

Article

# Lonely No More: Investigating the Connection between Family Health, Social Support, and Well-being in Chinese “Empty Nest Youth”

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**Abstract: Background:** The phenomenon of "empty nest youth" is becoming increasingly ubiquitous, capturing the attention of society at large. However, few studies have been conducted in recent years on this group, especially focusing on their family and mental health. As such, this study investigates the correlation between family health and well-being among "empty nest youth," as well as the function of social support and loneliness in this relationship. **Methods:** A cross-sectional survey was conducted from June to August 2022 across 32 provinces, municipalities, and autonomous regions in China, utilizing a multi-stage sampling technique. And we screened individuals who were unmarried, living alone, and between 22-44 years old, resulting in a valid sample size of 908 cases; multiple regression analysis, mediation effect testing, and moderation effect testing are used to examine research hypotheses. **Results:** The regression analysis results show that family health not only has a direct impact on well-being ( $\beta = 0.36, p < 0.001$ ) but also indirectly affects well-being through social support [ $\beta = 0.23, 95\% \text{ CI: } 0.19 \text{ } 0.28$ ]. Additionally, the loneliness moderates the predictive impact of not only family health on social support ( $\beta = -0.13, p < 0.001$ ) but also social support on well-being ( $\beta = -0.06, p < 0.001$ ). **Conclusions:** These findings underscore the significance of directing policymakers and healthcare professionals towards the "empty nest youth's" familial and social support systems. It underscores the need for the development of policies aimed at addressing their emotional and material requirements by leveraging these familial and social networks. This approach ultimately contributes to the enhancement of their overall psychological well-being, promoting a more coherent and logical pathway for intervention and support.

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**Keywords:** Youth; Family health; Social Support; Well-Being; Loneliness

## 1. Introduction

In recent years, China's socio-economic has witnessed a profound transformation, characterized by a rapid acceleration of industrialization and urbanization. To improve their prospects and secure a brighter future, a substantial number of young laborers have migrated from rural areas and towns to the first- and second-tier metropolises [1]. These urban centers possess abundant high-end technical resources, extensive employment opportunities, and well-developed medical and educational facilities, creating a massive "siphon effect" that consistently attracts the younger demographic [2, 3]. In the contemporary social context marked by network symbolism and labeling, these groups of young individuals have been referred to as "empty nest youth" [4]. The phenomenon of "empty nest youth" is becoming increasingly ubiquitous, capturing the attention of society at large.

The term "empty nest" originates from the notion of "empty nest elderly", a group of vulnerable individuals in society who experience neglect and emotional detachment due to the migration of young and middle-aged rural laborers to urban areas [5]. Similarly, "empty nest youth" share similar characteristics and typically refer to unmarried individuals between the ages of 22 to 40 years old who live alone, distant from their native towns and relatives [6]. These youth struggle in large metropolises and are burdened by the pressures of survival, rendering them increasingly isolated and lonely.

The proposal on promoting the transformation of the "empty nest youth" group to the "nesting youth" group from China's two sessions of the National People's Congress states that the number of "empty nest youth" is expected to rise to 92 million by 2021. 92 million people [7]. Nevertheless, the "empty nest" phenomenon is not unique to China. In the United States, it has been reported that approximately 28% of the population lives alone, while in Japan, this percentage rises to 30%. In the Nordic countries of Denmark, Finland, and Sweden, the proportion of people living alone is alarmingly high, standing at 40.5%, 40.8%, and 39.9%, respectively [8]. According to Eric Klinenberg, the ascent of a solitary society represents an unparalleled and inevitable social transformation, as each developed economy steadily converges toward this societal configuration [9]. Consequently, the "empty nest youth" represents a specific and objective social group, and given the burgeoning trend, it is imperative to conduct an in-depth study of this cohort.

## 2. Literature Review

In recent years, the concept of 'empty nest youth' has only recently gained recognition, resulting in limited research dedicated to this demographic. The causes of "empty nest youth" can be attributed to a variety of factors, including social, familial, and individual-level factors [10], and are also impacted by social mobility, lifestyle perceptions, and the one-child policy [11]. Concurrently, the mental health of "empty nest youth" is a significant concern. Numerous studies have demonstrated that young individuals living alone may experience inferior life satisfaction and loneliness, as well as poor health outcomes [12]. Living alone may result in social isolation, leading to less social interaction and increased psychological distress [13]. For example, during the epidemic, young individuals living alone and subjected to lockdown measures frequently grappled with psychological issues like stress, depression, and loneliness [14]. Nevertheless, a review study by Tamminen et al. revealed that there does not seem to be a direct correlation between living alone and the psychological well-being of youth, resulting in inconsistent findings [15]. Both earlier and more current research suggests that living alone may not be linked to an individual's mental health [16, 17]. Consequently, the mental health status of 'empty nest youth,' especially in the context of positive mental health within the 'empty nest' scenario, warrants our attention. Positive mental health, encompassing subjective well-being, constitutes a pivotal facet of an individual's overall health and well-being. As per the World Health Organization, positive mental health is a state of well-being in which individuals can optimally harness their abilities, navigate social pressures, perform effectively in their endeavors, and contribute to society [18]. Therefore, examining the subjective well-being of "empty nest youth" and its associated mechanisms is crucial for us to better comprehend the living circumstances of this demographic and to address the psychological dilemmas faced by young people today.

