The mediating and moderating roles of self-acceptance and self-reported health in the relationship between self-worth and subjective well-being among elderly Chinese rural empty-nester

An observational study
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Abstract
This study aims to test the moderation and mediation effects of self-acceptance and self-reported health on self-worth’s impact on subjective well-being among elderly Chinese rural empty-nester elderly, and confirm whether self-report health is a moderating variable between self-worth and subjective well-being.

This cross-sectional study was performed from May 2017 to April 2018; the participants were 365 empty-nest elderly adults from rural areas of Chifeng City in Inner Mongolia.

Data were collected with the General information questionnaire, Self-worth questionnaire for adults, Self-acceptance Questionnaire, and Memorial University of New Found land Scale of Happiness. For the analyses, correlations, regressions, and structural equation models were used. Bootstrapping was performed to confirm the mediation effect. Multiple regression analysis was performed to confirm the moderation effect.

Self-worth showed significant correlations with self-acceptance and subjective well-being (all \( P < .01 \)). Bootstrapping indicated that the mediating role of self-acceptance was statistically significant. And self-reported health moderated the self-worth and subjective well-being association.

Self-acceptance partially mediated the relationship between self-worth and subjective well-being of the rural empty-nest elderly and self-reported health moderated self-worth and subjective well-being association. Consequently, to improve the subjective well-being of the rural empty-nest elderly, self-acceptance and personal health should be the focus.

Abbreviations: \( \chi^2 = \) chi-square statistic, 95% CI = 95% confidence interval, AGFI = adjusted goodness-of-fit index, GFI = goodness-of-fit index, NFI = normed fit index, RMSEA = \( \chi^2/df \), root mean square error of approximation, SEM = structural equation modelling.

Keywords: rural empty-nest elderly, self-acceptance, self-worth, subjective well-being

1. Introduction
Population aging is a worldwide social phenomenon. Currently, China represents the largest elderly population in the world. In China, the number of empty-nest elderly families with only an old couple or one aged person is increasing, which is closely related to China’s overall economic environment, such as the accelerated process of urbanization, the imbalance of economic development between the inland and coastal regions, and the flow of rural surplus labor to large and eastern coastal cities. Some farmers have established their careers in those cities and become an important and indispensable part of urban dwellers, whereas their parents have been left behind in rural homes. The number of empty nest families is expected to reach 90% in 2030. Owing to the lack of emotional comfort, health care, life care, the empty-nest elderly were widespread “empty nest syndrome.” Subjective well-being (SWB) is the overall life satisfaction and happiness; it is an important comprehensive psychological index to measure individual life quality. Empty nest elderly were in a negative emotional situation for long time; it will be bad for their mental health and subjective well-being. Loneliness may lead to lower subjective well-being. Most previous studies were focused on the urban empty-nest elderly. In 2012, the number of Chinese rural empty-nest elderly was 50 million, and the rural elderly people feel less happy compared to urban elderly people. Furthermore, these individuals are often living in secluded areas away from others and away from mental health resources. Therefore, mental health problems loom large for the rural empty-nest elderly.
SWB is derived from the hedonic view of well-being. The hedonic view maintains that pursuing feelings of pleasure is the ultimate goal of life and that SWB reflects the degree of pleasure and the satisfaction of an individual’s life. According to Liu and Guo’s investigation, the mental health of empty-nest elderly was generally lower, and more than one-quarter of solitary older men had a negative mood and loneliness. Additionally, solitary empty-nest elderly had lower subjective well-being and family communication satisfaction. With the increasing life expectancy of Chinese population, it becomes critical to examine whether Chinese elderly could maintain a good quality of life as older adults. As Diener and Su described, one approach to determining whether people have a good life is through the lens of individuals’ subjective experience of their lives and the resulting measurement of subjective well-being.

