), 388–394.

Fan, Z. Y., & Fan, X. H. (2021). Effect of social support on the psychological adjustment of left-behind rural children in China: A moderated mediation model. *Frontiers in Psychology*, https://doi.org/10.3389/fpsyg.2020.604397.

Fang, X. Y., Li, X. M., & Dong, Q. (1996). Adolescents' smoking behavior and its relative factors. *Chinese Mental Health Journal, 10*(2), 77–80.

Fang, X. Y., Xu, J., Sun, L., & Zhang, J. T. (2004). Family functioning: Theory, influencing factors, and its relationship with adolescent social adjustment. *Advances in Psychological Science, 12*(4), 544–553.

Gach, E. J., Ip, K. I., Sameroff, A. J., & Olson, S. L. (2018). Early cumulative risk predicts externalizing behavior at age 10: The mediating role of adverse parenting. *Journal of Family Psychology, 32*(1), 92–102.

Harber, K. D., Einev-Cohen, M., & Lang, F. (2007). They heard a cry: Psychosocial resources moderate perception of others' distress. *European Journal of Social Psychology, 38*(2), 296–314.

Harber, K. D., Yeung, D., & Iacovelli, A. (2011). Psychosocial resources, threat, and the perception of distance and height: Support for the resources and perception model. *Emotion, 11*(5), 1080–1090.

Hobfoll, S. E. (2001). The influence of culture, community, and the nested-self in the stress process: Advancing conservation of resources theory. *Applied Psychology, 50*(3), 337–370.

Hu, Y., Fan, C. Y., Zhang, F. J., Xie, X. C., & Hao, E. H. (2014). The effect of perceived stress and online social support on the relationship between cyber-victimization and depression among adolescents. *Psychological Development and Education, 30*(2), 177–184.

Jaffee, S. R., Caspi, A., Moffitt, T. E., Polo-Tomas, M., & Taylor, A. (2007). Individual, family, and neighborhood factors distinguish resilient from non-

resilient maltreated children: A cumulative stressors model. *Child Abuse & Neglect, 31*(3), 231–253.

Kang, F. (2019). *Research on the implicit and explicit depression of junior middle school students by realistic bullying and cyber-bullying based on the role of social support and stress* (Unpublished master's thesis). Jiangxi Normal University, China.

Lei, H., Zhang, Q., Li, X., Yang, H., Du, W., & Shao, J. (2019). Cumulative risk and problem behaviors among Chinese left-behind children: A moderated mediation model. *School Psychology International, 40*(3), 309–328.

Li, D. P., Zhou, Y. Y., Zhao, L. Y., Wang, Y. H., & Sun, W. Q. (2016). Cumulative ecological risk and adolescent internet addiction: The mediating role of basic psychological need satisfaction and positive outcome expectancy. *Acta Psychologica Sinica, 48*(12), 1519–1537.

Li, K., Jiang, X., Pan, W. M., Xu, F. F., & Xue, L. (2020). Study on the influence of left-behind life on psychological capital of rural primary and secondary school students. *Chinese Primary Health Care, 34*(5), 78–81.

Liu, X., Zhao, J. X., Shen, J. L., & Wang, X. H. (2007). Social support of junior middle school's left-home-kids. *Chinese Journal of Clinical Psychology, 15*(2), 183–185.

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development, 71*(3), 543–562.

Manove, E. E., Poon, C. Y. S., Rhodes, J. E., & Lowe, S. R. (2021). Changes in psychosocial resources as predictors of posttraumatic growth: A longitudinal study of low-income, female Hurricane Katrina survivors. *Traumatology, 27*(4), 346–353.

Miao, H. L., Guo, C., Xiang, G. G., An, N., Liu, X. M., Wang, J., & Wang, T. Y. (2021). Types of left-behind children' social adaptation and its relationship with psychological suzhi: Based on latent profile analysis. *Journal of Southwest University (Social Sciences Edition), 47*(6), 131–137.

Molden, D. C., Hui, C. M., & Scholer, A. A. (2016). Understanding self-regulation failure: A motivated effort-allocation account. In E. R. Hirt, J. J. Clarkson, & L. Jia (Eds.), *Self-regulation and Ego control* (pp. 425–459). Academic Press.