The impact of family on the subjective well-being of "empty nest youth" is often overlooked, as their solitary status may make them appear disconnected from their families. However, with the emergence of media technology, mobile communication devices have gained widespread popularity. A 2021 report published by the Chinese Ministry of Industry and Information Technology disclosed that China boasted 1.608 billion cell phone users, with a cell phone penetration rate of 113.9% [19]. This implies that people can communicate with others through mobile devices in real-time using text, images, and videos at any time. Although "empty nest youth" are physically separated from their families,

they maintain a consistent level of communication with their families. In traditional Confucian culture, Chinese "empty nest youth" place great importance on their family relationships, and despite living and working independently, they remain in regular contact with their families. Consequently, the family remains an important dimension that affects the well-being of "empty nest youth." For instance, for those who live alone away from their families, family ties have a strong influence on their lives and psychology, impacting their physical and mental health [20]. Family systems theory posits that family members mutually influence one another, and the actions of one family member engender cognitive, emotional, and behavioral changes in other family members, ultimately affecting the overall well-being of the entire family unit [21]. Family health is a resource that takes into account family functioning, communication skills, daily life, emotional processes, and access to resources, providing a comprehensive measure of the family unit in which an individual resides. Research has demonstrated that family health significantly impacts the well-being of family members [22]. For instance, family-related factors, such as positive family relationships, have been found to be significantly associated with improved mental health and well-being in child cohorts [23]. For adolescents with adverse childhood experiences, family functioning becomes an important moderating factor in their emotional response to health [24]. Moreover, positive familial relationships have been shown to yield advantageous effects on subjective well-being within transgender and gender-diverse youth populations [25]. Nonetheless, it remains uncertain whether this positive effect of family relationships extends to the "empty nest youth" population.

Social support is a critical determinant of subjective well-being. According to Barrera et al.'s earlier definition, social support is the assistance and backing received from family members, neighbors, or other sources [26]. Early meta-analyses revealed a robust correlation between social support and well-being, with social support interventions contributing to the well-being of individuals across different age groups [27]. The buffering effect model of social support postulates that social support can alleviate the impact of social adversity on mental health [28]. Specifically, social support can reduce the negative consequences of adversity and decrease the risk of developing mental disorders, thereby enhancing individuals' subjective well-being. Furthermore, positive social networks and good interpersonal relationships are among the crucial factors that augment subjective well-being [29]. For instance, for women facing the stress of a cancer diagnosis, a larger social network provides them with emotional and instrumental support, which ultimately enhances their psychological well-being [30]. Another study from Hong Kong, China, observed that satisfaction with family and friend relationships had a positive impact on the subjective well-being of young Chinese [31]. Additionally, social support acts as a bridge between family and individual health. It provides emotional and tangible aid to individuals, alleviating the stress and tensions they face, which in turn increases their well-being or reduces negative psychological effects. Family members, friends, or other sources of support may serve as the source of this support. The interdependence of family members in families may provide emotional and material help. When a family member faces a health issue, family members can offer emotional care and material support to increase the individual's confidence and ability to cope with the disease, decrease negative emotions, and enhance positive psychology. For example, when young women experience postpartum depression, care from family members can increase their perception of social support, which, in turn, reduces postpartum depressive symptoms and improves sleep quality [32]. In the elderly population, intergenerational relationships from family also alleviate depressive symptoms through social support [33]. However, some studies have arrived at differing conclusions. A study from rural Appalachia reported that family-level factors did not significantly affect either social support or the mental health of older adults [34]. Therefore, we are interested in whether social support mediates the relationship between family and personal health in the "empty nest youth" population.