Self-acceptance is defined as holding a positive regard for or attitude toward oneself as a whole, including one’s past life experiences. Self-acceptance does not rely on the approval of others or personal achievements. Empirical evidence suggests self-acceptance is positively associated with subjective well-being. Research has shown that self-acceptance has a positive relationship with self-worth. For a person whose self-worth is more contingent or dependent on a specific domain, negative events in this domain should result in more drops and positive events should result in more increases in self-esteem. Self-acceptance is an important sign of mental health, it is the premise of people getting on with well with each other. According to the stress-and-coping model (Lazarus and Foulkman, 1984), when individuals appraise a negative event (e.g., discrimination) as stressful, they perceive their self-image to be threatened. This threat may have significant prediction for an individual’s self-evaluation, which may, in turn, directly link with their levels of psychological well-being. In Ryff and Singer’s opinion, self-acceptance involves a nonjudgmental regard to both the good and bad aspects of themselves in the past, present, and future. One aspect of self-acceptance is the ability and willingness to let others know one’s true self. Another important aspect of it is an appropriate self-evaluation. Xu et al. found self-acceptance significantly mediated the association of mindfulness and subjective well-being for a sample of university students. The relationship between self-acceptance and subjective well-being among elderly has been revealed in previous studies. However, few studies have focused on self-acceptance as the mediator between self-worth and subjective well-being among rural empty-nest elderly.

Although self-worth and self-acceptance are the important factors that affect subjective well-being. The relationship between self-worth and subjective well-being will change because of other factors. Self-reported health is thought to summarize the effects of both functional impairment and physical disease, which could evaluate and predicate the health status in elders. Recent research has found that the more subjective measure of health—self-reported health—appears to have a stronger association with psychological distress than physician-reported health and is possibly more important as a predictor of overall physical well-being than the more objective measures. However, whether self-reported health can moderate the association between self-worth and subjective well-being in rural empty-nest elderly remains uncovered. The first aim of this study was to assess the relationship between self-worth, self-acceptance, and subjective well-being among rural empty-nest elderly. The second aim was to build a mediation mechanism model of self-worth affecting subjective well-being through self-acceptance, verifying self-acceptance as a mediator between self-worth and subjective well-being. The third aim was to verify self-reported health as a moderator between self-worth and subjective well-being, to provide the basis for improving the subjective well-being of rural empty-nest elderly.

The main hypotheses of the study were the following:

- Hypothesis 1. Self-acceptance is a mediator between self-worth and subjective well-being among empty-nest elderly.
- Hypothesis 2. Self-reported health is a moderator between self-worth, self-acceptance, and subjective well-being.

2. Material and methods

2.1. Ethics

The study was approved by the ethics committee of Harbin medical University. Ethical issues were taken into consideration in designing the project. Every participant provided informed consent after receiving information about the goals and the methods of the investigation. The ethics committee of the university approved the study, which was completed in accordance with the Declaration of Helsinki. Their information was kept anonymous.

2.2. Location

Chifeng City is in the eastern parts of Inner Mongolia in China with a population 24.8171 million, people aged over 60 was 4.373 million, accounting for 17.6% of its population. As an ethnic minority region, Inner Mongolia autonomous region has its special production (industry, agriculture, and animal husbandry), life style, and cultural background. Owing to poor soil and water supply, and the low yield of agricultural and sideline products, agricultural earnings are very little. Given this, many young people go to work in the cities; some farmers have established their careers in those cities and become urban dwellers, whereas their parents are left behind in rural homes.
2.3. Participants

This study was a cross-sectional study carried out by researchers from Harbin Medical University from May 2017 to April 2018 in Chifeng City in the eastern parts of Inner Mongolia in China. Multistage stratified random cluster sampling was used. First, the 7 small towns in Chifeng County were stratified as 3 groups according to the developmental level of economy, and 1 small town was randomly selected from every group. Second, the villages in every selected small town were stratified as 3 groups according to the developmental level of economy, and 1 village was randomly selected from every group. In all, 9 villages were randomly selected.

A total of 365 rural elder adults in Chifeng Country were invited to participate in the study. The sample only included adults aged $\geq 60$ years who lived in rural Chifeng Country. The inclusion criteria were: age $\geq 60$, living at the survey site for at least 6 months, being at home during the investigation period, and able to participate in the study. Exclusion criteria were as follows: childless elderly, dementia, Parkinson disease, schizophrenia, seizures, claustrophobia, bipolar disorder, brain tumor, secondary hypertension, end-stage heart disease, renal failure and dialysis treatment, connective tissue diseases, malignancy, contraindication to magnetic resonance imaging, and unwillingness or difficulty in providing informed consent. Among 639 elderly living in the selected areas, 428 met the inclusion criteria, 365 of whom returned questionnaires for a response rate of 85.28% (as shown in Fig. 1).