National Ministry of Civil Affairs of China. (2018). Statistics data of left-behind children in rural China. Available online at: http://www.mca.gov.cn/article/gk/tjtb/201809/20180900010882.s

Niu, G. F., Li, Z. X., Wang, C. X., Ma, X. T., Sun, X. J., & Zhou, Z. K. (2019). The influence of online parent-child communication on left-behind junior high school students' social adjustment: A moderated mediation model. *Psychological Development and Education, 35*(6), 678–685.

Preena, G. R., & Janadari, N. (2021). Perceived workplace ostracism and deviant workplace behavior: The moderating effect of psychological capital. *Pakistan Journal of Commerce and Social Sciences, 15*(3), 476–496.

Rauer, A. J., Karney, B. R., Garvan, C. W., & Hou, W. (2008). Relationship risks in context: A cumulative risk approach to understanding relationship satisfaction. *Journal of Marriage and Family, 70*(2), 1122–1135.

Saleem, M. S., Isha, A. S. N., Awan, M. I., Yusop, Y. B., & Naji, G. M. A. (2022). Fostering academic engagement in post-graduate students: Assessing the Role of Positive Emotions, Positive Psychology, and Stress. *Frontiers in Psychology*, doi: 10.3389/fpsyg.2022.920395.

Seib, C., Porter-Steele, J., Ng, S.-K., Turner, J., Mcguire, A., Mcdonald, N., … Anderson, D. (2018). Life stress and symptoms of anxiety and depression in women after cancer: The mediating effect of stress appraisal and coping. *Psycho-Oncology, 27*(7), 1787–1794.

Shan, X. Y. (2021). *The influence of stress on middle school students' deviant behavior: Based on the investigation of grade two students in 8 middle schools in S city* (Unpublished master's thesis). Shanghai Normal University, Shanghai.

Shen, J. L. (2009). *Explore the psychological world of disadvantaged children* (Vol. two, pp. 10–11). Beijing, China: Beijing Normal University Press.

Su, S. B., Li, X. M., Lin, D. H., & Zhu, M. L. (2017). Future orientation, social support, and psychological adjustment among left-behind children in rural China: A longitudinal study. *Frontiers in Psychology*, https://doi.org/10.3389/fpsyg.2017.01303.

Sun, X., Tian, Y., Zhang, Y., Xie, X., Heath, M. A., & Zhou, Z. (2015). Psychological development and educational problems of left-behind children in rural China. *School Psychology International, 36*(3), 227–252.

Taylor, S. E. (1983). Adjustment to threatening events: A theory of cognitive adaptation. *American Psychologist, 38*(11), 1161–1173.

Taylor, S. E., & Broffman, J. I. (2011). Psychosocial resources: Functions, origins, and links to mental and physical health. *Advances in Experimental Social Psychology, 44*, 1–57.

The State Council of the People's Republic of China. (2016). Opinions on strengthening the care and protection for left-behind rural children in China. Available online at: http://www.gov.cn/zhengce/content/2016-02/14/content_{5041066}.htm

Ugarte, E., Narea, M., Aldoney, D., Weissman, D. G., & Hastings, P. D. (2021). Family risk and externalizing problems in Chilean children: Mediation by harsh parenting and emotional support. *Child Development, 92*(3), 871–888.

Wadsworth, M. E., Raviv, T., Santiago, C. D., & Etter, E. M. (2011). Testing the adaptation to poverty-related stress model: Predicting psychopathology

symptoms in families facing economic hardship. *Journal of Clinical Child & Adolescent Psychology, 40*(4), 646–657.

Wade, M., Madigan, S., Plamondon, A., Rodrigues, M., Browne, D., & Jenkins, J. M. (2018). Cumulative psychosocial risk, parental socialization, and child cognitive functioning: A longitudinal cascade model. *Developmental Psychology, 54*(6), 1038–1050.

Wang, J. P., Li, D. P., & Zhang, W. (2010). Adolescence's family financial difficulty and social adaptation: Coping efficacy of compensatory, mediation, and moderation effects. *Journal of Beijing Normal University (Social Sciences),* (4), 22–32.

Wang, X. D., Wang, X. L., & Man, H. (1999). *Rating scales for mental health* (Rev. ed.) (pp. 200–202). Beijing, China: Chinese Mental Health Journal Press.

Wen, Y. J., Li, X. B., Zhao, X. X., Wang, X. Q., Hou, W. P., Bo, Q. J., … Wang, C. Y. (2019). The effect of left-behind phenomenon and physical neglect on behavioral problems of children. *Child Abuse & Neglect, 88*, 144–151.