Loneliness is a distressing and vexing sentiment of profound desolation in an individual's social and emotional existence [35]. "Empty nest youth", who reside alone, are inclined to experience a sense of loneliness owing to their limited social connections. As loneliness is a negative psychological state, it can have a significant adverse impact on an individual's social associations, which, in turn, influences their relationships with their family and society. Research indicates that social support has a diminished effect on life satisfaction for "empty nest youth" with heightened levels of loneliness [36]. However, individuals with heightened levels of loneliness also tend to have less interaction with their family members [37] and consequently have a less supportive function towards their family. Thus, we propose that loneliness may act as a moderating factor in the association between family health, perceived social support, and the subjective well-being of "empty nest youth."

Drawing from the aforementioned analysis, this paper presents the following research hypotheses (refer to Figure 1):

Hypothesis 1: Family health level exerts a positive influence on subjective well-being.

Hypothesis 2: Perceived social support functions as a mediator in the association between family health and subjective well-being.

Hypothesis 3a: Loneliness negatively moderates the impact of family health on perceived social support.

Hypothesis 3b: Loneliness negatively moderates the impact of social support on subjective well-being.

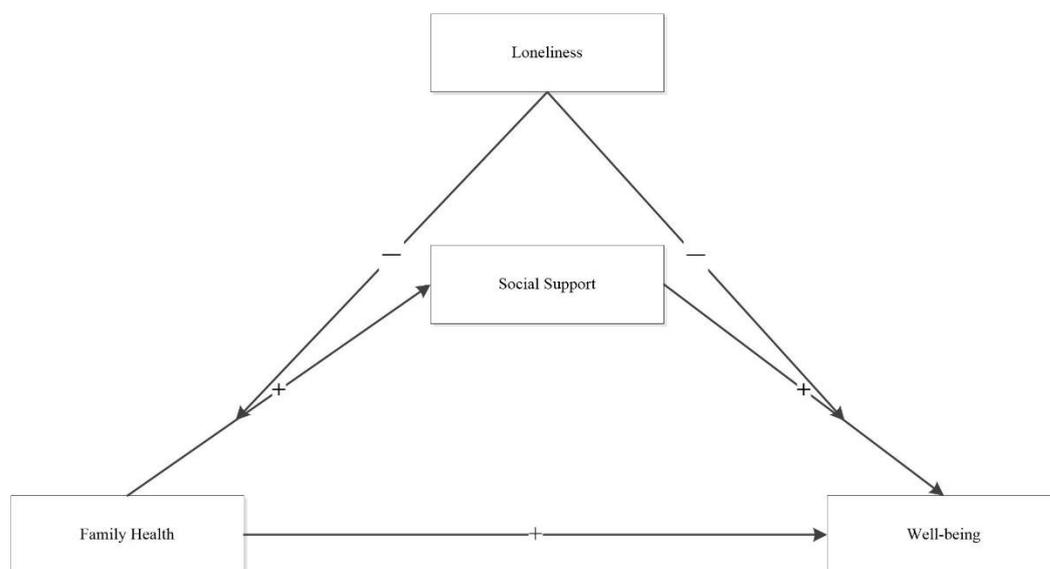


Figure 1. The hypothesis model of the current study

### 3. Materials and Methods

#### 3.1. Study design

A cross-sectional survey was conducted from June to August 2022 across 32 provinces, municipalities, and autonomous regions in China, utilizing a multi-stage sampling technique [38]. Surveyors underwent extensive training by the research team, and respondents were invited to participate in a one-on-one electronic questionnaire via a link generated by Questionnaire Star, a widely used social survey tool in China. Following the exclusion of illogical responses, a total of 21,916 questionnaires were collected, with the sample structure consistent with the Chinese population pyramid. To meet the requirements of this study, we screened individuals who were unmarried, living alone, and be-

tween 22-44 years old, resulting in a valid sample size of 908 cases. Among the 908 participants, the mean age was  $27.90 \pm 3.93$ , 67.5% were male, 68.9% were employed, 51.8% held a bachelor's degree, 80% resided in urban areas, and 56.7% had a per capita monthly household income ranging between 3000 and 9,000 RMB. For more comprehensive details, please refer to [Table 1](#).

**Table 1. Descriptive statistics of the participants (N = 908).**

Variables	M ± SD or n (%)
<b>Age</b>	27.90 ± 3.93
<b>Gender</b>	
Male	613(67.5)
Female	295(32.5)
<b>Occupational Status</b>	
Employed	626(68.9)
Student	155(17.1)
Self-employed	75(8.3)
Unemployed	52(6.7)
<b>Place of residence</b>	
Rural	2,551(46.6)
Urban	2,922(53.4)
<b>Highest education level</b>	
Junior high school and below	45(4.8)
Junior college	34(3.7)
High School	94(10.4)
College	125(13.8)
Undergraduate	470(51.8)
Master and above	140(15.4)
<b>Place of residence</b>	
Rural areas	182(20.0)
Urban areas	726(80.0)
<b>Monthly per capita household income (yuan)</b>	
≤1000	32(3.5)
1001–2000	44(4.8)
2001–3000	112(12.3)
3001–4000	123(13.5)
4001–5000	130(14.3)
5001–6000	116(12.8)
6001–9000	146(16.1)
9001–12,000	86(9.5)
12,001–15,000	40(4.4)
≥15,000	79(8.7)