2.4. Instruments

2.4.1. The general information questionnaire. The general information questionnaire was used to assess the demographic information, including age, sex, family income, degree of education, marital status, self-reported health status, and other information. Jürges and Avendano Mackenbach\cite{28} pointed out self-reported health that was in accordance with themselves is a reliable indicator of their health status. Self-reported health is the elderly to evaluate their own health, 5 response categories ranging from “very poor” (1 point) to “very good” (5 points).

2.4.2. The Adult self-worth questionnaire. The Adult Self-worth Questionnaire was used to assess self-worth, which was developed by Luo\cite{29}, self-worth was measured using 6 dimensions, which included family relations, personal qualities, communication, physical appearance, life attitude, and social relations. The questionnaire consists of 28 items. Each item has 5 response categories ranging from “do not fit” (1 point) to “very fit” (5 points), the total score range from 28 to 140, and higher scores indicated better self-worth. The questionnaire has been used in Chinese old people and demonstrated good reliability and validity, with Cronbach alphas for the total scale 0.899.

2.4.3. Self-acceptance questionnaire. We assessed self-acceptance with the Self-acceptance Questionnaire (SAQ). This 16-item questionnaire has 2 factors which are self-acceptance and self-evaluation\cite{30}. Cong and Gao reported an internal reliability of 0.85 and a test-retest reliability of 0.77. The SAQ is scored on a 4-point Likert-type scale. Higher scores indicate higher self-acceptance.

2.4.4. Memorial University of New Found Land Scale of Happiness. The Memorial University of New found Land Scale of Happiness (MUNSH)\cite{31} was used to assess respondents’ subjective level of well-being during the previous couple of months. This is a 24-item, self-completion scale with “yes” or “no” responses that includes 5 items measuring positive attitudes (PA), 5 items measuring negative attitudes (NA), 7 items measuring positive experiences (PE), and 7 items measuring negative experiences (NE). Each “positive” response is scored as
“1” and each negative response is scored as “—1,” but when computing the subscale scores and total scale score these are converted to a positive range so the range of values for the PA and NA subscales scores is 0 to 10, the range for the PE and NE subscales scores is 0 to 14, and the range for the total scale score is 0 to 48. For the Chinese version of the MUNSH, the test–retest reliability of the total score (using Spearman correlation coefficient) is 0.87 and the internal validity of the 25 items in the full scale (using alpha) is 0.76.\(^{[32]}\)

2.5. Statistical analysis

The following statistical tests were used for the univariate statistical analyses: Pearson correlations for continuous variables to investigate whether self-worth was correlated with self-acceptance, self-reported health, and subjective well-being. Data analysis was carried out using the statistical program package SPSS 16.0 and AMOS 17.0, and P values ≤.05 were considered statistically significant. Bootstrapping was used to verify the mediation effect. Multiple regression analysis was performed to confirm the moderating effect. Baron and Kenny’s analysis technique\(^{[33]}\) was used for testing the hypothesis concerning the mediation effect of self-acceptance on the relationship between the self-worth and subjective well-being.

3. Results

3.1. Sample characteristics

From May 2017 to April 2018, 365 elderly people aged ≥60 years were screened from nine villages in the area of Chifeng city in Inner Mongolia, China. Empty-nest elderly were defined as those who have children but do not live with their children. A total of 98 cases were full empty-nest elderly (those who do not live with their children in the same city or have no children), 267 were partial empty-nest elderly (those who live with their children in the same city but do not live together), and 78 were solitary, 287 were couples who live together. The age of these respondents ranged from 60 to 86 years (mean = 70.87 ± 6.21 years). A total of 144 (39.45%) were males, and 221 (60.55%) were females. The level of education was predominantly primary and middle school. (205 cases, 56.16%) with an average number years of education of 8.4 ± 2.3 years. Monthly income was mostly <1000 yuan (72.57%).