Xiong, J. M., Hai, M., Huang, F., Xin, L., & Xu, Y. (2020). Family cumulative risk and mental health in Chinese adolescents: The compensatory and moderating effects of psychological capital. *Psychological Development and Education, 36*(1), 94–102.

Yang, X. J., & Kong, K. Q. (2005). The effect of level of aspiration instruction and attributional training on feelings of academic success. *Journal of Psychological Science, 28*(1), 99–103.

Zeng, S. C. (2013). The stress and social support of migrant children and the protective role of social support in the relation between stress and psychological adaptation. *Journal of Psychological Science, 34*(3), 631–635.

Zhang, G. L. (2017). Relationship between loneliness and social adjustment among the left-behind rural children: Gratitude as a mediator. *Educational Research and Experiment,* (3), 25–30.

Zhou, Z. K., Sun, X. J., Liu, Y., & Zhou, D. M. (2005). Psychological development and education problems of children left in rural areas. *Journal of Beijing Normal University (Social Sciences),* (1), 71–79.

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment, 52*(1), 30–41.

The effect of cumulative risk related to family adversity on social adjustment among left-behind children in China: The mediating role of stress and the moderating role of psychosocial resources

FAN Xing-hua[1],[2],[3], FANG Xiao-yi[4], ZHAO Xian[5], CHEN Feng-ju[6]

([1] School of Educational Science, Hunan Normal University; [2] Cognition and Human Behavior Key Laboratory of Hunan Province; [3] Research Center for Mental Health Education of Hunan Province; [6] Library of Hunan Normal University, Changsha 410081, China)

([4] Institute of Developmental Psychology, Beijing Normal University, Beijing 100875, China)

([5] School of Primary Education, Yongzhou Normal College, Yongzhou 425000, China)

Abstract

In China, left-behind children (LBC) refer to children (under the age of 16) who remain at rural regions while both of their parents migrate to urban area for work, or one of their parents migrates for work and the other has limited capacity to care for their children. Relative to non-left-behind children (NLBC), LBC are exposed to various risk factors related to family, such as lack of parental care and insufficient family support, which could increase their vulnerability to psychological and behavioral problems. Based on Bronfenbrenner's bioecological theory and the cumulative risk (CR) model, this study used two-wave data (T1 and T2) and examined the association between cumulative risk related to family adversity (T1) and social adjustment outcomes (T1/T2), in which stress (T1/T2) is a mediator, and examined the moderating role of psychosocial resources (T1) in this association.

A two-wave longitudinal household surveys were conducted among six hundred fifty-one families of rural children. A total of 285 children whose both parents migrated for work throughout the study waves were categorized as the LBC group, while 366 children who reported living with their parents at least one of waves were categorized as the control group. All measures in the surveys showed good reliability, including family adversity, stress, psychosocial resources (i.e., psychological capital and social support) and social adjustment (i.e., subjective well-being, depression, positive behaviors and problem behaviors). Data analyses were performed using SPSS 24.0 and AMOS 22.0.

Results showed that: (1) LBC's T1 cumulative risk related to family adversity was linearly associated with their T1/T2 social adjustment; (2) After controlling for gender and age, LBC's T1 cumulative risk related to family adversity was negatively associated with T1 social adjustment ($\beta = -0.42$, $p < 0.001$), and T1 stress mediated this association. The association between stress and social adjustment was moderated by psychosocial resources, with a higher level of psychosocial resources associated with a smaller mediating effect of stress. (3) After controlling for gender and age, T1 stress and T1 social adjustment, T1 cumulative risk related to family adversity were negatively associated with T2 social adjustment ($\beta = -0.23$, $p < 0.001$), and T2 stress mediated this relationship. T1 psychosocial resources moderated the association of T1 cumulative risk related to family adversity on both T2 social adjustment and T2 stress. This showed

that with the level of T1 psychosocial resources increasing, the main effect of T1 cumulative risk related to family adversity on T2 social adjustment and the mediation effect of T2 stress decreased and became statistically non-significant.

The findings of this study demonstrate the detrimental impact of cumulative risk related to family adversity on social adjustment among LBC, as well as the mediating role of stress and the moderating role of psychosocial resources. Overall, these findings suggest that family risk factors are proximal factors for LBC's social maladjustment, and future intervention should attend to psychosocial resource promotion.

Keywords: left-behind children, cumulative risk related to family adversity, social adjustment, stress, psychosocial resources

Note: Figure translations are in progress. See original paper for figures.