### 3.2. Instruments

#### 3.2.1. Independent Variable: Family Health

In this study, we employed the Family Health Scale (Short-Form), developed by Crandall et al., to comprehensively evaluate family health [39]. Family health, as per Weiss-Laxer et al., is a resource that results from the intersection of each family member's health, interactions, and capacities, in addition to the family's physical, social, emotional, economic, and medical resources. The unidimensional scale consists of 10 items that assess

respondents' perceptions of family health, with questions such as 'I feel secure in my family relationships.' Participants respond using a 5-point Likert scale, ranging from 'strongly disagree' (scored as 1) to 'strongly agree' (scored as 5), with higher scores denoting better family health. This scale has been validated with good reliability and validity in previous research, and in this study, the Cronbach's alpha coefficient was 0.856.

### **3.2.2. Mediating Variable: Perceived Social Support**

The Perceived Social Support Scale was initially developed by Zimet et al. in 1990 [40]. For this study, we utilized a simplified version of the scale that has been proven to be both reliable and valid for the Chinese population [41]. The 3-item version of the scale was developed for Chinese residents by utilizing both classical test theory and item response theory, resulting in strong reliability and validity. The scale evaluates three dimensions: family support, other support, and friend support, with each item being rated on a 7-point Likert scale ranging from strongly disagree to strongly agree. Higher scores indicate greater perceived social support, and the total score is calculated by summing up all the items. In this study, the Cronbach's alpha coefficient was 0.856.

### **3.2.3. Dependent Variables: Well-Being**

To measure well-being, we employed the WHO-5 scale, which was initially introduced in 1988 at a conference organized by the World Health Organization to evaluate primary care patients' subjective well-being [42]. The scale has since been translated into more than 30 languages and is widely used in various research fields worldwide. The scale consists of five items, such as "I have experienced good spirits and cheerfulness" and "I have felt calm and relaxed," with a score ranging from 0 to 5 (from never before to all the time). In this study, the Cronbach's alpha coefficients for depression, anxiety, and well-being were 0.929, 0.049, and 0.805, respectively.

### **3.2.4. Moderate Variable: Loneliness**

The Three-item Loneliness Scale (T-ILS) is a concise and valid tool for evaluating loneliness in large-scale surveys and evaluations [43]. It was derived from the UCLA Loneliness Scale [44], which is one of the most extensively used instruments for measuring loneliness. The T-ILS comprises of three items: "How often do you feel left out?", "How often do you feel isolated from others?", and "How often do you feel that you lack companionship?". The response categories are hardly ever (coded 1), some of the time (2), and often (3), with a score range of 3-9. In this study, the Cronbach's alpha coefficient of this scale was 0.805.

### **3.2.5. Covariates**

We collected social-demographic variables including gender, age, highest education, Occupation status, place of residence, and monthly average household income and all of them were regarded as covariate variables included in the analysis.

## **3.3. Statistical analysis**

For data analysis, we employed SPSS 24.0 and Process 3.4 software with a significance level of two-tailed 0.05. Initially, we conducted descriptive statistics and correlation analysis using SPSS software. Subsequently, we employed the Process software recommended by Hayes for regression analysis and moderated effects test with mediation. During the analysis, we standardized the independent, mediating, moderating, and dependent variables and evaluated different models for each of the three dependent variables. We estimated the models using maximum likelihood estimation, set the Bootstrap sampling number to 5000, and determined the confidence intervals that were significant at the 95% level.

## 4. Results

### 4.1. Descriptive and correlative analysis for the main variables

Table 2 shows that the mean values and standard deviations of family health, social support, loneliness, and well-being were 33.57 (11.50), 14.94 (4.04), 4.83 (1.75), and 19.05 (6.15), respectively. Regarding the correlations, family health exhibited a positive association with social support ( $r = 0.511, p < 0.001$ ) and well-being ( $r = 0.380, p < 0.001$ ) and a negative association with loneliness ( $r = -0.275, p < 0.001$ ). Social support was significantly ( $r = 0.640, p < 0.001$ ) positively correlated with well-being, while it demonstrated significant negative correlations with loneliness ( $r = -0.229, p < 0.001$ ). Furthermore, loneliness ( $r = -0.298, p < 0.001$ ) was negatively correlated with well-being.