3.2. Relationship among self-worth, self-acceptance, self-reported health and subjective well-being

In our study, correlational analyses indicated that all dimensions of self-worth were significantly positively correlated with self-acceptance, self-reported health, and subjective well-being (Table 1).

3.3. The mediation of self-acceptance in the relationship between self-worth and subjective well-being

3.3.1. Structural equation analysis of mediation. Several indices were calculated to evaluate the model fit to the data: chi-square statistic (\(\chi^2\)), \(\chi^2/df\), root mean square error of approximation (RMSEA), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), and normed fit index (NFI). Throughout the study, a model was considered to have a good fit if all the path coefficients were significant at the 0.05 level, \(\chi^2/df < 3\), the RMSEA was <0.05, and the NFI and GFI were greater than 0.9.\(^{[34]}\)

In this study, the structural equation model of self-worth and self-acceptance affecting subjective well-being had \(\chi^2/df = 1.905;\) RMSEA = 0.050; GFI = 0.944; AGFI = 0.900; NFI = 0.820. The model fit was quite good. All the loadings of the indicators were significant at the 0.01 level, indicating good convergent validity. Self-worth had a direct effect on subjective well-being (\(\beta = 0.38, P < .01\)). Figure 2 shows that self-worth had a direct effect on self-acceptance (\(\beta = 0.98, P < .01\)). Self-acceptance had a direct effect on subjective well-being (\(\beta = 0.41, P < .01\)).

3.3.2. The mediation of self-acceptance in the relationship between self-worth and subjective well-being

According to the structural equation model, the preliminary judgment was that a self-acceptance mediation path existed, but the mediation effect (path coefficient of the product) needed further verification. Previous studies adopted the Sobel test to verify mediation, but the product of the mediation path coefficient does not necessarily has a normal distribution, leading to an increased probability of a type-one error.\(^{[33]}\) Bootstrapping is a relatively advanced technique to verify a single or tied mediation effect.\(^{[36]}\) Bootstrapping was performed to confirm the mediation effect, which is an increasingly popular nonparametric method to test mediation.\(^{[37]}\)

This method is a powerful and reasonable way to obtain a confidence interval (CI) for the mediation effect under most

| Correlations between self-worth, self-acceptance, self-reported health and subjective well-being (\(r\)). | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 0.576* | 0.672* | 0.648* | 0.579* | 0.564* | 0.573 | 0.519 | 0.493* | 1 | 12 |
| 2 | 0.576* | 1 | 0.726 | 0.731* | 0.684* | 0.601* | 0.621* | 0.474 | 0.472* | 1 | 12 |
| 3 | 0.672 | 0.726 | 1 | 0.837* | 0.789 | 0.759 | 0.706 | 0.653 | 0.607 | 1 | 12 |
| 4 | 0.648* | 0.690* | 0.827 | 1 | 0.790 | 0.780 | 0.690 | 0.668 | 0.684 | 1 | 12 |
| 5 | 0.579* | 0.684* | 0.827 | 1 | 0.807 | 0.766 | 0.690 | 0.668 | 0.745 | 1 | 12 |
| 6 | 0.579* | 0.684* | 0.789 | 0.790 | 1 | 0.766 | 0.690 | 0.668 | 0.745 | 1 | 12 |
| 7 | 0.564* | 0.601* | 0.759 | 0.780 | 0.766 | 1 | 0.690 | 0.668 | 0.684 | 0.690 | 12 |
| 8 | 0.573 | 0.621* | 0.725 | 0.706 | 0.690 | 0.668 | 1 | 0.663 | 0.663 | 0.663 | 12 |
| 9 | 0.519 | 0.474 | 0.653 | 0.668 | 0.684 | 0.663 | 0.663 | 1 | 0.663 | 0.663 | 12 |
| 10 | 0.493* | 0.472 | 0.583 | 0.600 | 0.599 | 0.599 | 0.663 | 0.663 | 1 | 0.663 | 12 |

Note: Variables 1–10 represent, family relations, personal qualities, communication, physical appearance, life attitude and social relations, self-acceptance, self-assessment, subjective well-being, self-reported health. \(P < .05\).
conditions. For each independent variable, when the bias-corrected and accelerated 95% CI (BCa 95% CI) of the medication effect \((a \times b\) product) excluded 0, it indicated that the mediating role of coping style was statistically significant. Table 2 showed that the direct effect, indirect effect, and total effect were significant. Thus, it can be concluded that the model was a partial mediation model.

