Validation of the Simplified Chinese Palliative Care Nursing Self-competence Scale: Two cross-sectional studies

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Abstract

BACKGROUND

Due to the increasing burden of life-limiting illnesses, palliative care has been demanded. Nurses’ palliative care competence is a vital factor in improving its accessibility. A reliable instrument is needed. Our aim was to translate and culturally adapt the Palliative Care Nursing Self-Competence scale (PCNSC) into Simplified Chinese (PCNSC-SC).

METHODS

Two cross-sectional studies were conducted after the content validity had been confirmed during the translation and adaption. The convergent validity, construct validity, internal consistency, and homogeneity were evaluated both in the first and second studies. The test-retest reliability was assessed only in the first study. Clinical nurses who had a registered nurse qualification certificate and at least 12 months of work experience from a tertiary hospital in Hubei, China participated in the two studies.

RESULTS

The PCNSC-SC contains eight dimensions and 34 items. Goodness-of-fit indices in confirmatory factor analysis met the criteria. The Cronbach's alpha of the PCNSC-SC was 0.984 and 0.990 in the two studies, respectively. The test-retest reliability of the PCNSC-SC after two weeks was 0.717.

CONCLUSION

The Simplified Chinese version of the PCNSC (PCNSC-SC) can be used to evaluate perceived self-competence in palliative care of Chinese nurses with good reliability and validity.

Background

Palliative care (PC) is aimed to care for patients to achieve a good death (1, 2). Due to the increasing burden of life-threatening or life-limiting illnesses in recent years, palliative care has been highly demanded (1, 3). World Health Organization (WHO) estimated that 40 million people require palliative care, while 78% of them are living in countries with low- and middle-economic status; and only 14% of them receive it (4). In China, palliative care emerged at the end of the last century and developed slowly in its early stage. Chinese National Health and Family Planning Commission issued a series of documents on PC and launched several pilot sites across the country in 2017 to improve PC development in China (5, 6), which resulted in significant progress. In addition to policy development and government involvement, healthcare professionals’ competence is a basic element in increasing the accessibility of palliative services (7).
The Lancet Commission claimed that all healthcare professionals caring for patients experiencing life-limiting conditions should acquire the competence to provide PC towards the end of life (2). It takes most of working time for nurses to care for patients. Their competence is vital to improve PC quality (8). Relevant studies on PC competence mainly reported moderate levels among oncology nurses (9) and nurses in nursing homes (10). Moreover, palliative care should be implemented in all departments where patients may be in the end-of-life stage (e.g., intensive care unit, emergency room, geriatric, and oncology departments), so that every nurse possesses basic PC competence (2, 7, 11). It is significant to evaluate the status of nurses’ PC competence in the health care systems.

Competence is a generative capacity in which knowledge, skills, and attitudes are integrated into one’s performance (12). Perceived self-competence is a self-judgment of a person’s competence to complete a specified performance (13). According to social cognitive theory, perceived self-competence, conceptually equivalent to the term self-efficacy, influences competence development (13, 14). Desbiens and colleagues pointed out that perceived self-competence is identified as a vital determinant influencing PC quality in the shared theory and is a predictor of professional behavior (14). Thus, perceived self-competence in palliative care is supposed to be a core component in improving its quality. Research showed that nurses who reported higher levels of perceived self-competence perform better specific behavior when delivering care to dying patients (15).

Consequently, high PC quality requires a high level of nurses’ perceived self-competence (9, 15, 16). Therefore, to promote competence development and professional practice of nurses in the PC field, accurate evaluation of perceived self-competence is the initial step. For this reason, it is essential to have instruments to evaluate nurses’ PC self-competence. The Palliative Care Nursing Self-competence Scale (PCNSC), which includes core elements of PC competence, is a specific measurement tool for nurses who care for dying patients and their families in various healthcare settings. Upon Bandura's social cognitive theory, the PCNSC has good psychometric properties. The original version of this scale was first developed in French in Canada, containing 50 items and ten dimensions, and then translated from French to English (17). The final English version consists of 34 items and eight dimensions (18). It had been reported that the 50-item PCNSC was used to describe a moderate level of perceived self-competence in PC among oncology nurses in Southwest China (9). Another study used the 34-item PCNSC to evaluate nursing students’ PC competence in Switzerland and indicated that good attitudes towards caring for dying patients were positively related to perceived self-competence in PC (19). Compared with the 50-item PCNSC, the 34-item was simpler and more convenient to describe nurses’ perceived self-competence in PC (18).