**Table 2.** Descriptive and correlative analysis for the main variables

	M(SD)	(1)	(2)	(3)	(4)
(1) Family Health	33.57 (11.50)	1			
(2) Social Support	14.94 (4.04)	.511***	1		
(3) Loneliness	4.83 (1.75)	-.275***	-.229***	1	
(4) Well-being	19.05 (6.15)	.380***	.640***	-.298***	1

Note. \*\*\*  $p < 0.001$ .

### 4.2. The relationship between family health and well-being: a moderated mediation model test

We initially conducted a basic mediation analysis using the recommended process plug-in (Model4) by Hayes [45]. The model incorporated the independent variable of family health, the mediating variable of social support, and the dependent variable of well-being, along with covariates including gender, age, occupational status, highest education level, place of residence, and monthly per capita household income. The results, presented in Table 3, indicate that family health significantly predicted well-being ( $\beta = 0.36, p < 0.001$ ). Additionally, the positive predictive impact of family health ( $\beta = 0.07, p < 0.05$ ) on well-being remained significant even after introducing the mediating variable of social support. Furthermore, family health had a substantial and positive influence on social support ( $\beta = 0.49, p < 0.001$ ), which also exerted a significant positive predictive effect on well-being ( $\beta = 0.59, p < 0.001$ ). Notably, the Bootstrap 95% confidence interval for both the direct effect of family health on well-being and the mediating effect of social support did not contain zero, indicating that family health not only has a direct impact on well-being but also indirectly affects well-being through social support [ $\beta = 0.29, 95\% \text{ CI: } 0.25-0.33$ ]. Table 4 displays the percentages of the direct and mediating effects, which were 19.84% and 80.56%, respectively.

Next, we employed Model 8 in PROCESS, which has two moderated mediated paths consistent with the hypotheses of this study. The model included gender, age, occupational status, highest level of education, place of residence, and monthly per capita household income, and the test results are displayed in Tables 4 and 5. The findings indicate that after incorporating loneliness into the model, both the interaction term between family health and loneliness ( $\beta = -0.13, p < 0.001$ ) and the interaction term between social support and loneliness ( $\beta = -0.06, p < 0.001$ ) significantly predicted well-being. This suggests that loneliness moderates the predictive impact of not only family health on social support but also social support on well-being. Further simple slope analysis is presented in Figure 2 and Figure 3.

Figure 2 illustrates that for individuals with low levels of loneliness (M-1SD), family health had a significant positive predictive effect on social support (simple slope = 0.60,  $t$

= 13.34,  $p < 0.001$ ). Although this positive predictive effect was also evident for individuals with high levels of loneliness (M+1SD) (simple slope = 0.34,  $t = 8.55$ ,  $p < 0.001$ ), the effect sizes were relatively small, indicating that as individual loneliness increased, the predictive effect of family health on their social support tended to decrease. As shown in Figure 3, for participants with low levels of loneliness (M-1SD), social support had a significant positive predictive effect on well-being (simple slope = 0.63,  $t = 17.76$ ,  $p < 0.001$ ). However, for individuals with high levels of loneliness (M+1SD), such a positive predictive effect also existed but with a relatively small effect size (simple slope = 0.51,  $t = 13.03$ ,  $p < 0.001$ ), implying that the predictive effect of social support on well-being tends to decrease as individuals' loneliness increases. Additionally, Table 6 displays that the mediating role of social support in the relationship between family health and well-being also had a decreasing trend at all three levels of loneliness. This suggests that as individual loneliness increased, family health was less likely to improve well-being through social support.

**Table 3. Mediated model test for social support**

Regression (N = 908)		Model Fit			Coefficient Significance	
Dependent Variables	Independent Variables	R	R <sup>2</sup>	F(df)	$\beta$	t
Well-Being		0.40	0.16	24.33 <sup>***</sup> <sub>(7)</sub>		
	Age				-0.01	-1.44
	Gender				0.06	0.84
	Occupational status				0.02	1.00
	Highest Education				0.01	0.56
	Place of Residence				-0.09	-1.10
	Monthly Per Capita Household Income				0.05	3.38 <sup>***</sup>
	Family Health				0.36	11.15 <sup>***</sup>
Social Support		0.53	0.28	49.58 <sup>***</sup> <sub>(7)</sub>		
	Age				-0.02	-2.18 <sup>**</sup>
	Gender				0.17	2.63
	Occupational status				0.02	0.92
	Highest Education				0.02	0.97
	Place of Residence				-0.07	-0.99
	Monthly Per Capita Household Income				0.03	2.40 <sup>*</sup>
	Family Health				0.49	16.30 <sup>***</sup>
Well-Being		0.33	0.11	52.45 <sup>***</sup> <sub>(8)</sub>		
	Age				-0.01	0.78
	Gender				0.04	0.46
	Occupational status				0.01	0.55
	Highest Education				0.01	0.97
	Place of Residence				-0.04	0.51
	Monthly Per Capita Household Income				0.03	2.45 <sup>*</sup>
	Family Health				0.07	2.22 <sup>*</sup>
	Social Support				0.59	20.00 <sup>***</sup>