### 3.4. Self-reported as a moderator between self-worth and subjective well-being

Control the variables of sex, age, level of education and occupation, in Model I and Model II, the self-worth total score was the independent variable, self-reported health was the moderating variable, subjective well-being was the dependent variable; in Model III, Model IV, self-acceptance was the independent variable, self-reported health was the moderating variable, subjective well-being was the dependent variable. And these data are standardized, multiple regression analysis results showed that the self-reported health moderating the relationship between the self-worth and subjective well-being. The moderating role of self-reported health was statistically significant (Table 3).

### 4. Discussion

Self-worth is a positive predictor of SWB, which is consistent with a previous study \(^{[10]}\) (John and Haaga, 2001). Therefore, there is a compelling need to investigate why self-worth is associated with the level of SWB. Expanding on previous research, the goal of this study was to query a model that tested whether or not self-acceptance and self-reported health mediated and moderated the association between self-worth and SWB among Chinese rural empty-nester elderly.

This study showed that the self-worth was significantly positively correlated with subjective well-being, it shows that higher self-worth and higher life satisfaction, higher self-worth people usually experience more positive emotions and less negative emotion, lower self-worth was opposite, which is consistent with previous studies. \(^{[38]}\) Self-worth and subjective well-being are both stressed self-emotional experience. They show strong characteristics of subjectivity, and personality is one of the most reliable predictors of subjective well-being; subjective well-being was related to certain personality traits such as extraversion, neuroticism, and self-worth and itself is a kind of relatively stable personality tendency, so self-worth is closely associated with subjective well-being. So it is very important for

### Table 2

| Model pathways                  | Point estimate SE | Bias-corrected 95% CI | Percentile 95% CI |
|---------------------------------|-------------------|-----------------------|-------------------|
|                                 |                   | Lower | Upper | Lower | Upper |
| Total effect                    |                   |       |       |       |       |
| Self-worth→subjective well-being | 2.63              | 0.786 | 1.129 | 0.787 | 1.129 |
| Indirect effect                 |                   |       |       |       |       |
| Self-worth→subjective well-being | 1.68              | 1.183 | 5.909 | 1.219 | 6.051 |
| Direct effect                   |                   |       |       |       |       |
| self-worth→subjective well-being | -0.95             | -4.806| -0.175| -5.095| -0.232|
| Self-Worth→self-acceptance      | 0.98              | 1.179 | 1.478 | 1.176 | 1.473 |
| Self-acceptance→Subjective well-being | 1.71              | 0.874 | 4.207 | 0.925 | 4.580 |

CI= confidence interval
rural empty-nester elderly to promote their self-worth, to improve the level of subjective well-being. However, the existing pension policy in China is difficult to meet the needs of the elderly to improve their self-worth. Therefore, community workers should build up the elderly long-term care system, enhancing the training of caregiving personnel, establishing a diversified elderly, it is also important to enhance the economic income as well as self-worth level.

In line with our hypotheses, our results suggest that self-acceptance mediates the relationships between self-worth and subjective well-being among empty-nest elderly. Figure 1 shows that self-worth directly affects SWB and self-acceptance, which is a positive predictor of SWB, which is consistent with a previous study. As a motivational-affective system, self-worth functions to continuously monitor a person’s social environment for signs of rejection and acceptance. Chinese rural empty-nest elderly who believed that they were treated negatively because of the children’s departure from home, other factors including lower income, less social support and living in the rural areas also made the empty-nest elderly more prone to low self-acceptance and further linked with lower levels of SWB. Self-worth is the elderly to judge their own value, empty nest elderly is a special group, the empty-nest elderly not only experience the restructuration of lifecycle, but also undergo the transformation of family-cycle, meanwhile, the organizational structure of individual and brain function changes with aging, the functional activities of the systems significantly decreased, which lead to many psychological problems and barriers. Depression and inferiority are the most frequent emotional issues, these cause they can’t accept themselves well, and can’t achieve ideal physical and mental health. Self-acceptance is on behalf of self-esteem and self-worth; it is not affected by external condition or the success or failure of the life events. When individual can confront these disadvantages unconditionally, they can change the negative side and constantly improve themselves. Therefore, interventions should focus on helping rural empty-nester elderly to improve their self-acceptance level, increasing self-acceptance would diminish the beneficial effects of mindfulness on stress.