With the rapid development of PC in China, there is an urgent need to develop nurses’ PC competence (7). However, to the author's knowledge, just some instruments are available to measure nurses’ PC self-competence (eg. Self-efficacy in Palliative Care, Palliative Care Self-efficacy Scale, Nurses’ Core Competence in Palliative Care and PCNSC) (17, 20–22), and none are translated into Chinese. To fill this gap, the author completed a translation, cultural adaptation, and validation process of the Palliative Care
Nursing Self-competence Scale (PCNSC) among Chinese nurses, to provide an instrument for assessing Chinese nurses’ perceived self-competence in PC.

**Methods**

**Study design**

Reporting of the two cross-sectional studies adheres to GRRAS guidelines (23). After the content validity had been confirmed during the translation and adaption, two cross-sectional studies were conducted in a tertiary hospital in Hubei, China. The convergent validity, construct validity, internal consistency, and homogeneity were evaluated both in the first and second studies. The test-retest reliability was assessed only in the first study. The two studies were undertaken from January-February in 2021.

**Sample Size And Participants**

In two cross-sectional studies, participants were included if they had a registered nurse qualification certificate and at least 12 months of work experience by convenience sampling. The construct validity was evaluated by exploratory factor analysis (EFA) in study one and by confirmatory factor analysis (CFA) in study two.

The sample size focused on EFA in the first study. According to the principles for EFA minimum sample size (5:1 ratio of participants to variables) (24), and considering the possibility of 10% invalid answers, a sample size of 187 participants was more than adequate for EFA. The PSNSC-SC was distributed to 216 clinical nurses.

The sample size focused on CFA in the second study. The sample source of CFA is different from EFA, and the sample size is at least 200 larger than for EFA (25). Therefore, another 373 emergency nurses completed the PCNSC-SC.

**Instruments**

**Demographic characteristics information questionnaire**

A socio-demographic questionnaire was developed through literature review and expert consultation and included 11 items: age, gender, ethnicity, educational level, professional title, marital status, area of employment, employment in years, religious beliefs, PC training, and experience in caring for dying patients.

**Palliative Care Nursing Self-competence Scale**
The PCNSC is composed of 34 items and eight dimensions, namely, physical needs: pain and other symptoms (eight items), psychological needs (four items), spiritual needs (four items), needs related to functional status (three items), ethical and legal issues (four items), interprofessional collaboration and communication (three items), personal and professional issues related to nursing care (four items) and end-of-life care (four items). It is scored using an 11-point Likert scale. The score for each item ranges from 0 (not competent at all) to 10 (highly competent) and the total score is 340. Higher values reflect a higher level of perceived self-competence. The Item-level Content Validity Index (S-CVI) was 0.95 which was first determined by Canadian clinical nurses (17).

With the author's permission to use the original scale, the translation of the PCNSC was based on Brislin's Translation procedure (26). The scale was translated from English into Chinese by two independent native Chinese translators and back-translated by two bilingual English translators on the research team. The preliminary translated version was submitted in two rounds to a committee of six experts to review and evaluate the semantic equivalence and conceptual equivalence (27). This committee consisted of three college faculty with PhDs in nursing and three hospital nurses with bachelor's degrees and extensive work experience. These experts first provided comments and suggestions regarding whether the items could be understood and applied in the Chinese context using a Likert scale with responses from 1 to 4 (1 = not relevant at all, 4 = very relevant). Pilot testing was carried out among a group of 25 eligible clinical nurses according to the principle that the sample size of the pilot testing accounted for 1/10 of the sample size of the formal investigation (28). Then, The pre-final Chinese version was developed (Supplementary 1).