Note. \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

**Table 4. Table of total effect, direct effect and mediating effect analysis**

Type of effect	Effect	Boot SE	Boot CI Lower	Boot CI Upper	Percentage of effect
Total effect	0.36	0.03	0.30	0.42	-
Direct effect	0.07	0.03	0.01	0.13	19.44%
Indirect effect	0.29	0.02	0.25	0.33	80.56%

Note: Boot SE, lower limits of Boot CI and upper limits of Boot CI refer to the standard errors of indirect effects estimated by the bias-corrected percentile Bootstrap method, lower and upper limits of 95% confidence intervals, respectively; all values are rounded to two decimal places.

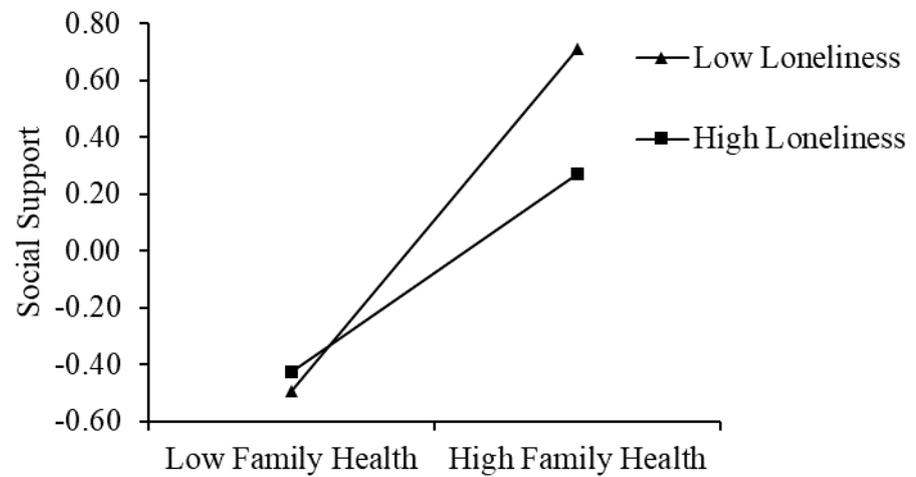
**Table 5. Test for moderated mediating model**

Regression (N = 908)		Model Fit			Coefficient Significance	
Dependent Variables	Independent Variables	R	R <sup>2</sup>	F(df)	$\beta$	t
Social Support		0.55	0.30	42.86 <sup>***</sup> <sub>(9)</sub>		
	Age				-0.02	-2.01*
	Gender				0.18	2.94**
	Occupational status				0.02	1.04
	Highest Education				0.02	0.82
	Place of Residence				-0.07	-0.94
	Monthly Per Capita Household Income				0.03	2.39
	Family Health				0.47	15.44 <sup>***</sup>
	Loneliness				-0.09	-3.19**
	Family Health $\times$ Loneliness				-0.13	-4.24 <sup>***</sup>
Well-Being		0.67	0.44	71.53 <sup>***</sup> <sub>(10)</sub>		
	Age				-0.01	-0.04
	Gender				-0.03	-0.59
	Occupational status				0.02	0.85
	Highest Education				-0.01	-0.07
	Place of Residence				-0.03	-0.40
	Monthly Per Capita Household Income				0.03	2.49*
	Family Health				0.03	0.26
	Social Support				0.57	19.30 <sup>***</sup>
	Loneliness				-0.16	-6.00 <sup>***</sup>
	Social Support $\times$ Loneliness				-0.06	-2.55*