Our results showed that, self-reported health did not moderate the relationship between self-acceptance and subjective well-being. In line with our hypotheses 2, our results suggest that self-reported moderate the relationship between self-worth and subjective well-being. Low self-worth is often associated with worse SWB, self-reported health also could offset the linkage between self-worth and SWB as a moderator. Therefore, self-reported health play a positive role in promoting subjective well-being of empty-nesters elderly. Rural Community Health Service Centers should be developed to provide physical and psychological evaluation and treatment.

5. Limitations

The results of this study contribute to examine how well a process model links self-worth to SWB through self-acceptance and self-reported health. However, several limitations of this study should be noted. First to alleviate the effect of self-worth on SWB from a wider perspective, more additional mediators should be examined further studies. Second, this study was cross-sectional; the conclusion should be verified in the future longitudinal research. Third, this study only examined the relationship among rural empty-nest elderly. Therefore, it is not clear whether the study’s findings apply to elderly in the cities. Future studies should evaluate whether similar results could be found when evaluating different older populations living in urban areas. Because of the aforementioned limitations, the analysis of the results in the study should be reviewed cautiously.

6. Conclusion

Despite these limitations, this was the first time when the moderated mediation model between self-worth and SWB was investigated, and the mediation and moderation model was significant. These results could help us better understand the interactive mechanisms of self-worth and SWB among the Chinese rural empty-nest elderly. With the urbanization of our country, and the flow of rural surplus labor to big cities, the population growth in the rural empty-nest elderly has shown a rapid trend. The physical and mental health of the rural empty-nest elderly, as a vulnerable group in our society, has become an important social problem. To aid in the improvement of quality

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**Table 3**

| Variables                        | B (SE) | Beta   | t     | P    | F value | R²  |
|----------------------------------|--------|--------|-------|------|---------|-----|
| Model I                          |        |        |       |      |         |     |
| Self-worth                       | 0.055  | 0.303  | 17.670| .000 | 481.551 | 0.727|
| Self-reported health             | 1.365  | 0.628  | 17.670| .000 |         |     |
| Model II                         |        |        |       |      |         |     |
| Self-worth                       | 0.033  | 0.182  | 2.920 | .410 | 326.943 | 0.731|
| Self-reported health             | 0.358  | 0.164  | 0.825 | .004 |         |     |
| Interaction                      |        |        |       |      |         |     |
| Self-worth × self-reported health| 0.099  | 0.552  | 2.360 | .019 |         |     |
| Model III                        |        |        |       |      |         |     |
| Self-worth                       | 0.209  | 0.399  | 11.503| .000 | 572.319 | 0.760|
| Self-reported health             | 1.202  | 0.553  | 15.936| .000 |         |     |
| Model IV                         |        |        |       |      |         |     |
| Self-worth                       | 0.197  | 0.377  | 5.965 | .000 | 380.736 | 0.760|
| Self-reported health             | 1.024  | 0.471  | 2.373 | .018 |         |     |
| Interaction                      |        |        |       |      |         |     |
| Self-worth × self-reported health| 0.005  | 0.099  | 0.420 | .675 |         |     |

Note: Age, sex, level of education, and occupation were control variables.
of life among the rural empty nesters elderly, aged care professional practitioners and our policy makers should not only focus on the self-worth, but also strengthen the awareness of the role of self-acceptance and self-reported health. Future studies should evaluate whether similar results could be found when evaluating different older populations living in urban areas.

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Author contributions
Hong Su conceived the idea. Lina Wang and Yang Li performed the statistical analyses and wrote the first draft of the manuscript. Hong Yu and Jiayuan Zhang played a major role in the field survey. All the authors have checked and approved the final manuscript.

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