**Data Collection**

A survey was carried out using Wenjuanxing (https://www.wjx.cn), an online survey system. The researchers distributed a link to the survey via WeChat (http://weixin.qq.com) and explained the aim of this survey. Moreover, enable the IP address restriction function to ensure that each IP address can fill in only one survey. For quality control purposes, the questionnaire could not be submitted if there were missing items. Finally, two researchers downloaded and checked the data.

**Data analysis**

IBM-SPSS statistical version 24 and AMOS version 23 (29) were used for data analysis. Descriptive statistics were used to profile the general demographic data.

The content validity was calculated by the committee of six experts using a four-point Likert scale (1 = not relevant at all, 4 = very relevant). While the Interrater Agreement (IR) level is above 0.7, the Content Validity Index can be calculated involving the content validity at the average scale level (S-CVI/ Ave), the content validity index of universal agreement (S-CVI/UA), and the content validity index of each item (I-CVI).
The construct validity was evaluated by EFA in the first study and by CFA in the second study. A Kaiser-Meyer-Olkin (KMO) test value above 0.7 is acceptable, and Bartlett’s test of sphericity was significant (\(p < 0.001\)), supporting EFA and CFA (25). The principal component extraction method was used for EFA, and obtained factors were orthogonally rotated through the varimax method. The criteria of factor extraction is followed by eigenvalues greater than 1.0, and the criteria of item retention are set by a factor loading cut-off greater than 0.4. The maximum likelihood method was used for CFA. The fit indices include the chi-square degree of freedom (\(\chi^2/\text{df}\)), root means square error of approximation (RMSEA), the goodness of fit index (GFI), adjusted goodness of fit index (AGFI), comparative fit index (CFI), Tucker-Lewis index (TLI), incremental fit index (IFI) and normal fit index (NFI).

For the reliability was determined by homogeneity, internal consistency, and test-retest reliability. The homogeneity was obtained by calculating the correlation coefficient (\(r\)) between the scores of each item and the total score. There was a significant association while the \(r\) was more than 0.4 (\(p < 0.05\)). The internal consistency was evaluated by Cronbach’s alpha coefficient for the scale and each dimension. Furthermore, the PCNSC was filled by 30 participants in a two-week interval in the first study to evaluate the test-retest reliability. The scores acquired in these two tests were compared by the Pearson correlation (Pearson \(r\)).

**Ethical Considerations**

The studies were authorized by the Academic Ethics Committee of ***blinded to review***. All participants gave informed consent to the survey. The studies were conducted with authorization from Dr. Desbiens following ethical guidelines for methodological research.

**Results**

**Sociodemographic Characteristics Of Participants**

A total of 589 nurses finished the survey. In the first study, 230 nurses from different clinical areas participated and 216 valid questionnaires. Among them, these participants were from the internal medicine department (20.4%), surgery (13.4%), obstetrics and gynecology (6.5%), and pediatrics (2.8%). Most participants were women (96.3%), and their average age was 30 years (range, 21–43). In the second study, 423 nurses from the emergency department participated and 373 valid questionnaires. Most participants were women (91.2%), and their average age was 31 years (range, 20–53). (See Table 1).

Validity

**Content validity**

In the second round of the committee, the IR was 0.88 indicating good consistency among six experts. The I-CVI ranged from 0.83 to 1. The S-CVI/ Ave and S-CVI/UA were found to be 0.98 and 0.88,
Construct Validity

In the EFA, the KMO test and Bartlett’s test of sphericity indicated satisfactory results before further analysis (KMO = 0.970; $\chi^2 = 9204.035$, df = 561, $p < 0.001$). A three-factor model explained 75.914% of the variance and each item loading was above 0.550 (Table 2).
Table 2  
Summary of factor loadings for PCNSC-SC in the first study ($n = 216$)