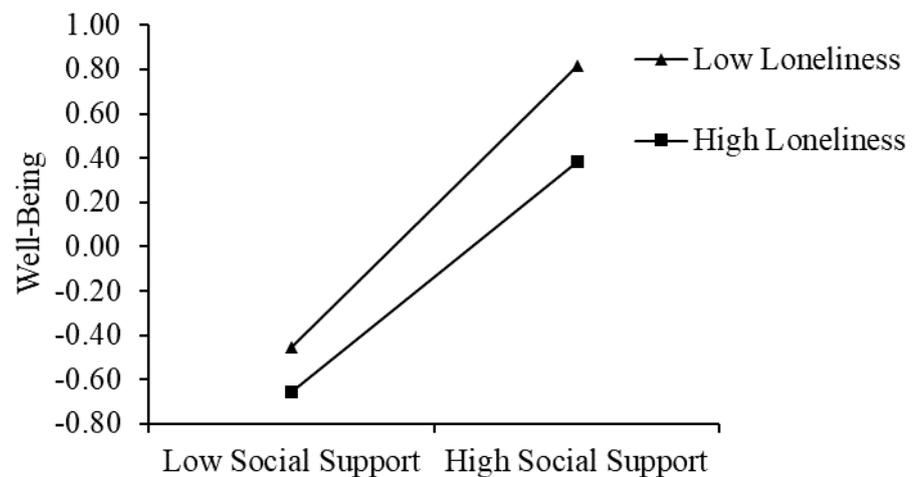
Note. \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

**Table 6. The mediating role of social support between family health and well-being at different levels of loneliness**

	Loneliness	Effect	Boot SE	Boot CI Lower	Boot CI Upper
Indirect Effect	-1.00 (M-1SD)	0.38	0.04	0.30	0.46
	0.00 (M)	0.27	0.03	0.22	0.32
	1.00 (M+1SD)	0.18	0.03	0.12	0.23



**Figure 2.** The moderating role of loneliness on the relationship between family health and social support.



**Figure 3.** The moderating role of loneliness on the relationship between social support and well-being.

## 5. Discussion

As such, this study investigates the correlation between family health and well-being among "empty nest youth," as well as the function of social support and loneliness in this relationship. The findings indicate that family health has a positive impact on well-being, with social support serving as a mediator. In addition, loneliness moderates the effect of family health on social support and social support on well-being, respectively.

The present study sheds light on the role of the family in promoting the positive psychology of "empty nest youth." Our findings demonstrate that family health has a significant positive effect on the well-being of "empty nest youth," suggesting that higher levels of family health correspond to higher levels of well-being. This result is in line with Bowen's family systems theory, which posits that families constitute intricate emotional systems wherein the attitudes and actions of each family member significantly impact the personal functioning and well-being of others within the familial unit [46]. As an emotional system, family interactions regulate the emotional states of family members

through communication and expression [47]. Research has indicated that adolescents experience greater subjective well-being in families with greater stability, health, and fewer significant problems [48]. Prior studies investigating the nexus between family dynamics and well-being have similarly affirmed this relationship. For instance, Koesten et al.'s examination of 395 young individuals discerned that families marked by increased expressiveness and reduced conflict positively influenced their members [49]. Moreover, open family communication in the context of traumatic events can positively impact patients' mental health [50]. In terms of family resources, families with more resources are better equipped to provide sufficient health care, well-being, and support to their members, which can boost individual well-being [51, 52]. Specifically, economic resources can reduce the risk-taking behavior of family members, while relational resources can protect the psychological well-being of family members in the face of external stressors [53]. Nonetheless, this study diverges from previous research in that "empty nest youth" constitute a demographic that is relatively distanced from their families. Nonetheless, our results still underscore the profound impact of family on the psychological well-being of individuals residing in solitary circumstances. On one hand, advancements in media technology have empowered nearly all family members to engage in real-time communication through electronic devices [54]. This enables immediate support from family members, which can impart a favorable influence on their psychological well-being to some extent. On the other hand, traditional Chinese Confucian culture underscores the centrality of family, and "empty nest youth" often retain robust psychological connections with their families. Consequently, this study assumes significance in unveiling the intricate interplay between family dynamics and the psychological health of this distinctive cohort of "empty nest youth." This implies that interventions focused on the family unit remain imperative for mitigating the mental stress and psychological afflictions experienced by "empty nest youth" and for amplifying their subjective well-being.