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Assess pain for a PC patient unable to communicate.</td>
<td>0.608</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Effectively use pharmacological interventions to alleviate pain in a PC patient.</td>
<td>0.747</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Use nonpharmacological and complementary interventions to alleviate pain in a PC patient.</td>
<td>0.744</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Provide effective care to alleviate nausea and vomiting in a PC patient.</td>
<td>0.778</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Provide effective care to alleviate constipation in a PC patient.</td>
<td>0.752</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Provide effective care to alleviate dyspnea in a PC patient.</td>
<td>0.745</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Provide proper mouth care to promote comfort in a PC patient.</td>
<td>0.663</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Provide early detection of delirium in a PC patient.</td>
<td>0.678</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Provide effective care to reduce psychological distress in a PC patient and their family.</td>
<td>0.680</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Provide support to a PC patient and their family when they experience grief.</td>
<td>0.624</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Assess the impact of a life-limiting illness on family dynamics.</td>
<td>0.620</td>
<td>0.517</td>
<td></td>
</tr>
<tr>
<td>12. Assist a PC patient and their family in identifying personal resources to cope with problems related to a life-limiting illness.</td>
<td>0.674</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Assess the spiritual needs of a PC patient and their family.</td>
<td>0.697</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Recognize signs of spiritual distress in a PC patient and their family.</td>
<td>0.666</td>
<td>0.507</td>
<td></td>
</tr>
<tr>
<td>15. Assist a PC patient to explore the meaning of their illness experience.</td>
<td>0.747</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Adapt the nursing care in accordance with the spiritual beliefs of a PC patient and their family.</td>
<td>0.742</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Assess the needs associated with activities of daily living in a PC patient.</td>
<td>0.598</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Assist a PC patient to maintain their functional independence for as long as possible.</td>
<td>0.550</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Implement appropriate interventions to help alleviate burden on family members caring for a PC patient.</td>
<td>0.602</td>
<td>0.520</td>
<td></td>
</tr>
<tr>
<td>20. Promptly identify ethical issues related to the care of a PC patient.</td>
<td>0.663</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Abbreviation: PC, palliative care.*
<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>21. Provide information to a PC patient concerning the legal issues</td>
<td>0.764</td>
<td></td>
<td></td>
</tr>
<tr>
<td>associated with life-limiting illness.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Assist a PC patient to make informed decisions regarding end-of-life care.</td>
<td>0.677</td>
<td>0.570</td>
<td></td>
</tr>
<tr>
<td>23. Advocate for a PC patient and their family with other members of the healthcare team.</td>
<td>0.585</td>
<td>0.614</td>
<td></td>
</tr>
<tr>
<td>24. Actively participate in discussions regarding a PC clinical situation during interdisciplinary team meetings.</td>
<td>0.618</td>
<td>0.603</td>
<td></td>
</tr>
<tr>
<td>25. Promote communication between the PC patient, their family and healthcare professionals to ensure information sharing.</td>
<td>0.660</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Abbreviation: PC, palliative care.

In the CFA, the validity of the eight-dimension structure was confirmed to ensure comparability with the original scale. The CFA showed an accepted fitting eight-factor model ($\chi^2/df = 3.915$, RMSEA = 0.089, CFI = 0.924, NFI = 0.901, TLI = 0.915, IFI = 0.924). More details are presented in Fig. 1.

Convergent Validity

Table 3 shows the critical ratio (CR) is greater than three for all 34 items of the scale, and the score for each item is significantly different between the high and low groups ($p < 0.001$) in the two studies.

Reliability

Homogeneity

The correlation coefficients ($r$) between the scores of each item and the total score of the PCNSC-SC ranged from 0.639 to 0.924 with statistical significance ($p < 0.001$) in two studies (Table 3).
Internal Consistency

The Cronbach’s alpha of the PCNSC-SC was 0.984 and 0.990 in the two studies, respectively. The Cronbach's alpha of each dimension ranged from 0.911 to 0.954 in the first study and from 0.926 to 0.964 in the second study (Table 4).