Our research provides evidence to support the significance of social support in the correlation between family and individual mental health. The results presented in this paper demonstrate that social support acts as a mediator between family health and well-being. This implies that individuals with higher levels of family health are more likely to receive support from their social network of relationships, which, in turn, increases their own subjective well-being. According to the main effects model of social support theory, social support has a generally positive impact on the physical and mental health of individuals [55]. On the one hand, the social networks that individuals have can provide them with positive emotional experiences, and these experiences can regulate one's nervous system and enhance physical and mental immune effects. On the other hand, social network relationships can also provide individuals with the necessary help and resources when facing difficulties and stress. They can also help individuals cultivate good health behaviors and correct values, thus promoting positive attitudes toward life and psychology [56]. Families play an essential role in providing social support because the interaction and support among family members can offer intimate emotional support, substantial help, and exchange of information [57]. From an intra-family perspective, family health is a reflection of the entire family system. The more cohesive and adaptive the family system is, the better it can enhance individuals' perceptions of social support [58]. Studies have shown that among older adults, their close family members are the primary source of social support in the event of illness, while extended social ties, such as brothers, sisters, and other relatives, serve as links to the broader community and contribute to broader health support for older adults [57]. For "empty nest youth," they also receive support and assistance from their families. For young people who are unaccompanied and homeless, family is an important force in promoting a positive life [59]. Although "empty nest youth" leave their family ties to reduce their dependence on family members, they still need help from family members in terms of emotional and financial ties, especially during stressful life situations or transitions that require financial support from family [60]. This relationship

is supported by the study of Edwards and Lopez, which showed that the perceived family support of Mexican American youth significantly increased their life satisfaction [61]. Thus, both family health and social support are critical factors in improving the well-being of "empty nest youth." Policy makers or healthcare professionals should consider strengthening their social networks to enhance their confidence and life satisfaction.

Additionally, this study revealed that loneliness had a negative moderating effect on the association between family health and social support, as well as the link between social support and well-being. This suggests that for "empty nest youth" with higher levels of loneliness, the impact of family health on perceived social support and the effect of social support on well-being were diminished. Regarding perceptions of social support with respect to family health, when "empty nest youth" experience loneliness, they may be less inclined to engage with the outside world, ultimately reducing their opportunities to form close bonds with their families and undermining family cohesion as a whole. For instance, studies have shown that adolescents who frequently experience loneliness are more likely to experience a decline in family cohesion [62]. According to Olsen's Circumplex Model of Marital and Family Systems Theory, effective family communication is a crucial contributor to family cohesion and resilience [63]. When "empty nest youth" experience heightened levels of loneliness, their ability to communicate effectively with their families may decline, resulting in imbalances within the family system and decreased family health. In terms of the effect of social support on well-being, loneliness represents a risk factor for perceived social support and well-being among "empty nest youth". While previous research has not established a moderating role for loneliness in the link between social support and well-being, a study by Cao and Lu suggested that loneliness moderates the association between social support and life satisfaction among "empty nest elderly" [35]. Given that life satisfaction is a critical dimension of well-being, our findings are in line with previous research. Nonetheless, future studies are warranted to explore the moderating mechanisms of loneliness more fully.

In summary, we must focus more on the mental health issues of "empty nest youth", such as loneliness, depression, and anxiety. If left unaddressed, these negative emotions can diminish the positive psychological impact of familial and social resources [64].

## 6. Implications and Limitations

This research carries significant implications, namely: (1) by focusing on the relatively recent social phenomenon of "empty nest" and the group of "empty nest youth," for which little research has been conducted, this study contributes to a deeper understanding of the psychological state of this demographic and how to enhance their positive psychology, thereby improving the quality of the social workforce; (2) by exploring the enhancement of the well-being of "empty nest youth" through the lens of family health, which has been neglected in the literature, this research provides a reference for scholars who intend to expand the family perspective in the future; (3) this study can serve as an empirical reference for policymakers and medical professionals who are devoted to resolving the issue of "empty nest youth" and can aid in developing more effective interventions with respect to family and social network relationships.

Nonetheless, this study has several limitations, including: (1) the use of cross-sectional survey data, which precludes identification of causal relationships between variables, and makes it challenging to establish whether families influence social support, or whether social support influences families. Therefore, future research should consider employing longitudinal study designs; (2) the use of "family health" as an overall measure of family status from a family perspective, without analyzing the impact of family on "empty nest youth" in more detailed dimensions, such as family communication, family conflict, and family emotional processes. Future research could explore more subdivided factors related to family and health; (3) the overlapping factors between family health and

social support suggest that future research should explicitly examine the relationship between the two constructs.

## 7. Conclusions

The present study investigated the link between family health and well-being in the context of "empty nest youth". The results indicate that family health significantly predicts well-being, mediated by social support and moderated by loneliness. These findings highlight the importance of policymakers and healthcare professionals focusing on the family and social networks of "empty nest youth" and developing policies that address their emotional and material needs through family and social networks, ultimately enhancing their positive psychological well-being.

**Ethics approval and consent to participate:** The study approval was obtained from the Clinical Research Ethics Committee of the Second Xiangya Hospital of Central South University. The ethics number is: No.2022-K050. All methods were carried out in accordance with relevant guidelines and regulations. Informed consent was obtained from all the participants and also from the legal guardians of the participants who were below 16 years of age.

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