<table>
<thead>
<tr>
<th>Sample</th>
<th>Cronbach’s α</th>
<th>Test-retest reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>the first study (n = 216)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical needs: pain and other symptoms</td>
<td>0.928</td>
<td>0.663</td>
</tr>
<tr>
<td>Psychological needs</td>
<td>0.936</td>
<td>0.735</td>
</tr>
<tr>
<td>Spiritual needs</td>
<td>0.954</td>
<td>0.731</td>
</tr>
<tr>
<td>Needs related to functional status</td>
<td>0.940</td>
<td>0.756</td>
</tr>
<tr>
<td>Ethical and legal issues</td>
<td>0.932</td>
<td>0.719</td>
</tr>
<tr>
<td>Interprofessional collaboration and communication</td>
<td>0.911</td>
<td>0.638</td>
</tr>
<tr>
<td>Personal and professional issues related to nursing care</td>
<td>0.943</td>
<td>0.622</td>
</tr>
<tr>
<td>End-of-life care</td>
<td>0.924</td>
<td>0.500</td>
</tr>
<tr>
<td>Total scale</td>
<td>0.984</td>
<td>0.717</td>
</tr>
<tr>
<td>the second study (n = 373)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical needs: pain and other symptoms</td>
<td>0.949</td>
<td></td>
</tr>
<tr>
<td>Psychological needs</td>
<td>0.953</td>
<td></td>
</tr>
<tr>
<td>Spiritual needs</td>
<td>0.964</td>
<td></td>
</tr>
<tr>
<td>Needs related to functional status</td>
<td>0.950</td>
<td></td>
</tr>
<tr>
<td>Ethical and legal issues</td>
<td>0.957</td>
<td></td>
</tr>
<tr>
<td>Interprofessional collaboration and communication</td>
<td>0.926</td>
<td></td>
</tr>
<tr>
<td>Personal and professional issues related to nursing care</td>
<td>0.956</td>
<td></td>
</tr>
<tr>
<td>End-of-life care</td>
<td>0.941</td>
<td></td>
</tr>
<tr>
<td>Total scale</td>
<td>0.990</td>
<td></td>
</tr>
</tbody>
</table>

Test-retest Reliability
In the first study, the test-retest reliability of 0.717 for the PCNSC-SC indicated the scale has temporal stability.

**Discussion**

These studies showed that the PCNSC-SC was a valid and reliable instrument to assess perceived self-competence in PC among nursing professionals in China.

The translation and cultural adaptation process followed Brislin's Translation procedure and the Delphin Method to ensure content equivalence. The final version had good readability and simplicity after several group discussions and expert consultation. Some items were modified to take into consideration the context of the Chinese culture based on experts’ recommendations. Descriptive details were added to explain the terms “family dynamics” and “spiritual needs”. The item “provide an authentic presence” is not easily understood by clinical nurses. Therefore, it was replaced with “accompany with continuous love and patience” after consulting the original author. The retention of item 2, “Effectively use pharmacological interventions to alleviate pain in a PC patient,” was controversial. Expert nurses working in hospitals were concerned that item 2 is related to pharmacological interventions since nurses do not have prescriptive rights. Their concerns reminded the research team to clarify this item with the information that nurses could make reasonable recommendations to physicians when writing prescriptions for patients. This item was retained in the PCNSC-SC since nurses must manage this issue successfully when caring for dying patients (2).

The construct validity of the PCNSC-SC showed that the cumulative variance contribution rate of the 3-factor model was 75.914%, and all factor loadings had acceptable values. Among them, items 1, 14, 19, 22, 23, 24, and 28 were revealed as double-loaded items. Although they need to be deleted according to statistics (25), the expert panel thought these items should be retained as they met the goals of PC and the essential criteria for competence evaluation of professionals (2). The results found that the factor structure evaluated by the PCNSC-SC expressed itself in three factors, which differed from the original model, which presented eight factors (17). A simple 3-factor model emerged influenced by local cultural codes and wording differences (30). Given that the overall structure of the eight-dimensional model in CFA was consistent with the original scale, the researchers finally decided to retain the good fitting eight-dimensional model. Furthermore, the $\chi^2$/df under 5 suggested no difference between the scale and empirical data (31).

The two studies were the first to translate and validate the PCNSC for use with Chinese nurses, demonstrating its reliability and validity for evaluating perceived self-competence in PC among clinical nurses. The PCNSC-SC was also developed to assess the impact of PC educational programs on nurses’ perceived self-competence (17). Findings in the current studies may complement those of previous studies and add to the existing knowledge. The process of evaluating perceived self-competence in PC can promote competence development. Ultimately, the use of the PCNSC-SC can foster PC quality for dying patients because it can guide the educational programs designed to enhance PC competence.
Limitations

While convenience sampling may be thought to limit the generalizability of the results, our studies are of significant importance when using a large sample in a representative tertiary hospital in China. Thus, a future study design is recommended with a larger and broader sample in various healthcare settings. A second limitation may be due to the fact that the original scale was developed in French and later translated into English. This study conducted translation and adaptation from the English version to the Simplified Chinese version. Thus, the author was invited to identify whether the back-translated version was consistent with the original scale. Future research may be required to translate the French version into the Simplified Chinese version based on psychometric testing.

Conclusion

These studies validated a helpful instrument that can contribute to determining PC educational needs of nurses and evaluating the implementation effect of PC educational programs. Furthermore, it is the first self-competence scale for PC to be validated in Chinese. In further research, assessing nurses’ perceived self-competence in PC could be highly relevant for developing and designing educational programs to implement PC for all patients suffering life-limiting illnesses.

Abbreviations

PC: Palliative care; WHO: World Health Organization; PCNSC: Palliative Care Nursing Self-competence Scale; PCNSC-SC: Simplified Chinese version of the PCNSC; EFA: exploratory factor analysis; CFA: confirmatory factor analysis; S-CVI: Item-level Content Validity Index; IR: Interrater Agreement; S-CVI/Ave: the content validity at the average scale level; S-CVI/UA: the content validity index of universal agreement; I-CVI: the content validity index of each item; KMO: Kaiser-Meyer-Olkin; $\chi^2$/df: chi-square degree of freedom; RMSEA: root means square error of approximation; GFI: the goodness of fit index; AGFI: adjusted goodness of fit index; CFI: comparative fit index; TLI: Tucker-Lewis index; IFI: incremental fit index; NFI: normal fit index; CR: critical ratio

Declarations

Ethical approval and consent to participate

The study was approved by the Academic Ethics Committee of the School of Health, Wuhan University (No. 2021YF0014). Informed consent was obtained from all individual participants included in the study.

Consent for publication

Not applicable.

Availability of supporting data
The authors would like to declare that they have full control of all primary data and that we agree to allow the journal to review their data if requested.

**Competing interests**

The authors declare that they have no competing interests.

**Funding**

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**Authors' contributions**

All authors made substantial contributions to all of the following: (a) the conception and design of the study, acquisition of data, or analysis and interpretation of data, (b) drafting the article or revising it critically for important intellectual content, and (c) final approval of the version to be submitted.

Mei Feng and Fang Wang contributed equally and share the first authorship. Yu Sihong, Fen Hu and Dan Luo contributed equally and share the corresponding authorship. Mei Feng, Fang Wang, Qian Liu, Sihong Yu, and Dan Luo conceived of and designed the study. Qian Liu acquired funding. Mei Feng and Fang Wang collected the data. Mei Feng, Fang Wang, Qian Liu, Fen Hu, Jie Chen, Jie Hao, Bing Xiang Yang, and Yu Sihong analyzed and interpreted the data. Mei Feng and Dan Luo wrote the original draft of the manuscript. All authors contributed to reviewing and editing the manuscript.

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**Authors' information**

Not applicable.

**References**


**Table 1,3**

Table 1,3 are available in the Supplementary Files section.

**Figures**
Figure 1

Measurements of the eight-factor model in the second study (n=373)

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.
• Table13.docx
• Supplementaryfile.docx